Current Clinical Strategies

Pediatric History and Physical Examination

Fourth Edition

Elizabeth K. Albright, MD

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# Contents

**Medical Documentation** ................................................................. 5  
Pediatric History ................................................................. 5  
Pediatric Physical Examination ........................................... 6  
Physical Examination of the Newborn ....................................... 7  
Progress Notes ................................................................. 8  
Discharge Note ................................................................. 8  
Discharge Summary ............................................................. 9  
Prescription Writing ............................................................. 9  
Procedure Note ................................................................. 10  
Developmental Milestones .................................................... 10  

**Cardiovascular Disorders** ...................................................... 13  
Chest Pain ........................................................................ 13  
Dyspnea and Congestive Heart Failure .................................. 14  
Hypertension .................................................................. 15  

**Pulmonary Disorders** ............................................................ 17  
Wheezing and Asthma .......................................................... 17  
Stridor and Oropharyngeal Obstruction .................................. 18  
Hoarseness .................................................................. 20  

**Infectious Diseases** ................................................................. 23  
Fever ........................................................................... 23  
Cough and Pneumonia .......................................................... 25  
Tuberculosis .................................................................. 27  
Otitis Media .................................................................. 27  
Pharyngitis .................................................................. 28  
Peritonsillar, Retropharyngeal or Parapharyngeal Abscess ....... 30  
Epiglottitis .................................................................. 30  
Croup (Viral Laryngotracheobronchitis) ................................ 31  
Bronchiolitis ................................................................ 31  
Meningitis ..................................................................... 32  
Urinary Tract Infection .......................................................... 33  
Lymphadenopathy and Lymphadenitis .................................. 34  
Cellulitis ...................................................................... 37  
 Infective Endocarditis ........................................................... 38  
Septic Arthritis ................................................................ 39  
Osteomyelitis .................................................................. 39  

**Gastrointestinal Disorders** ....................................................... 41  
Acute Abdominal Pain and the Acute Abdomen ....................... 41  
Recurrent Abdominal Pain ...................................................... 42  
Persistent Vomiting .............................................................. 44  
Jaundice and Hepatitis .......................................................... 48  
Hepatosplenomegaly ............................................................. 52  
Acute Diarrhea ................................................................ 54  
Chronic Diarrhea ............................................................... 54  
Constipation .................................................................. 57
Hematemesis and Upper Gastrointestinal Bleeding ............... 58
Melena and Lower Gastrointestinal Bleeding ..................... 60

Gynecologic Disorders ............................................. 63
Amenorrhea .................................................................. 63
Abnormal Vaginal Bleeding .......................................... 64
Pelvic Pain and Ectopic Pregnancy ................................. 65

Neurologic Disorders .................................................. 67
Headache ..................................................................... 67
Seizures, Spells and Unusual Movements ......................... 68
Apnea ......................................................................... 69
Delirium, Coma and Confusion ..................................... 71

Renal and Endocrinologic Disorders ............................... 73
Polyuria, Enuresis and Urinary Frequency ....................... 73
Hematuria ................................................................. 74
Proteinuria ............................................................... 75
Swelling and Edema .................................................... 77
Diabetic Ketoacidosis .................................................. 78

Dermatologic, Hematologic and Rheumatologic Disorders .... 81
Rash ......................................................................... 81
Bruising and Bleeding .................................................. 82
Kawasaki Disease ........................................................ 83

Behavioral Disorders and Trauma .................................... 85
Failure to Thrive .......................................................... 85
Developmental Delay ..................................................... 87
Psychiatric History ....................................................... 90
Attempted Suicide and Drug Overdose ......................... 91
Toxicological Emergencies .......................................... 92
Trauma ........................................................................ 94

Commonly Used Abbreviations ..................................... 95

Index ........................................................................... 99
Medical Documentation

Pediatric History

Identifying Data: Patient's name, age, sex; significant medical conditions, informant (parent).
Chief Compliant (CC): Reason that the child is seeking medical care and duration of the symptom.
History of Present Illness (HPI): Describe the course of the patient's illness, including when and how it began, character of the symptoms; aggravating or alleviating factors; pertinent positives and negatives, past diagnostic testing.
Past Medical History (PMH): Medical problems, hospitalizations, operations; asthma, diabetes.
Perinatal History: Gestational age at birth, obstetrical complications, type of delivery, birth weight, Apgar scores, complications (eg, infection, jaundice), length of hospital stay.
Medications: Names and dosages.
Nutrition: Type of diet, amount taken each feed, change in feeding habits.
Developmental History: Age at attainment of important milestones (walking, talking, self-care). Relationships with siblings, peers, adults. School grade and performance, behavioral problems.
Immunizations: Up-to-date?
Allergies: Penicillin, codeine?
Family History: Medical problems in family, including the patient's disorder; diabetes, seizures, asthma, allergies, cancer, cardiac, renal or GI disease, tuberculosis, smoking.
Social History: Family situation, alcohol, smoking, drugs, sexual activity. Parental level of education. Safety: Child car seats, smoke detectors, bicycle helmets.
Review of Systems (ROS)
  General: Overall health, weight loss, behavioral changes, fever, fatigue.
  Skin: Rashes, moles, bruising, lumps/bumps, nail/hair changes.
  Eyes: Visual problems, eye pain.
  Ear, nose, throat: Frequency of colds, pharyngitis, otitis media.
  Lungs: Cough, shortness of breath, wheezing.
  Cardiovascular: Chest pain, murmurs, syncope.
  Gastrointestinal: Nausea/vomiting, spitting up, diarrhea, recurrent abdominal pain, constipation, blood in stools.
  Genitourinary: Dysuria, hematuria, polyuria, vaginal discharge, STDs.
  Musculoskeletal: Weakness, joint pain, gait abnormalities, scoliosis.
  Neurological: Headache, seizures.
  Endocrine: Growth delay, polyphagia, excessive thirst/fluid intake, menses duration, amount of flow.
6 History and Physical Examination

Pediatric Physical Examination

**Observation:** Child's facial expression (pain), response to social overtures. Interaction with caretakers and examiner. Body position (leaning forward in sitting position; epiglottitis, pericarditis). Weak cry (serious illness), high-pitched cry (increased intracranial pressure, metabolic disorder); moaning (serious illness, meningitis), grunting (respiratory distress).

Does the child appear to be:
- (1) Well, acutely ill/toxic, chronically ill, wasted, or malnourished?
- (2) Alert and active or lethargic/fatigued?
- (3) Well hydrated or dehydrated?
- (4) Unusual body odors?

**Vital Signs:** Respiratory rate, blood pressure, pulse, temperature.

**Measurements:** Height, weight; head circumference in children ≤ 2 years; plot on growth charts and determine growth percentiles.

**Skin:** Cyanosis, jaundice, pallor, rashes, skin turgor, edema, hemangiomas, café au lait spots, nevi, Mongolian spots, hair distribution, capillary refill (in seconds).

**Lymph Nodes:** Location, size, tenderness, mobility and consistency of cervical, axillary, supraclavicular, and inguinal nodes.

**Head:** Size, shape, asymmetry, cephalohematoma, bossing, molding, bruits, fontanelles (size, tension), dilated veins, facial asymmetry.

**Eyes:** Pupils equal round and reactive to light and accommodation (PERRLA); extraocular movements intact (EOMI); Brushfield's spots; epicanthic folds, discharge, conjunctiva; red reflex, corneal opacities, cataracts, fundi; strabismus (eye deviation), visual acuity.

**Ears:** Pinnae (position, size), tympanic membranes (landmarks, mobility, erythema, dull, shiny, bulging), hearing.

**Nose:** Shape, discharge, bleeding, mucosa, patency.

**Mouth:** Lips (thinness, downturning, fissures, cleft lip), teeth, mucus membrane color and moisture (enanthem, Epstein's pearls), tongue, cleft palate.

**Throat:** Tonsils (erythema, exudate), postnasal drip, hoarseness, stridor.

**Neck:** Torticollis, lymphadenopathy, thyroid nodules, position of trachea.

**Thorax:** Shape, symmetry, intercostal or substernal retractions.

**Breasts:** Turner stage, size, shape, symmetry, masses, nipple discharge, gynecomastia.

**Lungs:** Breathing rate, depth, expansion, prolongation of expiration, fremitus, dullness to percussion, breath sounds, crackles, wheezing, rhonchi.

**Heart:** Location of apical impulse. Regular rate and rhythm (RRR), first and second heart sounds (S1, S2); gallops (S3, S4), murmurs (location, position in cycle, intensity grade 1-6, pitch, effect of change of position, transmission). Comparison of brachial and femoral pulses.

**Abdomen:** Contour, visible peristalsis, respiratory movements, dilated veins, umbilicus, bowel sounds, bruits, hernia. Rebound tenderness, tympany; hepatomegaly, splenomegaly, masses.

**Genitalia:**
- **Male Genitalia:** Circumcision, hypospadias, phimosis, size of testes, cryptorchidism, hydrocele, hemia, inguinal masses.
- **Female Genitalia:** Imperforate hymen, discharge, labial adhesions, clitoral hypertrophy, pubertal changes.

**Rectum and Anus:** Erythema, excoriation, fissures, prolapse, imperforate anus. Anal tone, masses, tenderness, anal reflex.
Physical Examination of the Newborn

**Extremities:** Bow legs (infancy), knock knees (age 2 to 3 years). Edema (grade 1-4+), cyanosis, clubbing. Joint range of motion, swelling, redness, tenderness. A "click" felt on rotation of hips indicates developmental hip dislocation (Barlow maneuver). Extra digits, simian lines, pitting of nails, flat feet.

**Spine and Back:** Scoliosis, rigidity, pilonidal dimple, pilonidal cyst, sacral hair tufts; tenderness over spine or costovertebral tenderness.

**Neurological Examination:**
- **Behavior:** Level of consciousness, intelligence, emotional status.
- **Motor system:** Gait, muscle tone, strength (graded 0 to 5).
- **Reflexes**
  - **Deep Tendon Reflexes:** Biceps, brachioradialis, triceps, patellar, and Achilles reflexes (graded 1-4).
  - **Superficial Reflexes:** Abdominal, cremasteric, plantar reflexes
- **Neonatal Reflexes:** Babinski, Landau, Moro, rooting, suck, grasp, tonic neck reflexes.

**Developmental Assessment:** Delayed abilities for age on developmental screening test.

**Laboratory Evaluation:** Electrolytes (sodium, potassium, bicarbonate, chloride, BUN, creatinine), CBC (hemoglobin, hematocrit, WBC count, platelets, differential); X-rays, urinalysis (UA).

**Assessment:** Assign a number to each problem, and discuss each problem separately. Discuss the differential diagnosis, and give reasons that support the working diagnosis. Give reasons for excluding other diagnoses.

**Plan:** Describe therapeutic plan for each numbered problem, including testing, laboratory studies, medications, antibiotics, and consultations.

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**Physical Examination of the Newborn**

**General Appearance:** Overall visual and auditory appraisal of the completely undressed infant. Weak cry (serious illness), high-pitched cry (increased intracranial pressure, metabolic disorders), grunting (respiratory distress). Unusual body odors.

**Vital Signs:** Respiratory rate (normal 40-60 breaths/min), heart rate (120-160 beats/minute), temperature.

**Head:** Lacerations, caput, cephalohematoma, skull molding. Fontanelles (size, tension), head circumference.

**Neck:** Flexibility and asymmetry.

**Eyes:** Scleral hemorrhages, cataracts, red reflex, pupil size.

**Mouth:** Palpate for cleft lip and cleft palate.

**Respiratory:** Acrocyanosis, retractions, nasal flaring, grunting. Palpation of clavicles for fractures.

**Heart:** Position of point of maximal impulse, rhythm, murmurs. Distant heart sounds (pneumothorax). Comparison of brachial and femoral pulses.

**Abdomen:** Asymmetry, masses, fullness, umbilicus, hernias. Liver span (may extend 2.5 cm below the right costal margin), spleen span, nephromegaly.

**Male Genitalia:** Hypospadias, phimosis, hernia, presence of both testes. Anal patency

**Female Genitalia:** Interlabial masses, mucoid vaginal discharge or blood streaked discharge (normal). Anal patency

**Skin:** Pink, cyanotic, pale. Jaundice (abnormal in the first day of life), milia (yellow papules), Mongolian spots (bluish patches).
8 Progress Notes

**Extremities:** Extra digits, simian lines, pilonidal dimple or cyst, sacral hair tuft, hip dislocation; a "click" felt on rotation of hips (Barlow maneuver, developmental hip dislocation).

**Neurologic Examination:** Tone, activity, symmetry of extremity movement, symmetry of facial movements, alertness, consolability, Moro reflex, suck reflex, root reflex, grasp reflex, plantar reflex.

**Progress Notes**

Daily progress notes should summarize developments in the patient's hospital course, problems that remain active, plans to treat those problems, and arrangements for discharge. Progress notes should address every problem on the problem list.

### Example Progress Note

<table>
<thead>
<tr>
<th>Date/time:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subjective:</strong> Any problems and symptoms should be charted. Appetite, pain or fussiness may be included.</td>
</tr>
<tr>
<td><strong>Objective:</strong> General appearance. Vitals, temperature, maximum temperature over past 24 hours, pulse, respiratory rate, blood pressure. Feedings, fluid I/O (inputs and outputs), daily weights. Physical exam, including chest and abdomen, with particular attention to active problems. Emphasize changes from previous physical exams.</td>
</tr>
<tr>
<td><strong>Laboratory Evaluation:</strong> New test results. Circle abnormal values.</td>
</tr>
<tr>
<td><strong>Current medications:</strong> List medications and dosages.</td>
</tr>
<tr>
<td><strong>Assessment and Plan:</strong> This section should be organized by problem. A separate assessment and plan should be written for each problem.</td>
</tr>
</tbody>
</table>

**Discharge Note**

The discharge note should be written prior to discharge.

<table>
<thead>
<tr>
<th>Date/time:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnoses:</strong></td>
</tr>
<tr>
<td><strong>Treatment:</strong> Briefly describe therapy provided during hospitalization, including antibiotics, surgery, and cardiovascular drugs.</td>
</tr>
<tr>
<td><strong>Studies Performed:</strong> Electrocardiograms, CT scan.</td>
</tr>
<tr>
<td><strong>Discharge medications:</strong></td>
</tr>
<tr>
<td><strong>Follow-up Arrangements:</strong></td>
</tr>
</tbody>
</table>
Discharge Summary

Patient's Name and Medical Record Number:
Date of Admission:
Date of Discharge:
Admitting Diagnosis:
Discharge Diagnosis:
Attending or Ward Team Responsible for Patient:
Surgical Procedures, Diagnostic Tests, Invasive Procedures:
History, Physical Examination and Laboratory Data: Describe the course of the patient's disease up until the time that the patient came to the hospital, including pertinent physical exam and laboratory data.
Hospital Course: Describe the course of the patient's illness while in the hospital, including evaluation, treatment, medications, and outcome of treatment.
Discharged Condition: Describe improvement or deterioration in the patient's condition, and describe the present status of the patient.
Disposition: Note the situation to which the patient will be discharged (home), and indicate who will take care of the patient.
Discharge Medications: List medications and instructions for patient on taking the medications.
Discharge Instructions and Follow-up Care: Date of return for follow-up care at clinic; diet.
Problem List: List all active and past problems.
Copies: Send copies to attending, clinic, consultants.

Prescription Writing

• Patient’s name:
• Date:
• Drug name and preparation (eg, tablets size): Lasix 40 mg
• Quantity to dispense: #40
• Frequency of administration: Sig: 1 po qAM
• Refills: None
• Signature
Procedure Note

A procedure note should be written in the chart after a procedure is performed. Procedure notes are brief operative notes.

**Procedure Note**

Date and time:

Procedure:

Indications:

Patient Consent: Document that the indications, risks and alternatives to the procedure were explained to the parents and patient. Note that the parents and patient were given the opportunity to ask questions and that the parents consented to the procedure in writing.

Lab tests: Relevant labs, such as the CBC and electrolytes.

Anesthesia: Local with 2% lidocaine.

Description of Procedure: Briefly describe the procedure, including sterile prep, anesthesia method, patient position, devices used, anatomic location of procedure, and outcome.

Complications and Estimated Blood Loss (EBL):

Disposition: Describe how the patient tolerated the procedure.

Specimens: Describe any specimens obtained and lab tests that were ordered.

Developmental Milestones

<table>
<thead>
<tr>
<th>Age</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>Raises head slightly when prone; alerts to sound; regards face, moves extremities equally.</td>
</tr>
<tr>
<td>2-3 months</td>
<td>Smiles, holds head up, coos, reaches for familiar objects, recognizes parent.</td>
</tr>
<tr>
<td>4-5 months</td>
<td>Rolls front to back and back to front; sits well when propped; laughs, orients to voice; enjoys looking around; grasps rattle, bears some weight on legs.</td>
</tr>
<tr>
<td>6 months</td>
<td>Sits unsupported; passes cube hand to hand; babbles; uses raking grasp; feeds self crackers.</td>
</tr>
<tr>
<td>8-9 months</td>
<td>Crawls, cruises; pulls to stand; pincer grasp; plays pat-a-cake; feeds self with bottle; sits without support; explores environment.</td>
</tr>
<tr>
<td>12 months</td>
<td>Walking, talking a few words; understands no; says mama/dada discriminantly; throws objects; imitates actions, marks with crayon, drinks from a cup.</td>
</tr>
<tr>
<td>Age</td>
<td>Milestones</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>15-18 months</td>
<td>Comes when called; scribbles; walks backward; uses 4-20 words; builds tower of 2 blocks.</td>
</tr>
<tr>
<td>24-30 months</td>
<td>Removes shoes; follows 2 step command; jumps with both feet; holds pencil, knows first and last name; knows pronouns. Parallel play; points to body parts, runs, spoon feeds self, copies parents.</td>
</tr>
<tr>
<td>3 years</td>
<td>Dresses and undresses; walks up and down steps; draws a circle; knows more than 250 words; takes turns; shares. Group play.</td>
</tr>
<tr>
<td>4 years</td>
<td>Hops, skips, catches ball; memorizes songs; plays cooperatively; knows colors; uses plurals.</td>
</tr>
<tr>
<td>5 years</td>
<td>Jumps over objects; prints first name; knows address and mother's name; follows game rules; draws three part man; hops on one foot.</td>
</tr>
</tbody>
</table>
12 Developmental Milestones
Cardiovascular Disorders

Chest Pain

Chief Complaint: Chest pain.

History of Present Illness: Duration of chest pain, location, character (squeezing, sharp, dull). Progression of pain, frequency, aggravating and relieving factors (inspiration, exertion, eating). Weight loss, fever, cough, dyspnea, vomiting, heartburn, abdominal pain. School function and attendance. Relationship of pain to activity (at rest, during sleep, during exercise). Does the pain interfere with the patient’s daily activities? Have favorite sports or other activities continued?

Cardiac Testing: Results of prior evaluations, ECGs, echocardiograms.

Past Medical History: Exercise tolerance, diabetes, asthma, trauma.

Medications: Aspirin.

Family History: Heart disease, myocardial infarction, angina.

Social History: Significant life events, stresses, recent losses or separations. Elicit drugs, smoking.

### Historical Findings for Chest Pain

<table>
<thead>
<tr>
<th>Acute pain?</th>
<th>Abdominal pain, limb pain, headaches?</th>
</tr>
</thead>
<tbody>
<tr>
<td>First time?</td>
<td>Light-headedness, tetany, cramps, dizziness?</td>
</tr>
<tr>
<td>Systemic symptoms?</td>
<td>Dermatomal distribution?</td>
</tr>
<tr>
<td>Duration of complaints?</td>
<td>Aggravated by rising from supine position?</td>
</tr>
<tr>
<td>Exertional?</td>
<td>Poor school attendance?</td>
</tr>
<tr>
<td>Syncope? Palpitations?</td>
<td>Stressful life events?</td>
</tr>
<tr>
<td>Cough?</td>
<td></td>
</tr>
<tr>
<td>Localized?</td>
<td></td>
</tr>
<tr>
<td>Reproducible? How?</td>
<td></td>
</tr>
<tr>
<td>Associated symptoms?</td>
<td></td>
</tr>
</tbody>
</table>

Physical Examination

General: Visible pain, apprehension, distress. Note whether the patient looks “ill” or well. Positions that accentuate or relieve the pain.

Vital Signs: Pulse (tachycardia), BP, respirations (tachypnea), temperature. Growth chart and percentiles.

Skin: Cold extremities, pallor.


Heart: First and second heart sounds; third heart sound (S3), S4 gallop (more audible in the left lateral position), murmur.

Abdomen: Bowel sounds, tenderness, masses, hepatomegaly, splenomegaly.

Back: Vertebral column deformities, tenderness.

Extremities: Unequal or diminished pulses (aortic coarctation).

Laboratory Evaluation: Electrolyte, CBC, chest X-ray.
Dyspnea and Congestive Heart Failure

Differential Diagnosis of Chest Pain

<table>
<thead>
<tr>
<th>Musculoskeletal Disorders</th>
<th>Cardiovascular Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costochondritis</td>
<td>Pericarditis</td>
</tr>
<tr>
<td>Chest wall syndrome</td>
<td>Left ventricular outflow</td>
</tr>
<tr>
<td>Tietze syndrome</td>
<td>obstruction, aortic murmur</td>
</tr>
<tr>
<td>Xiphoid cartilage syndrome</td>
<td>Dysrhythmias</td>
</tr>
<tr>
<td>Stitch</td>
<td>Pulmonary Disorders: Pneumonia, pneumonia, asthma</td>
</tr>
<tr>
<td>Precordial catch syndrome</td>
<td>Gastrointestinal Disorders: Esophagitis, gastroesophageal reflux, peptic ulcer disease</td>
</tr>
<tr>
<td>Slipping rib syndrome</td>
<td>Vertebral/Radicular Disorders: Spinal stenosis</td>
</tr>
<tr>
<td><strong>Idiopathic Disorders:</strong> Psychogenic, hyperventilation</td>
<td></td>
</tr>
<tr>
<td><strong>Breast Disorders:</strong> Gynecomastia, fibrocystic changes</td>
<td></td>
</tr>
</tbody>
</table>

Dyspnea and Congestive Heart Failure

**Chief Complaint:** Shortness of breath.

**History of Present Illness:** Rate of onset of dyspnea (gradual, sudden), dyspnea on exertion, chest pain. Past episodes, aggravating or relieving factors, cough, fever, drug allergies. Difficulty keeping up with peers during play. Feeding difficulty, tachypnea or diaphoresis with feedings, diminished volume of feeding, prolonged feeding time. Poor weight gain.

**Past Medical History:** Hypertension, asthma, diabetes.

**Medications:** Bronchodilators, digoxin, furosemide.

**Past Treatment or Testing:** Cardiac testing, x-rays, ECGs.

**Physical Examination**

**General Appearance:** Respiratory distress, dyspnea, pallor. Note whether the patient looks “ill” or well.

**Vital Signs:** BP (supine and upright), pulse (tachycardia), temperature, respiratory rate (tachypnea), growth percentiles, growth deficiency.

**HEENT:** Jugular venous distention.

**Chest:** Intercostal retractions, dullness to percussion, stridor, wheezing, crackles, rhonchi.

**Heart:** Lateral displacement of point of maximal impulse, hyperdynamic precordium; irregular, rhythm; S3 gallop, S4, murmur.

**Abdomen:** Hepatomegaly, liver tenderness, splenomegaly.

**Extremities:** Cool extremities, edema, pulses, cyanosis, clubbing.

**Laboratory Evaluation:** O₂ saturation, chest x-ray (cardiomegaly, effusions, pulmonary edema).

**Differential Diagnosis:** Heart failure, foreign body aspiration, pneumonia, asthma, pneumothorax, hyperventilation.
Hypertension

Chief Complaint: High blood pressure.

History of Present Illness: Current blood pressure, age of onset of hypertension. Headaches, vomiting (increased intracranial pressure), dysuria, nocturia, enuresis, abdominal pain (renal disease). Growth delay, weight loss, fevers, diaphoresis, flushing, palpitations (pheochromocytoma).

Perinatal History: Neonatal course, umbilical artery/vein catheterization (renal artery stenosis).

Past Medical History: Lead exposure; increased appetite, hyperactivity, tremors, heat intolerance (hyperthyroidism).

Medications Associated with Hypertension: Oral contraceptives, corticosteroids, cocaine, amphetamines, nonsteroidal antiinflammatory drugs.

Family History: Hypertension, preeclampsia, renal disease, pheochromocytoma.

Social History: Tobacco, alcohol.

Physical Examination

General Appearance: Confusion, agitation (hypertensive encephalopathy).

Vital Signs: Tachycardia (hyperthyroidism), fever (connective tissue disorder). BP in all extremities, pulse, asymmetric, respiratory rate.

Skin: Pallor (renal disease), café au lait spots, hypopigmented lesions (Von Recklinghausen's disease, tuberous sclerosis), lymphedema (Turner's syndrome), rashes (connective tissue disease), striae, hirsutism (Cushing's syndrome), plethora (pheochromocytoma).

HEENT: Papilledema, thyromegaly (hyperthyroidism), moon faces (Cushing's syndrome); webbing of the neck (Turner's syndrome, aortic coarctation).

Chest: Crackles (pulmonary edema), wheeze, intercostal bruits (aortic coarctation); buffalo hump (Cushing's syndrome).

Heart: Delayed radial to femoral pulses (aortic coarctation). Laterally displaced apical impulse (ventricular hypertrophy), murmur.

Abdomen: Bruit below costal margin (renal artery stenosis); Masses (pheochromocytoma, neuroblastoma, Wilms' tumor), pulsating aortic mass (aortic aneurysm), enlarged kidney (polycystic kidney disease, hydronephrosis); costovertebral angle tenderness; truncal obesity (Cushing's syndrome).

Extremities: Edema (renal disease), joint swelling, joint tenderness (connective tissue disease). Tremor (hyperthyroidism, pheochromocytoma), femoral bruits.

Neurologic: Rapid return phase of deep tendon reflexes (hyperthyroidism).

Laboratory Evaluation: Potassium, BUN, creatinine, glucose, uric acid, CBC.

UA with microscopic analysis (RBC casts, hematuria, proteinuria). 24 hour urine for metanephrine; plasma catecholamines (pheochromocytoma), lipid profile. Echocardiogram, ECG, renal ultrasound.

Chest X-ray: Cardiomegaly, indentation of aorta (coarctation), rib notching.
<table>
<thead>
<tr>
<th>Differential Diagnosis of Hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Renal</strong></td>
</tr>
<tr>
<td>Chronic pyelonephritis</td>
</tr>
<tr>
<td>Chronic glomerulonephritis</td>
</tr>
<tr>
<td>Hydronephrosis</td>
</tr>
<tr>
<td>Congenital dysplastic kidney</td>
</tr>
<tr>
<td>Multicystic kidney</td>
</tr>
<tr>
<td>Solitary renal cyst</td>
</tr>
<tr>
<td>Vesicoureteral reflux nephropathy</td>
</tr>
<tr>
<td><strong>Vascular</strong></td>
</tr>
<tr>
<td>Coarctation of the aorta</td>
</tr>
<tr>
<td>Renal artery lesions</td>
</tr>
<tr>
<td>Umbilical artery catheterization with</td>
</tr>
<tr>
<td>thombus formation</td>
</tr>
<tr>
<td><strong>Endocrine</strong></td>
</tr>
<tr>
<td>Hyperthyroidism</td>
</tr>
<tr>
<td>Hyperparathyroidism</td>
</tr>
<tr>
<td>Congenital adrenal hyperplasia</td>
</tr>
<tr>
<td>Cushing syndrome</td>
</tr>
<tr>
<td>Hyperaldosteronism</td>
</tr>
<tr>
<td><strong>Central Nervous System</strong></td>
</tr>
<tr>
<td>Intracranial mass</td>
</tr>
<tr>
<td>Hemorrhage</td>
</tr>
<tr>
<td><strong>Essential Hypertension</strong></td>
</tr>
<tr>
<td>Low renin</td>
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<tr>
<td>Normal renin</td>
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</tbody>
</table>
Pulmonary Disorders

Wheezing and Asthma

Chief Complaint: Wheezing.
History of Present Illness: Onset, duration and progression of wheezing; current and baseline peak flow rate; severity of attack compared to previous episodes; fever, frequency of hospitalizations; home nebulizer use; cough.
Aggravating factors: Exercise, cold air, viral or respiratory infections, exposure to dust mites, animal dander. Seasons that provoke symptoms; foreign body aspiration.
Past Medical History: Previous episodes, pneumonia, recurrent croup, allergic rhinitis, food allergies. Baseline arterial blood gas results; pulmonary function testing.
Perinatal History: Prematurity (bronchopulmonary dysplasia).
Family History: Asthma, allergies, hay fever, atopic dermatitis.

Physical Examination
General Appearance: Respiratory distress, anxiety, pallor. Note whether the patient looks well, ill, or somnolent.
Vital Signs: Peak expiratory flow rate (PEFR). Temperature, respiratory rate (tachypnea), depth of respirations, pulse (tachycardia), BP (widened pulse pressure), pulsus paradoxus (>15 mmHg is significant pulmonary compromise).
Skin: Flexural eczema, urticaria.
Nose: Nasal flaring, chronic rhinitis, nasal polyps.
Mouth: Pharyngeal erythema, perioral cyanosis, grunting.
Chest: Sternocleidomastoid muscle contractions, intracostal retractions, supraclavicular retractions, barrel chest. Expiratory wheeze, rhonchi, decreased breath sounds, prolonged expiratory phase.
Heart: Distant heart sounds, third heart sound (S3); increased intensity of pulmonic component of second heart sound (pulmonary hypertension).
Abdomen: Retractions, paradoxical abdominal wall motion (abdomen rises on inspiration), tenderness.
Extremities: Cyanosis, clubbing, edema.
Laboratory Evaluation: CBC, electrolytes. Pulmonary function tests, urinalysis.
ABG: Respiratory alkalosis, hypoxia.
Chest X-ray: Hyperinflation, flattening of diaphragms; small, elongated heart.
18 Stridor and Oropharyngeal Obstruction

**Differential Diagnosis of Wheezing**

<table>
<thead>
<tr>
<th>Infant</th>
<th>Older Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular ring</td>
<td>Asthma</td>
</tr>
<tr>
<td>Tracheoesophageal fistula</td>
<td>Aspiration (reflux, foreign body)</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
<td>Epiglottitis</td>
</tr>
<tr>
<td>Asthma</td>
<td>Laryngotracheobronchitis (croup)</td>
</tr>
<tr>
<td>Viral infection (bronchiolitis, upper respiratory tract infection)</td>
<td>Cystic fibrosis</td>
</tr>
<tr>
<td>Pertussis</td>
<td>Hypersensitivity pneumonitis</td>
</tr>
<tr>
<td>Cystic fibrosis</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>Bronchopulmonary dysplasia</td>
<td>Tumor</td>
</tr>
<tr>
<td>Congenital heart disease</td>
<td>Alpha-1-antitrypsin deficiency</td>
</tr>
<tr>
<td></td>
<td>Vocal cord dysfunction</td>
</tr>
</tbody>
</table>

**Stridor and Oropharyngeal Obstruction**

**Chief Complaint:** Difficulty breathing.

**History of Present Illness:** Time of onset of stridor, respiratory distress. Fever, sore throat, headache, malaise. Voice changes (muffled voice), drooling. Hoarseness, exposure to infections. Trauma or previous surgery. Increased stridor with stress; worsening in the supine position; improvement with the neck extended (congenital laryngomalacia). Cough, cyanosis, regurgitation, choking with feedings, drooling, foreign body. History of intubation (subglottic stenosis), hemangiomas.

**Perinatal History:** Abnormal position in utero, forceps delivery, shoulder dystocia. Respiratory distress or stridor at birth.

**Oropharyngeal Obstruction**

| Fever, sore throat, headache                                           | Gradual onset                                    |
| Muffled voice                                                        | Acute onset, fever                               |
| Craniofacial anomalies                                               | Worsens in supine position                       |
| Cutaneous abnormalities                                              | Perinatal trauma                                  |
| Neurologic symptoms                                                  | Method of delivery                                |
|                                                                      | Present at birth                                  |
|                                                                      | Feeding difficulties                              |
|                                                                      | Previous intubation                               |

**Stridor**

<p>| |</p>
<table>
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<tbody>
<tr>
<td>Gradual onset</td>
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<tr>
<td>Acute onset, fever</td>
</tr>
<tr>
<td>Worsens in supine position</td>
</tr>
<tr>
<td>Perinatal trauma</td>
</tr>
<tr>
<td>Method of delivery</td>
</tr>
<tr>
<td>Present at birth</td>
</tr>
<tr>
<td>Feeding difficulties</td>
</tr>
<tr>
<td>Previous intubation</td>
</tr>
</tbody>
</table>

**Physical Examination**

**General Appearance:** Adequacy of oxygenation and ventilation, airway stability. Anxiety, restlessness, fatigue, obtundation. Grunting respirations, muffled voice, hoarseness, stridor.


**Head:** Congenital anomalies.
**Skin:** Perioral cyanosis, nail cyanosis, clubbing.

**Nose:** Nasal flaring.

**Mouth:** Bifid uvula, cleft palate. Symmetrical palate movement. Brisk gag reflex, tonsil symmetry. Tongue symmetry, movement in all directions, masses.

**Neck:** Masses, external fistulas, mid-line trachea.

**Heart:** Murmurs, abnormal pulses, asymmetric blood pressures.

**Chest:** Wall movement and symmetry, retractions, chest diameter, accessory muscle use (severe obstruction), hyperresonance, wheezes.

**Abdomen:** Retractions, paradoxical abdominal wall motion (abdomen rises on inspiration), tenderness.

**Extremities:** Cyanosis, clubbing, edema.

<table>
<thead>
<tr>
<th>Anxiety, fatigue, lethargy</th>
<th>Increased anteroposterior chest diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanosis</td>
<td>Accessory muscle use</td>
</tr>
<tr>
<td>Tachypnea</td>
<td>Mouth-breathing</td>
</tr>
<tr>
<td>Hyperpnea</td>
<td>Grunting, nasal flaring</td>
</tr>
<tr>
<td>Shallow breaths</td>
<td>Muffled voice</td>
</tr>
<tr>
<td>Pulse oximeter &lt;95 %</td>
<td>Hyponasal speech</td>
</tr>
<tr>
<td>Poor growth</td>
<td>Hypernasal speech</td>
</tr>
<tr>
<td>Clubbing</td>
<td>Low-pitched, fluttering sound</td>
</tr>
<tr>
<td>Heart murmur</td>
<td>Aphonia</td>
</tr>
<tr>
<td>Congenital head and neck anomalies</td>
<td>Quiet, moist stridor</td>
</tr>
<tr>
<td>Bifid uvula</td>
<td>Stridor</td>
</tr>
<tr>
<td>Enlarged tonsil(s)</td>
<td>Asymmetric wheezes</td>
</tr>
<tr>
<td>Neck mass</td>
<td>Neck extended</td>
</tr>
<tr>
<td>Asymmetric chest expansion</td>
<td>Opisthotonic posture</td>
</tr>
<tr>
<td>Retractions</td>
<td>Torticollis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differential Diagnosis of Oropharyngeal Obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micronathia</td>
</tr>
<tr>
<td>Pierre Robin syndrome</td>
</tr>
<tr>
<td>Treacher Collins syndrome</td>
</tr>
<tr>
<td>Macroglossia</td>
</tr>
<tr>
<td>Down syndrome</td>
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<tr>
<td>Beckwith-Wiedemann syndrome</td>
</tr>
<tr>
<td>Lymphangioma</td>
</tr>
<tr>
<td>Hemangiomia</td>
</tr>
<tr>
<td>Lingual thyroid</td>
</tr>
<tr>
<td>Tonsillitis/hypertrophy: Bacterial, viral</td>
</tr>
<tr>
<td>Uvulitis</td>
</tr>
<tr>
<td>Peritonsillar abscess</td>
</tr>
<tr>
<td>Retropharyngeal abscess</td>
</tr>
<tr>
<td>Parapharyngeal abscess</td>
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<tr>
<td>Hemangiomia</td>
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<tr>
<td>Lymphangioma</td>
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<tr>
<td>Ranula</td>
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<tr>
<td>Lymphoma</td>
</tr>
<tr>
<td>Lymphosarcoma</td>
</tr>
<tr>
<td>Rhabdomyosarcoma</td>
</tr>
<tr>
<td>Fibrosarcoma</td>
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<tr>
<td>Epidermoid carcinoma</td>
</tr>
<tr>
<td>Adenoidal hypertrophy</td>
</tr>
<tr>
<td>Palatal hypotonia</td>
</tr>
<tr>
<td>Obesity</td>
</tr>
</tbody>
</table>
20 Hoarseness

### Differential Diagnosis of Stridor

<table>
<thead>
<tr>
<th>Neonatal</th>
<th>Older Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laryngomalacia</td>
<td>Oropharyngeal infection (peritonsillar abscess, retropharyngeal abscess, tonsillitis)</td>
</tr>
<tr>
<td>Subglottic stenosis</td>
<td>Viral infections (croup)</td>
</tr>
<tr>
<td>Webs</td>
<td>Epiglottitis</td>
</tr>
<tr>
<td>Laryngeal cysts</td>
<td>Bacterial tracheitis</td>
</tr>
<tr>
<td>Tracheal stenosis</td>
<td>Aspirated/swallowed foreign body</td>
</tr>
<tr>
<td>Tracheomalacia</td>
<td>Tumor (hemangioma, lymphangioma)</td>
</tr>
<tr>
<td>Tracheal cartilage ring defect</td>
<td></td>
</tr>
<tr>
<td>Laryngeal/tracheal ring calcification</td>
<td></td>
</tr>
<tr>
<td>Vascular ring</td>
<td></td>
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<tr>
<td>Pulmonary sling</td>
<td></td>
</tr>
<tr>
<td>Innominate artery tracheal compression</td>
<td></td>
</tr>
<tr>
<td>Vocal cord paralysis (Arnold-Chiari malformation, Dandy-Walker cyst, recurrent laryngeal nerve injury)</td>
<td></td>
</tr>
<tr>
<td>Tumor</td>
<td></td>
</tr>
<tr>
<td>Trauma (intubation, thermal injury, corrosive, gastric secretions)</td>
<td></td>
</tr>
</tbody>
</table>

### Hoarseness

**Chief Complaint:** Hoarseness.

**History of Present Illness:** Age and time of onset, duration of symptoms, rate of onset, respiratory distress. Fever, hemangiomas, sore throat; prolonged loud crying or screaming (vocal chord polyps or nodules). Trauma or previous surgery; exposure to infections, exacerbating or relieving factors.

**Perinatal History:** Abnormal position in utero, shoulder dystocia, hyperextended neck during delivery (excessive neck traction). Respiratory distress or stridor at birth.

**Past Medical History:** Intubation (subglottic stenosis); prior episodes of croup, upper respiratory tract infections. Neurologic disorders (hydrocephalus, Arnold-Chiari malformation), trauma, previous surgery.

**Physical Examination**

**General Appearance:** Hoarseness, abnormal sounds/posture, muffled voice; hyponasal speech, hypernasal speech, quiet, moist stridor, inspiratory stridor, biphasic stridor; tachypnea.

**Vital Signs:** Respiratory rate (tachypnea), tachycardia, temperature. Delayed growth parameters.

**Mouth:** Tongue symmetry, movement in all directions, masses. Cleft lip, cleft palate, bifid uvula, enlarged tonsil(s). Mouth-breathing, grunting, nasal flaring;

**Neck:** Congenital anomalies; neck mass, masses or external fistulas, mid-line trachea.

**Cardiac:** Murmurs, asymmetric blood pressures.

**Chest:** Asymmetric chest expansion, retractions, increased anteroposterior chest diameter; accessory muscle use, abnormal vocal fremitus, wheezes, asymmetric wheezes; upright posture, neck extended, opisthotonic posture, torticollis.

**Extremities:** Cyanosis, clubbing.
<table>
<thead>
<tr>
<th>Neonatal</th>
<th>Older Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laryngomalacia</td>
<td>Postnasal drip</td>
</tr>
<tr>
<td>Webs</td>
<td>Epiglottitis</td>
</tr>
<tr>
<td>Subglottic stenosis</td>
<td>Recurrent voice abuse (cord polyps, nodules)</td>
</tr>
<tr>
<td>Cystic lesions</td>
<td>Sicca syndromes</td>
</tr>
<tr>
<td>Excessive secretions</td>
<td>Neoplasia (papilloma, hemangioma)</td>
</tr>
<tr>
<td>(fistulas,</td>
<td>Trauma (postsurgical, intubation)</td>
</tr>
<tr>
<td>gastroesophageal reflux)</td>
<td>Gaucher disease,</td>
</tr>
<tr>
<td>Vascular tumors</td>
<td>mucopolysaccharidosis</td>
</tr>
<tr>
<td>(hemangioma,</td>
<td>Williams syndrome, Cornelia de</td>
</tr>
<tr>
<td>lymphangioma)</td>
<td>Lange syndrome</td>
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<tr>
<td>Cri du chat syndrome</td>
<td>Conversion reaction</td>
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<tr>
<td>Vocal cord paralysis</td>
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<tr>
<td>Vocal cord trauma</td>
<td></td>
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<tr>
<td>Hypothyroidism,</td>
<td></td>
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<tr>
<td>hypocalcemia,</td>
<td></td>
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<tr>
<td>Farber disease</td>
<td></td>
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<tr>
<td>Viral infection</td>
<td></td>
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<tr>
<td>(laryngitis, croup)</td>
<td></td>
</tr>
</tbody>
</table>
22 Hoarseness
Infectious Diseases

Fever

**Chief Complaint:** Fever.

**History of Present Illness:** Degree of fever; time of onset, pattern of fever; cough, sputum, sore throat, headache, abdominal pain, ear pain, neck stiffness, dysuria; vomiting, rash, night sweats. Diarrhea, bone or joint pain, vaginal discharge.

**Past Medical History:** Ill contacts. Exposure to mononucleosis; exposure to tuberculosis or hepatitis; tuberculin skin testing; travel history, animal exposure; recent dental procedure.

**Medications:** Antibiotics, anticonvulsants.

**Allergies:** Drug allergies.

**Family History:** Familial Mediterranean fever, streptococcal disease, connective tissue disease.

**Social History:** Alcohol use, smoking.

**Review of Systems:** Breaks in the skin (insect bites or stings), weight loss, growth curve failure. Previous surgery or dental work. Heart murmur, AIDS risk factors.

### Historical Findings in Fever of Unknown Origin

| Skin breaks? Puncture or laceration. |
| Insect bites? Tick exposure, flies or mosquitoes. |
| Unusual or poorly prepared foods? Raw fish, unpasteurized milk. |
| Onset, periodicity, temperature curve, weight loss, school absence? |
| Localized pain? |
| Fever pattern? |
| Exposures or travel? |
| Pets? Kitten exposure, exposure to other animals. |
| Drugs? Any medication. |

| Review of systems? Rashes, joint complaints, cough, bowel movements. |
| Blood, urine, stool, and throat cultures? |
| Complete blood count? Inflammatory disorders usually lead to a rise in leukocyte count. Falling counts suggest a marrow process. |
| Screening laboratory procedures? Rise in sedimentation rate. |
| Tuberculin skin test with controls? |

**Physical Examination**

**General Appearance:** Lethargy, toxic appearance. Note whether the patient looks “ill” or well.

**Vital Signs:** Temperature (fever curve), respiratory rate (tachypnea), pulse (tachycardia). Hypotension (sepsis), hypertension (neuroblastoma, pheochromocytoma). Growth and weight percentiles.

**Skin:** Rashes, nodules, skin breaks, bruises, pallor. Icterus, splinter hemorrhages; delayed capillary refill, petechia (septic emboli, meningococcemia),
A 24 Fever

- Ecthyma gangrenosum (purpuric plaque of Pseudomonas). Pustules, cellulitis, furuncles, abscesses.

**Lymph Nodes:** Cervical, supraclavicular, axillary, inguinal adenopathy.

**Eyes:** Conjunctival erythema, retinal hemorrhages, papilledema.

**Ears:** Tympanic membrane inflammation, decreased mobility.

**Mouth:** Periodontitis, sinus tenderness; pharyngeal erythema, exudate.

**Neck:** Lymphadenopathy, neck rigidity.

**Breast:** Tenderness, masses, discharge.

**Chest:** Dullness to percussion, rhonchi, crackles.

**Heart:** Murmurs (rheumatic fever, endocarditis, myocarditis).

**Abdomen:** Masses, liver tenderness, hepatomegaly, splenomegaly; right lower quadrant tenderness (appendicitis). Costovertebral angle tenderness, suprapubic tenderness (urinary tract infection).

**Extremities:** Wounds; IV catheter tenderness (phlebitis) joint or bone tenderness (septic arthritis). Osler's nodes, Janeway's lesions (endocarditis). Clubbing, vertebral tenderness.

**Rectal:** Perianal skin tags, fissures, anal ulcers (Crohn disease), rectal fiooculence, fissures, masses, occult blood.

**Pelvic/Genitourinary:** Cervical discharge, cervical motion tenderness, adnexal tenderness, adnexal masses, genital herpes lesions.

| Complete blood count, including leukocyte differential and platelet count | Serum lactate |
| Arterial blood gases | Cultures with antibiotic sensitivities |
| Blood urea nitrogen and creatinine | Blood |
| Urinalysis | Urine |
| INR, partial thromboplastin time, fibrinogen | Wound |
| Sputum, drains | Chest x-ray |
| | Computed tomography, magnetic resonance imaging, abdominal X-ray |

**Differential Diagnosis of Fever**

**Infectious Disease (50% of diagnoses)**

**Localised Infection**

- Respiratory tract
  - Upper--rhinitis, pharyngitis, sinusitis
  - Lower--pneumonia, bronchitis, bronchiectasis, foreign body

- Urinary tract infection

- Osteomyelitis

- Meningitis, encephalitis

- Abdominal abscess, appendicitis

**Generalised Infection**

- Common--Epstein-Barr virus, enteric infection (Salmonella, Yersinia species), cat-scratch disease, tuberculosis, hepatitis, cytomegalovirus

- Unusual--tularemia, brucellosis, leptospirosis, Q fever, Lyme disease, syphilis, toxoplasmosis
Cough and Pneumonia

Chief Complaint: Cough

History of Present Illness: Duration of cough, fever. Sputum color, quantity, consistency. Sore throat, rhinorrhea, headache, ear pain; vomiting, chest pain, hemoptysis. Travel history, exposure to tuberculosis, tuberculin testing. Timing of the cough, frequency of cough; cough characteristics. Dry, "brassy" cough (tracheal or large airway origins). Cough that is most notable when attention is drawn to it (psychogenic cough). Exposure to other persons with cough.

Past Medical History: Previous hospitalizations, prior radiographs. Diabetes, asthma, immunodeficiencies, chronic pulmonary disease.

Medications: Antibiotics

Immunizations: H influenzae, streptococcal immunization.

Allergies: Drug Allergies

Perinatal History: Respiratory distress syndrome, bronchopulmonary dysplasia, congenital pneumonias.

Psychosocial History: Daycare or school attendance, school absences, stressors within the family, tobacco smoke.

Family History: Atopy, asthma, cystic fibrosis, tuberculosis, recurrent infections.

Review of Systems: General state of health; growth and development; feeding history, conjunctivitis, choking, abnormal stools, neuromuscular weakness.

Physical Examination

General Appearance: Respiratory distress, cyanosis, dehydration. Note whether the patient looks "ill" well.

Vital Signs: Temperature (fever), respiratory rate (tachypnea), pulse (tachycardia), BP, height and weight percentiles.

Skin: Eczema, urticaria.

Lymph Nodes: Cervical, axillary, inguinal lymphadenopathy

Ears: Tympanic membrane erythema.

Nose: Nasal polyps.
26 Cough and Pneumonia

Throat: Pharyngeal cobblestone follicles, pharyngeal erythema, masses, tonsillar enlargement.

Neck: Rigidity, masses, thyroid masses.

Chest: Chest wall deformities, asymmetry, unequal expansion. Increased vocal fremitus, dullness to percussion, wheezing, rhonchi, crackles; bronchial breath sounds with decreased intensity.

Heart: Tachypnea, gallops, murmurs (rheumatic fever, endocarditis, myocarditis).

Abdomen: Hepatomegaly, splenomegaly.

Extremities: Cyanosis, clubbing.

Neurologic: Decreased mental status, gag reflex, muscle tone and strength, swallowing coordination.

Laboratory Evaluation: CBC, electrolytes, BUN, creatinine; O₂ saturation, UA. WBC (>15,000 cells/dL), blood cultures. Sputum or deep tracheal aspirate for Gram’s stain and culture. Tuberculin skin test (PPD), cultures and fluorescent antibody techniques for respiratory viruses.

Chest X-ray: Segmental consolidation, air bronchograms, atelectasis, pleural effusion.

<table>
<thead>
<tr>
<th>Infant</th>
<th>Toddler/Young School-Age</th>
<th>Older School-Age/Adolescent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections</td>
<td>Viral infections</td>
<td>Asthma</td>
</tr>
<tr>
<td>Viral/bacterial infections</td>
<td>Sinusitis</td>
<td>Recurrent viral infections</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Tuberculosis</td>
<td>Sinusitis</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
<td>Gastroesophageal reflux</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>Anomalies</td>
<td>Inhaled foreign body</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>Vascular ring</td>
<td>Desquamative interstitial pneumonitis</td>
<td>Gastroesophageal reflux</td>
</tr>
<tr>
<td>Innominate artery compression</td>
<td>Lymphocytic interstitial pneumonitis</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>Tracheoesophageal fistula</td>
<td>Asthma</td>
<td></td>
</tr>
<tr>
<td>Pulmonary sequestration</td>
<td>Cough-variant asthma</td>
<td></td>
</tr>
<tr>
<td>Subglottic stenosis</td>
<td>Pollutants (cigarette smoke)</td>
<td></td>
</tr>
<tr>
<td>Interstitial pneumonia</td>
<td>Suppurative lung disease</td>
<td></td>
</tr>
<tr>
<td>Desquamative interstitial pneumonitis</td>
<td>Cystic fibrosis</td>
<td></td>
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<tr>
<td>Lymphocytic interstitial pneumonitis</td>
<td>Bronchiectasis</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>Right middle lobe syndrome</td>
<td></td>
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<tr>
<td>Cystic fibrosis</td>
<td>Ciliary dyskinesia syndromes</td>
<td></td>
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<tr>
<td>Ciliary dyskinesia syndromes</td>
<td>Immunodeficiency</td>
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<tr>
<td>Immunodeficiency</td>
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</tbody>
</table>
Tuberculosis

Chief Complaint: Cough and fever.


Travel History: Travel to South America, Southeast Asia, India.

Past Medical History: Previous pneumonia, previous hospitalizations, prior radiographs, AIDS risk factors. Diabetes, asthma, steroids, immunodeficiencies, chronic pulmonary disease.

Medications: Antihistamines.

Allergies: Drug allergies.

Family History: Source case drug resistance. Tuberculosis, recurrent infections, chronic lung disease.

Review of Systems: General state of health; growth and development; feeding history, abnormal stools, neuromuscular weakness.

Social History: Daycare or school attendance.

Physical Examination

General Appearance: Respiratory distress. Note whether the patient looks “ill” or well.

Vital Signs: Temperature (fever), respiratory rate (tachypnea), pulse (tachycardia), BP, growth percentiles.

Skin: Rashes, cyanosis, urticaria.

Lymph Nodes: Lymphadenopathy (cervical, supraclavicular, axillary, inguinal).

HEENT: Tympanic membrane erythema, neck stiffness.

Chest: Increased vocal fremitus. Increased percussion resonance, rhonchi, crackles, bronchial breath sounds with decreased intensity.

Cardiac: Distant heart sounds, murmur, rub.

Abdomen: Masses, tenderness, hepatomegaly, splenomegaly.

Extremities: Clubbing, edema.

Neurologic: Mental status, muscle tone and strength.

Laboratory Evaluation: CBC, electrolytes, BUN, creatinine; O₂ saturation, liver function tests; UA, early morning gastric aspirate to obtain swallowed sputum for acid-fast bacilli stain and culture. Histological examination of lymph nodes, pleura, liver, bone marrow biopsies.

Chest X-ray: Segmental consolidation, hilar node enlargement, segmental atelectasis.

 Differential Diagnosis: Atypical mycobacteria infection, active pulmonary tuberculosis, latent tuberculosis.

Otitis Media

Chief Complaint: Ear pain.

History of Present Illness: Ear pain, fever, irritability. Degree of fever; time of onset; cough, sore throat, headache, neck stiffness, diarrhea.

Past Medical History: Previous episodes of otitis media, pneumonia, asthma, diabetes, immunosuppression, steroid use.
28 Pharyngitis

**Allergies:** Antibiotics.
**Family History:** Recurrent ear infections.

**Physical Examination**
**Ears:** Bulging, opacified, erythematous tympanic membrane; poor visualization of landmarks, absent light reflex, retraction, decreased mobility with insufflation of air.
**Nose:** Nasal discharge, erythema.
**Throat:** Pharyngeal erythema, exudate.
**Chest:** Breath sounds.
**Heart:** Rate and rhythm, murmurs.
**Abdomen:** Tenderness, hepatomegaly.

**Laboratory Evaluation:** CBC, electrolytes, tympanocentesis.

**Differential Diagnosis:** Acute otitis media, mastoiditis, otitis externa, otitis media with effusion, cholesteatoma, tympanosclerosis, cholesteatoma.

**Pharyngitis**

**Chief Complaint:** Sore throat.

**History of Present Illness:** Sore throat, fever, cough, irritability, ear pain. Nasal discharge, headache, abdominal pain; prior streptococcal pharyngitis, past streptococcal pharyngitis, scarlet fever, rheumatic fever.

**Past Medical History:** Previous episodes of otitis media, pneumonia, asthma, diabetes, immunosuppression.

**Allergies:** Antibiotics.

**Family History:** Streptococcal throat infections.

**Physical Examination**
**General Appearance:** Note whether the patient appears well or toxic.
**Vital Signs:** Temperature (fever), pulse, blood pressure, respiratory rate.
**Skin:** Rash ("sandpaper" feel, scarlet fever).
**Lymph Nodes:** Tender cervical adenopathy.
**Ears:** Tympanic membrane erythema, bulging.
**Nose:** Mucosal erythema.
**Throat:** Erythema, vesicles, ulcers, soft palate petechiae. Tonsillar exudate.
**Mouth:** Foul breath.
**Abdomen:** Tenderness (mesenteric adenitis), hepatomegaly, splenomegaly.
<table>
<thead>
<tr>
<th>Clinical Manifestations of Pharyngitis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Group A streptococcus</strong></td>
</tr>
<tr>
<td><strong>Viral (other than EBV)</strong></td>
</tr>
<tr>
<td><strong>Epstein-Barr virus</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Generally 3 years or older</td>
</tr>
<tr>
<td><strong>Season</strong></td>
</tr>
<tr>
<td>Fall to spring</td>
</tr>
<tr>
<td><strong>Clinical</strong></td>
</tr>
<tr>
<td>Tender cervical adenopathy, foul breath, tonsillar exudates, soft palate petechiae, abdominal pain (mesenteric adenitis), headache, rash (&quot;sandpaper&quot; feel, scarlet fever), no rhinorrhea, no cough, conjunctivitis (ie, no URI symptoms)</td>
</tr>
</tbody>
</table>
30 Peritonsillar, Retropharyngeal or Parapharyngeal Abscess

Laboratory Evaluation: Rapid antigen detection test, throat culture.
Differential Diagnosis of Pharyngitis: Viruses (influenza, adenovirus. Epstein-Barr virus), groups C and G streptococci, Corynebacterium diphtheriae (gray exudate in the pharynx), Chlamydia.

Peritonsillar, Retropharyngeal or Parapharyngeal Abscess

Chief Complaint: Throat pain.
History of Present Illness: Recent tonsillopharyngitis or URI. Stridor, dysphagia, drooling.
Past Medical History: Previous peritonsillar abscesses, pharyngitis, otitis media, pneumonia, asthma, diabetes, immunosuppression.
Medications: Immunosuppressants.
Allergies: Antibiotics.
Family History: Streptococcal pharyngitis.

Physical Examination
General Appearance: Severe throat pain and dysphagia. Ill appearance.
Lymph Nodes: Cervical lymphadenopathy.
Chest: Breath sounds, rhonchi.
Heart: Murmurs, rubs.
Abdomen: Tenderness, hepatomegaly, splenomegaly.
Laboratory Evaluation: Cultures of surgical drainage. Lateral neck X ray.

Epiglottitis

Chief Complaint: Sore throat.
History of Present Illness: 3 to 7 years of age and an abrupt onset of high fever, severe sore throat, dysphagia, drooling. Refusal to swallow, drooling; quiet, hoarse voice.
Past Medical History: Immunosuppression.
Medications: Immunosuppressants.
Vaccinations: Haemophilus influenza immunization.

Physical Examination
Chest: Stridor, decreased breath sounds.
Heart: Murmurs.
Abdomen: Tenderness, splenomegaly.
Extremities: Cyanosis.
Laboratory Evaluation: Lateral neck x-rays
### Differential Diagnosis of Epiglottitis

<table>
<thead>
<tr>
<th>Epiglottitis</th>
<th>Viral Laryngotracheitis</th>
<th>Bacterial Tracheitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>High fever, dysphagia, drooling, “toxic” appearance, refusal to speak</td>
<td>Low-grade fever, coryza. barking cough, hoarse voice</td>
<td>Improving croup that worsens; high fever, stridor, anterior neck tenderness: no drooling</td>
</tr>
</tbody>
</table>

### Croup (Viral Laryngotracheobronchitis)

**Chief Complaint:** Cough.

**History of Present Illness:** Mild upper respiratory symptoms, followed by sudden onset of a barking cough and hoarseness, often at night.

**Past Medical History:** Immunosuppression.

**Past Medical History:** Prematurity, respiratory distress syndrome, bronchopulmonary dysplasia.

**Medications:** Antibiotics.

**Vaccinations:** Haemophilus influenza immunization.

### Physical Examination

**General Appearance:** Low-grade fever, non-toxic appearance. Comfortable at rest, baryk, seal-like cough. Restlessness, altered mental status.

**Vital Signs:** Respirations (tachypnea), blood pressure, pulse (tachycardia), temperature (low-grade fever).

**Skin:** Pallor, cyanosis.

**Chest:** Inspiratory stridor, tachypnea, retractions, diminished breath sounds.

**Abdomen:** Retractions, paradoxical abdominal wall motion (abdomen rises on inspiration), tenderness.

**Laboratory Evaluation:** Anteroposterior neck radiographs: subglottic narrowing, (“steeple sign”); pulse oximetry.

**Differential Diagnosis:** Epiglottitis, acute croup, foreign body aspiration, anaphylaxis; spasmodic croup (recurrent allergic upper airway spasm).

### Bronchiolitis

**Chief Complaint:** Wheezing.

**History of Present Illness:** Duration of wheezing, cough, mild fever, nasal discharge, congestion. Cold weather months. Oxygen saturation.

**Past Medical History:** Chronic pulmonary disease (ie, prematurity, bronchopulmonary dysplasia), heart disease, immunocompromise.

**Medications:** Bronchodilators.

**Allergies:** Aspirin, food allergies.

**Family History:** Asthma, hayfever, eczema.

**Social History:** Exposure to passive cigarette smoke.
32 Meningitis

Physical Examination
General Appearance: Comfortable appearing, non-toxic.
Vital Signs: Temperature (low-grade fever), respirations, pulse, blood pressure.
Ears: Typanic membrane erythema.
Nose: Rhinorrhea
Mouth: Flaring of the nostrils.
Chest: Chest wall retractions, wheezing, fine crackles on inspiration, diminished air exchange.
Heart: Murmurs.
Abdomen: Paradoxical abdominal wall motion with respiration (ie, abdomen collapses with each inspiration).
Laboratory Evaluation: CBC, electrolytes, pulse oximetry. Nasopharyngeal washings for RSV antigen.
Chest X-ray: Hyperinflation, flattened diaphragms, patchy atelectasis.
Differential Diagnosis: Foreign body aspiration, asthma, pneumonia, congestive heart failure, aspiration syndromes (gastroesophageal reflux).

Meningitis

Chief Complaint: Fever and lethargy.
History of Present Illness: Duration and degree of fever; headache, neck stiffness, cough; lethargy, irritability (high-pitched cry), vomiting, anorexia, rash.
Past Medical History: Pneumonia, otitis media, endocarditis. Diabetes, sickle cell disease; recent upper respiratory infections. Travel history.
Perinatal History: Prematurity, respiratory distress.
Medications: Antibiotics.
Social History: Home situation.
Family History: Exposure to H influenza or neisseria meningitis.

Physical Examination
General Appearance: Level of consciousness; obtundation, labored respirations. Note whether the patient looks “ill,” well, or malnourished.
Vital Signs: Temperature (fever), pulse (tachycardia), respiratory rate (tachypnea), BP (hypotension).
Skin: Capillary refill, rashes, petechia, purpura (meningococcemia).
Head: Bulging or sunken fontanelle.
Eyes: Extraocular movements, papilledema, pupil reactivity, icterus.
Neck: Nuchal rigidity. Brudzinski’s sign (neck flexion causes hip flexion); Kernig's sign (flexing hip and extending knee elicits resistance).
Chest: Rhonchi, crackles, wheeze.
Heart: Rate of rhythm, murmurs.
Extremities: Splinter hemorrhages (endocarditis).
Neurologic: Altered mental status, weakness, sensory deficits.
Laboratory Evaluation:
   CSF Tube 1 - Gram stain, culture and sensitivity, bacterial antigen screen (1-2 mL).
   CSF Tube 2 - Glucose, protein (1-2 mL).
   CSF Tube 3 - Cell count and differential (1-2 mL).
Electrolytes, BUN, creatinine. CBC with differential, blood cultures, smears and cultures from purpuric lesions: cultures of stool, urine, joint fluid, abscess;
purified protein derivative (PPD).

### Cerebral Spinal Fluid Analysis

<table>
<thead>
<tr>
<th>Disease</th>
<th>Color</th>
<th>Protein</th>
<th>Cells</th>
<th>Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal CSF Fluid</td>
<td>Clear</td>
<td>&lt;50 mg/100 mL</td>
<td>&lt;5 lymphs/mm³³</td>
<td>&gt;40 mg/100 mL ½-2/3 of blood glucose level</td>
</tr>
<tr>
<td>Bacterial meningitis or tuberculous meningitis</td>
<td>Cloudy</td>
<td>Elevated 50-1500</td>
<td>&gt;100 WBC/mm³³</td>
<td>Low, &lt;½ of blood glucose</td>
</tr>
<tr>
<td>Tuberculous, fungal, partially treated bacterial, syphilitic meningitis, meningeval metastases</td>
<td>Clear opalescent</td>
<td>Elevated usually &lt;500</td>
<td>10-500 WBC with predominant lymphs</td>
<td>20-40, low</td>
</tr>
<tr>
<td>Viral meningitis, partially treated bacterial meningitis, encephalitis, toxoplasmosis</td>
<td>Clear opalescent</td>
<td>Slightly elevated or normal</td>
<td>10-500 WBC with predominant lymphs</td>
<td>Normal to low</td>
</tr>
</tbody>
</table>

### Urinary Tract Infection

**Chief Complaint:** Pain with urination.

**History of Present Illness:** Dysuria, frequency (voiding repeatedly of small amounts), malodorous urine, incontinence; suprapubic pain, low-back pain, fever, chills (pyelonephritis), vomiting, irritability; constipation. Urine culture results (suprapubic aspiration or urethral catheterization).

**Past Medical History:** Urinary infections.

<table>
<thead>
<tr>
<th>Age</th>
<th>Signs/Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate/infant</td>
<td>Hypothermia, hyperthermia, failure to thrive, vomiting, diarrhea, sepsis, irritability, lethargy, jaundice, malodorous urine</td>
</tr>
<tr>
<td>Toddler</td>
<td>Abdominal pain, vomiting, diarrhea, constipation, abnormal voiding pattern, malodorous urine, fever, poor growth</td>
</tr>
</tbody>
</table>
34 Lymphadenopathy and Lymphadenitis

<table>
<thead>
<tr>
<th>Age</th>
<th>Signs/Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>School age</td>
<td>Dysuria, frequency, urgency, abdominal pain,</td>
</tr>
<tr>
<td></td>
<td>incontinence or secondary enuresis, constipation,</td>
</tr>
<tr>
<td></td>
<td>malodorous urine, fever</td>
</tr>
<tr>
<td>Adolescent</td>
<td>Dysuria, frequency, urgency, abdominal pain,</td>
</tr>
<tr>
<td></td>
<td>malodorous urine, fever</td>
</tr>
</tbody>
</table>

Physical Examination

General Appearance: Dehydration, septic appearance. Note whether the patient looks toxic or well.

Vital Signs: Temperature (high fever [>38°C] pyelonephritis), respiratory rate, pulse, BP.

Chest: Breath sounds.

Heart: Rhythm, murmurs.

Abdomen: Suprapubic tenderness, costovertebral angle tenderness (pyelonephritis), renal mass, nephromegaly. Lower abdominal mass (distended bladder), stool in colon.

Pelvic/Genitourinary: Circumcision, hypospadia, phimosis, foreskin; vaginal discharge.


Differential Diagnosis: Cystitis, pyelonephritis, vulvovaginitis, gonococcal or chlamydia urethritis, herpes infection, cervicitis, appendicitis, pelvic inflammatory disease.

Differential Diagnosis of Urinary Tract Symptoms

<table>
<thead>
<tr>
<th>Urinary tract infection</th>
<th>Emotional disturbances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethritis</td>
<td>Vulvovaginitis</td>
</tr>
<tr>
<td>Urethral irritation by</td>
<td>Trauma (sexual abuse)</td>
</tr>
<tr>
<td>soaps, detergents,</td>
<td>Pinworms</td>
</tr>
<tr>
<td>bubble bath</td>
<td></td>
</tr>
<tr>
<td>Vaginal foreign bodies</td>
<td></td>
</tr>
</tbody>
</table>

Lymphadenopathy and Lymphadenitis

Chief Complaint: Swollen lymph nodes.


Past Medical History: Developmental delay, growth failure.

Social History: Intravenous drug use, high-risk sexual behavior.
Lymphadenopathy and Lymphadenitis 35

**Medications:** Phenytoin.

**Review of Systems:** Weight loss, night sweats, bone pain. Pallor, easy bruising.

### Historical Evaluation of Lymphadenopathy

<table>
<thead>
<tr>
<th>Generalized or regional adenopathy</th>
<th>Animal exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Blood product exposure</td>
</tr>
<tr>
<td>Rash</td>
<td>Arthralgia/arthritis</td>
</tr>
<tr>
<td>Exposure to infection</td>
<td>Delayed growth/development</td>
</tr>
<tr>
<td>Travel</td>
<td>Weight loss, night sweats</td>
</tr>
<tr>
<td></td>
<td>Lesions at birth</td>
</tr>
</tbody>
</table>

### Physical Examination

**General Appearance:** Dehydration, septic appearance. Note whether the patient looks toxic or well.

**Vital Signs:** Temperature (fever), pulse (tachycardia), blood pressure, wide pulse pressure (hyperthyroidism). Growth percentiles.

**Lymph Nodes:** Generalized or regional adenopathy. Location, size of enlarged lymph nodes; discreteness, mobility, consistency, tenderness, fluctuation. Supraclavicular or posterior triangle lymphadenopathy.

**Skin:** Lesion in the area(s) drained by affected lymph nodes. Sandpaper rash (scarlet fever), punctums, pustules, splinter hemorrhages (endocarditis), exanthems or enanthems, malar rash (systemic lupus erythematosus).

**Eyes:** Conjunctivitis, uveitis.

**Chest:** Breath sounds, wheeze, crackles.

**Heart:** Rhythm, murmurs.

**Abdomen:** Tenderness, masses, hepatomegaly splenomegaly.

**Extremities:** Joint swelling, joint tenderness, extremity lesions, nasopharyngeal masses.

### Additional Evaluation

<table>
<thead>
<tr>
<th>Generalized or regional adenopathy</th>
<th>Hepatosplenomegaly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth failure</td>
<td>Skin pustule/puncture</td>
</tr>
<tr>
<td>Fever</td>
<td>Conjunctivitis/uveitis</td>
</tr>
<tr>
<td>Tachycardia, wide pulse pressure, brisk reflexes</td>
<td>Midline neck mass that retracts with tongue protrusion</td>
</tr>
<tr>
<td>Rash/exanthem</td>
<td>Mass in posterior triangle</td>
</tr>
<tr>
<td></td>
<td>Supraclavicular mass</td>
</tr>
</tbody>
</table>
36 Lymphadenopathy and Lymphadenitis

<table>
<thead>
<tr>
<th>Location of Node(s)</th>
<th>Etiology of Infection or Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior auricular, posterior/ suboccipital, occipital</td>
<td>Measles, scalp infections (eg, tinea capitis)</td>
</tr>
<tr>
<td>Submandibular, anterior cervical</td>
<td>Oropharyngeal or facial infections (unilateral, “cold” submandibular nodes without infection indicates atypical mycobacteria)</td>
</tr>
<tr>
<td>Preauricular</td>
<td>Sinusitis, tularemia</td>
</tr>
<tr>
<td>Posterior cervical</td>
<td>Adjacent skin infection</td>
</tr>
<tr>
<td>Bilateral cervical of marked degree</td>
<td>Kawasaki's disease, mononucleosis, toxoplasmosis, secondary syphilis</td>
</tr>
<tr>
<td>Supraclavicular or scalene, lower cervical</td>
<td>Infiltrative process (malignancy)</td>
</tr>
<tr>
<td>Axillary</td>
<td>Cat scratch disease, sporotrichosis</td>
</tr>
<tr>
<td>Generalized adenopathy, including axillary, epitrochlear, inguinal</td>
<td>Generalized infection (mononucleosis, hepatitis), immunodeficiency (HIV), sarcoidosis</td>
</tr>
<tr>
<td>Recurrent episodes of adenitis</td>
<td>Chronic granulomatous disease, immunodeficiency</td>
</tr>
</tbody>
</table>

**Differential Diagnosis of Generalized Lymphadenopathy**

**Systemic Infections**

| Bacterial infections | Tuberculosis |
| Scarlet fever | Syphilis |
| Viral exanthems (eg, rubella or rubeola) | Toxoplasma organisms |
| Epstein-Barr virus | Brucella organisms |
| Cytomegalovirus | Histoplasmosis |
| Hepatitis virus | Coccidioidomycosis |
| Cat-scratch disease | Typhoid fever |
| Mycoplasma organisms | Malaria |
| Bacterial endocarditis | Chronic granulomatous disease |
| **Immune-Mediated Inflammatory Disorders** | HIV infection |
| Systemic lupus erythematosus | Kawasaki syndrome |
| Juvenile rheumatoid arthritis | Hyper IgD syndrome |
| Serum sickness | Hyper IgE syndrome |
| **Storage Diseases** | |

### Cellulitis

#### Chief Complaint: Red skin lesion.

#### History of Present Illness: Warm, red, painful, indurated lesion. Fever, chills, headache; diarrhea, localized pain, night sweats. Insect bite or sting; joint pain.

#### Past Medical History: Cirrhosis, diabetes, heart murmur, recent surgery; AIDS risk factors.

#### Allergies: Drug allergies.


#### Family History: Diabetes, cancer.

#### Social History: Home situation.

#### Physical Examination

#### General Appearance: Note whether the patient looks “ill” or well.
38 Infective Endocarditis

**Vital Signs:** Temperature (fever curve), respiratory rate (tachypnea), pulse (tachycardia), BP (hypotension).

**Skin:** Warm, erythematous, tender, indurated lesion. Poorly demarcated erythema with flat borders. Bullae, skin breaks, petechia, ecchyma gangrenosum (purpuric of Pseudomonas), pustules, abscesses.

**Lymph Nodes:** Adenopathy localized or generalized lymphadenopathy.

**HEENT:** Conjunctival erythema, periodontitis, tympanic membrane inflammation, neck rigidity.

**Chest:** Rhonchi, crackles, dullness to percussion (pneumonia).

**Heart:** Murmurs (endocarditis).

**Abdomen:** Liver tenderness, hepatomegaly, splenomegaly. Costovertebral angle tenderness, suprapubic tenderness.

**Extremities:** Wounds, joint or bone tenderness (septic arthritis).

**Laboratory Evaluation:** CBC, ESR, blood cultures x 2, electrolytes, glucose, BUN, creatinine, UA, urine Gram stain, C&S; skin lesion cultures. Needle aspiration of border for Gram’s stain and culture. Antigen detection studies.

**Differential Diagnosis:** Cellulitis, erysipelas, dermatitis, dermatophytosis.

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**Infective Endocarditis**

**Chief Complaint:** Fever

**History of Present Illness:** Chronic fever, murmur, malaise, anorexia, weight loss, arthralgias, abdominal pain. Recent gastrointestinal procedure, urinary procedure, dental procedure. valvular disease, rheumatic fever, seizures, stroke.

**Past Medical History:** Congenital heart disease.

**Physical Examination**

**General Appearance:** Note whether the patient looks toxic or well.

**Vital Signs:** Blood pressure (hypotension), pulse (tachycardia), temperature (fever), respirations (tachypnea).

**Eyes:** Roth spots (white retinal patches with surrounding hemorrhage)

**Chest:** Crackles, rhonchi.

**Heart:** Regurgitant murmurs.

**Skin:** Petechiae, Janeway lesions, Osler’s nodes, splinter hemorrhages.

**Extremities:** Edema, clubbing.

**Abdomen:** Hepatomegaly, splenomegaly, tenderness.

**Neurologic:** Weakness, sensory deficits.

**Laboratory Studies:** CBC (leukocytosis with left shift), ESR, CXR, ECG, blood cultures, urinalysis and culture, BUN/creatinine, cultures of intravenous lines and catheter tips; echocardiography.

**Differential Diagnosis:** Infective endocarditis, rheumatic fever, systemic infection, tuberculosis, urinary tract infection.
Septic Arthritis

Chief Complaint: Joint pain.
History of Present Illness: Joint pain and warmth, redness, swelling, decreased range of motion. Acute onset of fever, limp, or refusal to walk. Penetrating injuries or lacerations. Preexisting joint disease (eg, rheumatoid arthritis), prosthetic joint; sexually transmitted disease exposure.
Past Medical History: H. influenzae immunization, sickle cell anemia, M. tuberculosis exposure.

Physical Examination
General Appearance: Note whether the patient looks toxic or well.
Vital Signs: Temperature (fever), blood pressure (hypotension), pulse (tachycardia), respirations.
Skin: Erythema, skin puncture. Vesicular rash, petechia.
HEENT: Neck rigidity.
Chest: Crackles, rhonchi.
Heart: Murmurs, friction rub.
Abdomen: Tenderness, hepatomegaly, splenomegaly.
Extremities: Erythema, limitation in joint range of motion, joint tenderness, swelling. Refusal to change position.
Laboratory Evaluation: X-rays of joint (joint space distention, periosteal reaction), CT or MRI. Arthrocentesis for cell count, Gram's stain, glucose, mucin clot, cultures. Bone-joint scans (gallium, technetium). Blood cultures. Culture of cervix and urethra on Thayer-Martin media for gonorrhea. Lyme titer, anti-streptolysin-O titer.

### Synovial Fluid Findings in Various Types of Arthritis

<table>
<thead>
<tr>
<th></th>
<th>WBC Count/mm³</th>
<th>% PMN</th>
<th>Joint Fluid:Blood Glucose Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic arthritis</td>
<td>&gt;50,000</td>
<td>≥ 90</td>
<td>Decreased</td>
</tr>
<tr>
<td>Juvenile rheumatoid arthritis</td>
<td>&lt;15,000-20,000</td>
<td>60</td>
<td>Normal to decreased</td>
</tr>
<tr>
<td>Lyme arthritis</td>
<td>15,000-100,000</td>
<td>50+</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Differential Diagnosis: Septic arthritis, Lyme disease, juvenile rheumatoid arthritis, systemic lupus erythematosus, acute rheumatic fever, inflammatory bowel disease, lupus erythematosus, bone marrow, trauma, synovitis, trauma, cellulitis.

Osteomyelitis

Chief Complaint: Leg pain.
History of Present Illness: Extremity pain, degree of fever, duration of fever, limitation of extremity use; refusal to use the extremity or bear weight. Hip pain, abdominal pain, penetrating trauma, dog or cat bite (Pasturella multocida), human bites, immunocompromise, tuberculosis.
40 Osteomyelitis

Past Medical History: Diabetes mellitus, sickle cell disease; surgery, prosthetic devices.
Medications: Immunosuppressants.
Social History: Intravenous drug abuse.

Physical Examination
General Appearance: Note whether the patient looks septic or well.
Vital Signs: Blood pressure (hypotension), pulse (tachycardia), temperature (fever), respirations (tachypnea).
Skin: Petechiae, cellulitis, rash.
Chest: Crackles, rhonchi.
Heart: Regurgitant murmurs.
Extremities: Point tenderness, swelling, warmth, erythema. Tenderness of femur, tibia, humerus.
Back: Tenderness over spinus processes.
Abdomen: Tenderness, rectal mass.
Feet: Puncture wounds.
Laboratory Evaluation: CBC (elevated WBC), ESR (>50), blood culture; X-rays (soft tissue edema), CT or MRI. Technetium bone scan.
Differential Diagnosis: Cellulitis, skeletal or blood neoplasia (Ewing’s sarcoma, leukemia), bone infarction (hemoglobinopathy), hemophilia with bleeding, thrombophlebitis, child abuse/trauma, synovitis.
Gastrointestinal Disorders

Acute Abdominal Pain and the Acute Abdomen

Chief Complaint: Abdominal pain.

History of Present Illness: Duration of pain, location of pain; characteristics of pain (diffuse, burning, crampy, sharp, dull); constant or intermittent; frequency. Effect of eating, defecation, urination, movement. Characteristics of last bowel movement. Relationship to last menstrual period.

Past Medical History: Diabetics, asthma, prematurity, surgery. Endoscopies, X-rays.

Medications: Aspirin, NSAIDs, narcotics, anticholinergics, laxatives.

Family History: Abdominal pain in family members, peptic ulcer disease, irritable bowel syndrome.

Social History: Recent travel, change in food consumption, drugs or alcohol.

Review of Systems: Growth delay, weight gain, emesis, bloating, distension.

Physical Examination

General Appearance: Degree of distress, body positioning to relieve pain, nutritional status. Signs of dehydration, septic appearance.

Vitals: Temperature (fever), pulse (tachycardia), BP (hypertension, hypotension), respiratory rate and pattern (tachypnea).

Skin: Jaundice, petechia, pallor, rashes.

HEENT: Pale conjunctiva, pharyngeal erythema, pus, flat neck veins.

Lymph Nodes: Cervical axillary, periumbilical, inguinal lymphadenopathy, Virchow node (supraclavicular mass).

Abdomen

Inspection: Distention, visible peristalsis (small bowel obstruction).

Auscultation: Absent bowel sounds (late obstruction), high-pitched rushes (early obstruction), bruits.

Palpation: Masses, hepatomegaly, liver texture (smooth, coarse), splenomegaly. Bimanual palpation of flank, nephromegaly. Rebound tenderness, hernias, (inguinal, femoral, umbilical); costovertebral angle tenderness. Retained fecal material, distended bladder (obstructive uropathy).

McBurney's Point Tenderness: Located two-thirds of the way between umbilicus and anterior superior iliac spine (appendicitis).

Iliopsoas Sign: Elevation of legs against examiner's hand causes pain, retrocecal appendicitis. Obturator sign: Flexion of right thigh and external rotation of thigh causes pain in pelvic appendicitis.

Rovsing's Sign: Manual pressure and release at left lower quadrant causes referred pain at McBurney's point (appendicitis).

Percussion: Liver and spleen span, tympany.

Rectal Examination: Impacted stool, masses, tenderness; gross or occult blood.

Perianal Examination: Fissures, fistulas, hemorrhoids, skin tags, soiling (fecal
42 Recurrent Abdominal Pain

or urinary incontinence).

**Male Genital Examination:** Hernias, undescended testes, hypospadias.

**Female Genital Examination:** Urethra, distal vagina, trauma; imperforate hymen. Pelvic examination in pubertal girls. Cervical discharge, adnexal tenderness, masses, cervical motion tenderness.

**Extremities:** Edema, digital clubbing.

**Neurologic:** Observation of the patient moving on and off of the examination table. Gait.

**Laboratory Evaluation:** CBC, electrolytes, liver function tests, amylase, lipase, UA, pregnancy test.

**Chest X-ray:** Free air under diaphragm, infiltrates.

**Acute Abdomen X-ray Series:** Flank stripe, subdiaphragmatic free air, distended loops of bowel, sentinel loop, air fluid levels, calcifications, fecaliths.

**Differential Diagnosis of Acute Abdominal Pain**

**Generalized Pain:** Intestinal obstruction, diabetic ketoacidosis, constipation, malrotation of the bowel, volvulus, sickle crisis, acute porphyria, musculoskeletal trauma, psychogenic pain.

**Epigastrium:** Gastroesophageal reflux, intestinal obstruction, gastroenteritis, gastritis, peptic ulcer disease, esophagitis, pancreatitis, perforated viscus.

**Right Lower Quadrant:** Appendicitis, intussusception, salpingitis, endometritis, endometriosis, ectopic pregnancy, hemorrhage or rupture of ovarian cyst, testicular torsion.

**Right Upper Quadrant:** Appendicitis, cholecystitis, hepatitis, gastritis, gonococcal perihepatitis (Fitz-Hugh-Curtis syndrome), pneumonia.

**Left Upper Quadrant:** Gastroesophageal reflux, peptic ulcer, gastritis, pneumonia, pancreatitis, volvulus, intussusception, sickle crisis.

**Left Lower Quadrant:** Volvulus, intussusception, mesenteric lymphadenitis, intestinal obstruction, sickle crisis, colitis, strangulated hernia, testicular torsion, psychogenic pain, inflammatory bowel disease, gastroenteritis, pyelonephritis, salpingitis, ovarian cyst, ectopic pregnancy, endometriosis.

**Hypogastric/Pelvic:** Cystitis, urolithiasis, appendicitis, pelvic inflammatory disease, ectopic pregnancy, strangulated hernia, endometriosis, ovarian cyst torsion, bladder distension.

**Recurrent Abdominal Pain**

**Chief Complaint:** Abdominal pain.

**History of Present Illness:** Quality of pain (burning, crampy, sharp, dull); location (diffuse or localized). Duration of pain, change in frequency; constant or intermittent.

Effect of eating, vomiting, defecation, urination, inspiration, movement and position. Characteristics of bowel movements. Relation to last menstrual period. Vomiting (bilious, undigested food, blood), constipation, diarrhea, hematochezia, melena; dysuria, hematuria, anorexia, weight loss. Relationship to meals; triggers and relievers of the pain (antacids). Relationship to the menstrual cycle.

What does the patient do when the pain occurs? How does it affect activity? School attendance, school stress, school phobia. What fears does the child have? What activities has the child discontinued?

**Past Testing:** Endoscopies, x-rays, upper GI series.
**Past Medical History:** Diabetes, asthma, surgery, diabetes, prematurity. Prior treatment for a abdominal pain.

**Family History:** Abdominal pain in family members, urolithiasis, migraine, peptic ulcer disease, irritable bowel syndrome, hemolytic anemia, chronic pain.

**Social History:** Recent travel, change in schools, change in water and food consumption, marital discord, recent losses (grandparent, pet), general family function. Review of a typical day, including meals, activities, sleep pattern, school schedule, time of bowel movements; drugs/alcohol, sexual activity, sexual abuse.

**Review of Systems:** Growth, weight gain, stool pattern, bloating, distension, hematemesis, hematochezia, jaundice. Headache, limb pain, dizziness, fatigue, weakness. Stress- or tension-related symptoms.

**Physical Examination**

**General Appearance:** Degree of distress, septic appearance. Note whether the patient looks “ill” or well.

**Vitals:** Temperature (fever), pulse (tachycardia), BP (hypertension, hypotension), respiratory rate (tachypnea). Growth percentiles, deceleration in growth, weight-for-height.

**Skin:** Pallor, rashes, nodules, jaundice, purpura, petechia.

**HEENT:** Pale conjunctiva, scleral icterus.

**Lymph Nodes:** Cervical, periumbilical, inguinal lymphadenopathy, Virchow node (enlarged supraclavicular node).

**Chest:** Breath sounds, rhonchi, wheeze.

**Heart:** Murmurs, distant heart sounds, peripheral pulses.

**Abdomen**

**Inspection:** Abdominal distention, scars, visible peristalsis.

**Auscultation:** Quality and pattern of bowel sounds; high-pitched bowel sounds (partial obstruction), bruits.

**Palpation:** Palpation while noting the patient's appearance, reaction, and distractibility. Tenderness, rebound, masses, hepatomegaly; liver texture (smooth, coarse); splenomegaly; retained fecal material. Bimanual palpation of flank (nephromegaly), hernias (inguinal, femoral, umbilical); costovertebral angle tenderness.

**McBurney's point tenderness:** Located two thirds of the way between umbilicus and anterior superior iliac spine, appendicitis.

**Rovsing's sign:** Manual pressure and release at left lower quadrant causes referred pain at McBurney's point, appendicitis.

**Percussion:** Tympany, liver and spleen span by percussion.

**Perianal Examination:** Fissures, fistulas, hemorrhoids, skin tags, underwear soiling (fecal or urinary incontinence).

**Rectal Examination:** Impacted stool, masses, tenderness; gross or occult blood.

**Male Genital Examination:** Hernias, undescended testes, hypospadias.

**Female Genital Examination:** Hymenal ring trauma, imperforate hymen, urethra, distal vagina. Pelvic examination in pubertal girls. Cervical discharge, adnexal tenderness, masses, cervical motion tenderness.

**Extremities:** Brachial pulses, femoral pulses, edema. Digital clubbing, loss of nailbed angle (osteoarthropathy).

**Neurologic Examination:** Observation of the patient moving on and off of the examination table; gait.

**Laboratory Evaluation:** CBC, electrolytes, BUN, liver function tests, amylase,
44 Persistent Vomiting

lipase, UA, pregnancy test.

**Chest X-ray:** Free air under diaphragm, infiltrates.

**X-rays of Abdomen (acute abdomen series):** Flank stripe, subdiaphragmatic free air, distended loops of bowel, air fluid levels, mass effects, calcifications, fecaliths.

### Differential Diagnosis of Recurrent Abdominal Pain

<table>
<thead>
<tr>
<th>Gastrointestinal Causes</th>
<th>Psychogenic Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antral gastritis, peptic ulcer</td>
<td>Conversion reaction</td>
</tr>
<tr>
<td>Constipation</td>
<td>Somatization disorder</td>
</tr>
<tr>
<td>Crohn disease</td>
<td>Anxiety disorder</td>
</tr>
<tr>
<td>Carbohydrate malabsorption</td>
<td>Other Causes</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>Intervertebral disk disease</td>
</tr>
<tr>
<td>Cholelithiasis</td>
<td>Spine disease</td>
</tr>
<tr>
<td>Malrotation and volvulus</td>
<td>Musculoskeletal trauma</td>
</tr>
<tr>
<td>Intestinal parasitic infection (G. lamblia)</td>
<td>Migraine or cyclic vomiting</td>
</tr>
<tr>
<td><strong>Urinary Tract Disorders</strong></td>
<td>Abdominal epilepsy</td>
</tr>
<tr>
<td>Ureteropelvic junction obstruction</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td></td>
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<tr>
<td>Urolithiasis</td>
<td></td>
</tr>
</tbody>
</table>

### Persistent Vomiting

**Chief Complaint:** Vomiting.

**History of Present Illness:** Character of emesis (effortless, forceful, projectile, color, food, uncurdled milk, bilious, feculent, blood, coffee ground material); abdominal pain, retching, fever, headache, cough.

Jaundice, recent change in medications. Ingestion of spoiled food; exposure to ill contacts. Overfeeding, weight and growth parameters, vigorous hand or finger sucking, maternal polyhydramnios. Wheezing, irritability, apnea.

Emesis related to meals; specific foods that induce emesis (food allergy or intolerance to milk, soy, gluten). Pain on swallowing (odynophagia), difficulty swallowing (dysphagia). Diarrhea, constipation.

Proper formula preparation, air gulping, postcibal handling. Constant headache, worse with Valsalva maneuver and occurring with morning emesis (increased ICP).

Possibility of pregnancy (last menstrual period, contraception, sexual history). Prior X-rays, upper GI series, endoscopy.

**Past Medical History:** Diabetes, peptic ulcer, CNS disease. Travel, animal or pet exposure.

**Medications:** Digoxin, theophylline, chemotherapy, anticholinergics, morphine, ergotamines, oral contraceptives, progesterone, erythromycin.

**Family History:** Migraine headaches.
**Persistent Vomiting 45**

### Historical Findings in Persistent Vomiting

<table>
<thead>
<tr>
<th>Appearance of Vomitus</th>
<th>Other Gastrointestinal Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large volume, bilious</td>
<td>Nausea</td>
</tr>
<tr>
<td>Uncurdled milk, food</td>
<td>Swallowing difficulties</td>
</tr>
<tr>
<td>Bile</td>
<td>Constipation</td>
</tr>
<tr>
<td>Feculent emesis</td>
<td>Pain</td>
</tr>
<tr>
<td>Bloody, coffee-grounds</td>
<td>Jaundice</td>
</tr>
</tbody>
</table>

**Character of Emetic Act**
- Effortless, nonbilious
- Tongue thrusting
- Finger sucking, gagging
- Projectile vomiting

**Timing of Emesis**
- Early morning
- Related to meals or foods

### Physical Examination

**General Appearance:** Signs of dehydration, septic appearance. Note whether the patient looks “ill” or well.

**Vital Signs:** BP (hypotension, hypertension), pulse (tachycardia), respiratory rate, temperature (fever). Growth percentiles.

**Skin:** Pallor, jaundice, flushing, rash.

**HEENT:** Nystagmus, papilledema; ketone odor on breath (apple odor, diabetic ketoacidosis); jugular venous distention. Bulging fontanelle, papilledema.

**Lungs:** Wheezes, rhonchi, rales.

**Abdomen:** Tenderness to percussion, distention, increased bowel sounds, rebound tenderness (peritonitis). Nephromegaly, masses, hepatomegaly, splenomegaly, costovertebral angle tenderness.

**Extremities:** Edema, cyanosis.

**Genitourinary:** Adnexal tenderness, uterine enlargement.

**Rectal:** Perirectal lesions, localized tenderness, masses, occult blood.

**Neurologic Examination:** Strength, sensation, posture, gait, deep tendon reflexes.

### Vital Signs: Tachycardia, Bradycardia, Tachypnea, Fever, Hypotension, Hypertension, Short Stature, Poor Weight Gain

**Abdomen**
- Distension
- Absent bowel sounds
- Increased bowel sounds
- Rebound tenderness
- Masses

**Genitourinary System**
- Adnexal pain
- Mass
- Rectal mass

**Respiratory:** Bronchospasm, pneumonia

**Neurologic:** Migraine, seizures, increased intracranial pressure

**Renal:** Flank pain

**Skin:** Rash, purpura

### Laboratory Evaluation:
- CBC, electrolytes, UA, amylase, lipase, LFTs, pregnancy test, abdominal X-ray series.
46 Persistent Vomiting

<table>
<thead>
<tr>
<th>Functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innocent vomiting</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
</tr>
<tr>
<td>Postcibal handling</td>
</tr>
<tr>
<td>Improper formula preparation</td>
</tr>
<tr>
<td>Aerophagia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gastrointestinal Obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal: obstruction atresia, stenosis, vascular ring, tracheal esophageal fistula, cricopharyngeal incoordination, achalasia, natal hernia, diaphragmatic hernia</td>
</tr>
<tr>
<td>Torsion of the stomach</td>
</tr>
<tr>
<td>Mairotation of the bowel</td>
</tr>
<tr>
<td>Volvulus</td>
</tr>
<tr>
<td>Intestinal atresia, stenosis, meconium ileus with cystic fibrosis, meconium plug</td>
</tr>
<tr>
<td>Webs</td>
</tr>
<tr>
<td>Annular pancreas</td>
</tr>
<tr>
<td>Paralytic ileus (peritonitis, postoperative, acute infection, hypokalemia)</td>
</tr>
<tr>
<td>Hirschsprung disease</td>
</tr>
<tr>
<td>Imperforate anus</td>
</tr>
<tr>
<td>Enteric duplication</td>
</tr>
</tbody>
</table>

Other gastrointestinal causes: Necrotizing enterocolitis, congenital lactose intolerance, milk-soy protein intolerance, lactobezor, GI perforation, hepatitis, pancreatitis

Neurologic: Increased intracranial pressure, subdural hydrocephalus, edema, kernicterus

Renal: Obstructive uropathy, renal insufficiency

Infection: Systemic infections, pyelonephritis

Metabolic: Urea cycle deficiencies, aminoacidopathies, disorders of carbohydrate metabolism, acidosis, congenital adrenal hyperplasia, tetany, hypercalcaemia

Drugs/toxins: Theophylline, caffeine, digoxin

Blood: Swallowed maternal blood, gastritis, ulcers

Pneumonia

Dysautonomia

Postoperative anesthesiia
<table>
<thead>
<tr>
<th>Differential Diagnosis of Vomiting in Infants 2 Weeks to 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gastroesophageal reflux, esophagitis</strong></td>
</tr>
<tr>
<td><strong>Functional</strong></td>
</tr>
<tr>
<td>Innocent</td>
</tr>
<tr>
<td>Improper formula preparation</td>
</tr>
<tr>
<td>Aerophagia</td>
</tr>
<tr>
<td>Postcibal handling</td>
</tr>
<tr>
<td>Nervous</td>
</tr>
<tr>
<td>Rumination</td>
</tr>
<tr>
<td><strong>Esophageal:</strong> Foreign body, stenosis, vascular ring, tracheoesophageal fistula</td>
</tr>
<tr>
<td>cricopharyngeal incoordination, achalasia, hiatal hernia</td>
</tr>
<tr>
<td><strong>Stomach:</strong> Bezoar, lactobeazor</td>
</tr>
<tr>
<td><strong>Intestinal obstruction,</strong> pyloric stenosis, malrotation, Meckel diverticulitis,</td>
</tr>
<tr>
<td>intussusception, incarcerated hernia, Hirschsprung disease, appendicitis, intestinal</td>
</tr>
<tr>
<td>duplications</td>
</tr>
<tr>
<td><strong>Other gastrointestinal causes:</strong> Annular pancreas, paralytic ileus, hypokalemia,</td>
</tr>
<tr>
<td>Helicobacter sp. infection, peritonitis, pancreatitis, celiac disease, viral and</td>
</tr>
<tr>
<td>bacterial enteritis, lactose intolerance, milk-soy protein intolerance, cholecystitis,</td>
</tr>
<tr>
<td>gallstones, pseudo-obstruction</td>
</tr>
<tr>
<td><strong>Neurologic:</strong> Increased intracranial (subdural hematoma, hydrocephalus, cerebral</td>
</tr>
<tr>
<td>edema)</td>
</tr>
<tr>
<td><strong>Renal:</strong> Obstructive uropathy, renal insufficiency, stones</td>
</tr>
<tr>
<td><strong>Infectious:</strong> Meningitis, sepsis, pyelonephritis, otitis media, sinusitis, pertussis,</td>
</tr>
<tr>
<td>hepatitis, parasitic infestation</td>
</tr>
<tr>
<td><strong>Metabolic:</strong> Urea cycle deficiencies, aminoacidopathies, disorder of carbohydrate</td>
</tr>
<tr>
<td>metabolism, acidosis, congenital adrenal hyperplasia, tetany, hypercalcaemia</td>
</tr>
<tr>
<td><strong>Drugs/toxins:</strong> Theophylline, digoxin, iron, ipecac</td>
</tr>
<tr>
<td><strong>Blood</strong></td>
</tr>
<tr>
<td>Hydrometrocolpos</td>
</tr>
<tr>
<td>Radiation/chemotherapy</td>
</tr>
<tr>
<td><strong>Reye syndrome</strong></td>
</tr>
<tr>
<td>Psychogenic vomiting</td>
</tr>
<tr>
<td>Munchausen syndrome by proxy</td>
</tr>
</tbody>
</table>
Jaundice and Hepatitis

<table>
<thead>
<tr>
<th>Differential Diagnosis of Vomiting in Children Older Than 12 Months of Age</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gastroesophageal reflux</strong></td>
</tr>
<tr>
<td><strong>Gastrointestinal obstruction</strong></td>
</tr>
<tr>
<td>Esophagus: Esophagitis, foreign body, corrosive ingestion, hiatal hernia</td>
</tr>
<tr>
<td>Stomach: Foreign body, bezoar, chronic granulomatous disease</td>
</tr>
<tr>
<td>Intestinal obstruction: Pyloric channel ulcer, intramural hematoma, malrotation, volvulus, Meckel diverticulitis, meconium ileus in cystic fibrosis, incarcerated hernia, intussusception, Hirschsprung disease, ulcerative colitis, Crohn disease, superior mesenteric artery syndrome</td>
</tr>
<tr>
<td><strong>Other gastrointestinal causes:</strong> Annular pancreas, paralytic ileus, hypokalemia, Helicobacter pylori infection, peritonitis, pancreatitis, celiac disease, viral or bacterial enteritis, hepatobiliary disease, gallstone ileus, Henoch-Schönlein purpura.</td>
</tr>
<tr>
<td><strong>Neurologic:</strong> Increased intracranial pressure, Leigh disease, migraine, motion sickness, seizures</td>
</tr>
<tr>
<td><strong>Renal:</strong> Obstructive uropathy, renal insufficiency, stones</td>
</tr>
<tr>
<td><strong>Infection:</strong> Meningitis, sepsis, pyelonephritis, otitis media, sinusitis, hepatitis, parasitic infestation, streptococcal pharyngitis, labyrinthitis</td>
</tr>
<tr>
<td><strong>Metabolic:</strong> Inborn errors of metabolism, acidosis, diabetic ketoacidosis, adrenal insufficiency</td>
</tr>
<tr>
<td><strong>Drugs/toxins:</strong> Aspirin, digoxin, iron, lead, ipecac, elicit drugs</td>
</tr>
<tr>
<td><strong>Torsion of the testis or ovary</strong></td>
</tr>
<tr>
<td><strong>Blood</strong></td>
</tr>
<tr>
<td>Radiation/chemotherapy</td>
</tr>
<tr>
<td>Reye syndrome</td>
</tr>
<tr>
<td>Postoperative vomiting</td>
</tr>
<tr>
<td>Cyclic vomiting</td>
</tr>
<tr>
<td>Pregnancy</td>
</tr>
<tr>
<td><strong>Psychologic:</strong> Bulimia nervosa, anorexia nervosa, stress, Munchausen syndrome by proxy</td>
</tr>
</tbody>
</table>

Jaundice and Hepatitis

**Chief Complaint:** Jaundice.

**History of Present Illness:** Timing, progression, distribution of jaundice. Abdominal pain, anorexia, vomiting, fever, dark urine, pruritus, arthralgias, rash, diarrhea. Gradual, caudal progression of jaundice (physiologic jaundice or breast-feeding jaundice), blood products, raw shellfish, day care centers, foreign travel.

**Past Medical History:** Hepatitis serologies, liver function tests, liver biopsy, hepatitis immunization.

**Perinatal History:** Course of the pregnancy, illnesses, infections, medications taken during the pregnancy. Inability to pass meconium (cystic fibrosis), failure to thrive, irritability. Newborn hypoglycemia, lethargy after the first formula feedings (carbohydrate metabolic disorders).

**Medications:** Acetaminophen, isoniazid, phenytoin.

**Family History:** Liver disease, familial jaundice, lung disease, alpha,-antitrypsin deficiency. History of perinatal infant death (metabolic disorders).

**Social History:** IV drug abuse, alcohol, exposure to hepatitis.
**Historical Findings in Jaundice**

<table>
<thead>
<tr>
<th>Neonate</th>
<th>Older Child</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family history:</strong> Familial jaundice, emphysema, infant deaths</td>
<td><strong>Acute illness</strong></td>
</tr>
<tr>
<td><strong>Prenatal history:</strong> Infection in pregnancy, maternal risk for hepatitis, medications</td>
<td><strong>Failure to thrive</strong></td>
</tr>
<tr>
<td><strong>Perinatal history:</strong> Hypoglycemia, vomiting, lethargy with feedings, failure to pass meconium, icterus, acholic stools.</td>
<td><strong>Family history of jaundice</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Exposure:</strong> Blood products, raw shellfish, travel, drug abuse</td>
</tr>
</tbody>
</table>

**Physical Examination**

**General Appearance:** Signs of dehydration, septic appearance, irritability. Note whether the patient looks “ill” or well.

**Vital Signs:** Pulse, BP, respiratory rate, temperature (fever).

**Skin:** Ecchymoses, excoriations, jaundice, urticaria, bronze discoloration (hemochromatosis), diffuse rash (perinatal infection). Malar rash, discord lesions (lupus), erythematous scaling papules (cystic fibrosis).

**Lymph Nodes:** Cervical or inguinal lymphadenopathy.

**Head:** Cephalohematoma, hypertelorism, high forehead, large fontanelle, pursed lips (Zellweger syndrome), microcephaly.

**Eyes:** Scleral icterus, cataracts, Kayser-Fleischer rings (bronze corneal pigmentation, Wilson's disease), xanthomas (chronic liver disease).

**Mouth:** Sublingual jaundice.

**Heart:** Rhythm, murmurs.

**Chest:** Gynecomastia, breath sounds.

**Abdomen:** Bowel sounds, bruits, right upper quadrant tenderness; liver span, hepatomegaly; liver margin texture (blunt, irregular, firm, smooth), splenomegaly; ascites.

**Extremities:** Joint tenderness, joint swelling, palmar erythema, edema, anasarca. Jaundice, erythematous nodules over shins (erythema nodosum).

**Neurologic:** Lethargy, hypotonia, neuromuscular deficits.

**Rectal:** Perianal skin tags (inflammatory bowel disease), hemorrhoids, occult blood.

**Screening Labs**

- Complete blood count, platelets, differential, smear
- AST, ALT, GGT, alkaline phosphatase
- Total and fractionated bilirubin
- Protein, albumin levels
- INR, PTT
- Stool color
## 50 Jaundice and Hepatitis

<table>
<thead>
<tr>
<th>Assessment Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infection</strong></td>
</tr>
<tr>
<td>Cultures of blood, urine, cerebrospinal fluid</td>
</tr>
<tr>
<td>Serologies: Toxoplasmosis, rubella, cytomegalovirus, herpes, hepatitis panel, syphilis, Epstein-Barr virus</td>
</tr>
<tr>
<td><strong>Metabolic</strong></td>
</tr>
<tr>
<td>Alpha1-antitrypsin level and Pi typing</td>
</tr>
<tr>
<td>Thyroxine and thyroid stimulating hormone</td>
</tr>
<tr>
<td>Metabolic screen: Urine/serum amino acids</td>
</tr>
<tr>
<td>Sweat chloride test</td>
</tr>
<tr>
<td>Ceruloplasmin, urinary copper excretion</td>
</tr>
<tr>
<td>Toxicology screen</td>
</tr>
<tr>
<td><strong>Structural</strong></td>
</tr>
<tr>
<td>24-hour duodenal intubation for bilirubin excretion</td>
</tr>
<tr>
<td>Ultrasound</td>
</tr>
<tr>
<td>Radionuclide or hepatobiliary scan</td>
</tr>
<tr>
<td>Operative cholangiogram</td>
</tr>
<tr>
<td><strong>Autoimmune/inflammatory:</strong></td>
</tr>
<tr>
<td>ESR, ANA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pathologic Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver biopsy</td>
</tr>
<tr>
<td>Bone marrow biopsy (enzyme deficiency, hemoglobinopathies, hemolytic anemias)</td>
</tr>
</tbody>
</table>
### Nonpathologic Causes
- Physiologic jaundice
- Breast milk jaundice

### Pathologic Causes

#### Unconjugated hyperbilirubinemia
- Bilirubin overproduction
  - ABO/Rh incompatibility
  - Hemoglobinopathies
- Erythrocyte membrane defects
- Polycythemia
- Extravascular blood
- Increased uptake
  - Increased enterohepatic uptake
  - Intestinal obstruction
- Genetic
  - Crigler-Najjar types I and II
  - Gilbert syndrome
- Miscellaneous
  - Hypothyroidism
  - Sepsis, urinary tract infection
  - Hypoxia, acidosis
  - Hypoglycemia
  - Maternal diabetes mellitus
  - High intestinal obstruction
  - Drugs
  - Fatty acids (hyperalimentation)
  - Lucy-Driscoll syndrome

#### Conjugated hyperbilirubinemia (continued)
- Metabolic/genetic
  - Alpha_1-antitrypsin deficiency
  - Galactosemia
- Fructose intolerance
- Glycogen storage disease
- Tyrosinemia
- Zellweger syndrome
- Cystic fibrosis
- Excretory defects
  - Dubin-Johnson syndrome
  - Rotor syndrome
  - Summerskill syndrome
  - Byler disease
- Infections
  - TORCH (toxoplasmosis, other agents, rubella, cytomegalovirus, herpes simplex)
- Syphilis
- HIV
- Varicella-zoster virus
- Coxsackievirus
- Hepatitis (A, B, C, D, and E)
- Echovirus
- Tuberculosis
- Gram-negative infections
- Listeria monocytogenes
- Staphylococcus aureus
- Sepsis, urinary tract infections
- Miscellaneous
  - Trisomies 17, 18, 21
  - Total parenteral nutrition
  - Postoperative jaundice
  - Extracorporeal membrane oxygenation
  - Idiopathic neonatal hepatitis

### Conjugated hyperbilirubinemia
- Anatomic
  - Extrahepatic
    - Biliary atresia
    - Bile duct stenosis
    - Choledochal cyst
    - Bile duct perforation
    - Biliary sludge
    - Biliary stone or neoplasm
  - Intrahepatic
    - Alagille syndrome
    - Nonsyndromic interlobular ductal hypoplasia
    - Caroli disease
    - Congenital hepatic fibrosis
    - Inspissated bile
Hepatosplenomegaly

Chief Complaint: Liver or spleen enlarged.

History of Present Illness: Duration of enlargement of the liver or spleen.
Acute or chronic illness, fever, jaundice, pallor, bruising, weight loss, fatigue, joint pain, joint stiffness. Nutritional history, growth delay. Neurodevelopmental delay or loss of developmental milestones.

Past Medical History: Previous organomegaly, neurologic symptoms. General health.

Perinatal History: Prenatal complications, neonatal jaundice.

Medications: Current and past drugs, anticonvulsants, toxins.

Family History: Storage diseases, metabolic disorders, hepatic fibrosis, alpha₁-antitrypsin deficiency. History of neonatal death.

Social History: Infections, toxin, exposures, drugs or alcohol.

Physical Examination

General Appearance: Wasting, ill appearance, malnutrition.


HEENT: Head size and shape, icterus, cataracts (galactosemia), Kayser-Fleischer rings (Wilson disease). Coarsening of facial features (mucopolysaccharidoses).

Skin: Excoriations, spider angiomas (chronic liver disease, bilary obstruction of the biliary tract); pallor, petechiae, bruising (malignancy, chronic liver disease); erythema nodosum (inflammatory bowel disease, sarcoidosis).

Lymph Nodes: Location and size of lymphadenopathy.

Lungs: Crackles, wheeze, rhonchi.

Abdomen: Distension, prominent superficial veins (portal hypertension), umbilical hernia, brufts. Percussion of flanks for shifting dullness. Liver span by
percussion, hepatomegaly. Liver consistency and texture. Spleen size and texture, splenomegaly.

**Perianal:** Hemorrhoids (portal hypertension), fissures, skin tags, fistulas (inflammatory bowel disease).

**Rectal Exam:** Masses, tenderness.

**Extremities:** Edema, joint tenderness, joint swelling, joint erythema (juvenile rheumatoid arthritis, mucopolysaccharidoses). Clubbing (hypoxia, intestinal disorders, hepatic disorders).

### Growth curve failure
- Skin: Icterus, pallor, edema, pruritus, spider nevi, petechiae and bruises, rashes
- Head--microcephaly or macrocephaly
- Eyes--cataracts (galactosemia); Kayser-Fleischer rings (Wilson disease)
- Nodes--generalized lymphadenopathy
- Chest--adventitious sounds
- Heart--gallop, tachycardia, rub, pulsus paradoxus
- Abdomen--ascites, large kidneys, prominent veins, hepatosplenomegaly
- Rectal--hemorrhoids, sphincter tone, fissures, fistulas, skin tags with inflammatory bowel disease
- Neurologic--developmental delay, dystonia, tremor, absent reflexes, ataxia

### Differential Diagnosis of Hepatosplenomegaly

<table>
<thead>
<tr>
<th>Predominant Splenomegaly</th>
<th>Predominant Hepatomegaly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infection</strong></td>
<td>CMV, syphilis, neonatal hepatitis</td>
</tr>
<tr>
<td>Viral--Epstein-Barr, cytomegalovirus, parvovirus B19</td>
<td>Hepatitis--A, B, C, D, E, tuberculosis, sarcoidosis, chronic granulomatous disease</td>
</tr>
<tr>
<td>Bacterial--endocarditis, shunt infection</td>
<td>Drugs--alcohol, phenytoin</td>
</tr>
<tr>
<td>Protozoal--malaria, babesiosis</td>
<td>Sclerosing cholangitis, infectious cholangitis</td>
</tr>
<tr>
<td><strong>Hematologic</strong></td>
<td>Abscess</td>
</tr>
<tr>
<td>Hemolytic anemias</td>
<td>Chronic active hepatitis</td>
</tr>
<tr>
<td>Porphyrias</td>
<td>Cardiac--failure, pericarditis</td>
</tr>
<tr>
<td>Osteopetrosis, myelofibrosis</td>
<td>Budd-Chiari syndrome</td>
</tr>
<tr>
<td><strong>Vascular</strong></td>
<td>Paroxysmal nocturnal hemoglobinuria</td>
</tr>
<tr>
<td>Portal vein anomalies</td>
<td>Biliary atresia or hypoplasia</td>
</tr>
<tr>
<td>Hepatic scarring or fibrosis</td>
<td>Choledochal cyst</td>
</tr>
<tr>
<td><strong>Tumor and infiltration</strong></td>
<td>Congenital hepatic fibrosis</td>
</tr>
<tr>
<td>Cysts, hemangiomas, hamartomas</td>
<td>Child abuse--trauma</td>
</tr>
<tr>
<td>Lymphoreticular malignancies</td>
<td>Galactosemia, glycogen storage disease, fructose intolerance</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>Tyrosinemia, urea cycle disorders</td>
</tr>
<tr>
<td></td>
<td>Cystic fibrosis</td>
</tr>
<tr>
<td></td>
<td>Alpha-1-antitrypsin deficiency</td>
</tr>
<tr>
<td></td>
<td>Wilson disease, hemochromatosis</td>
</tr>
<tr>
<td></td>
<td>Fatty change: Malnutrition, obesity, alcohol, corticosteroids, diabetes</td>
</tr>
<tr>
<td></td>
<td>Primary or metastatic tumors</td>
</tr>
</tbody>
</table>
54 Acute Diarrhea

Acute Diarrhea

Chief Complaint: Diarrhea.

History of Present Illness: Duration and frequency, of diarrhea; number of stools per day, characteristics of stools (bloody, mucus, watery, formed, oily, foul odor); fever, abdominal pain or cramps, flatulence, anorexia, vomiting. Season (rotavirus occurs in the winter). Amount of fluid intake and food intake.

Past Medical History: Recent ingestion of spoiled poultry (salmonella), spoiled milk, seafood (shrimp, shellfish; Vibrio parahaemolyticus); common food sources (restaurants), travel history. Ill contacts with diarrhea, sexual exposures.

Family History: Coeliac disease.

Medications Associated with Diarrhea: Magnesium-containing antacids, laxatives, antibiotics.

Immunizations: Rotavirus immunization.

Physical Examination

General Appearance: Signs of dehydration. Note whether the patient looks septic, well, or malnourished.

Vital Signs: BP (hypotension), pulse (tachycardia), respiratory rate, temperature (fever).

Skin: Turgor, delayed capillary refill, jaundice.

HEENT: Dry mucous membranes.

Chest: Breath sounds.

Heart: Rhythm, gallops, murmurs.

Abdomen: Distention, high-pitched rushes, tenderness, splenomegaly, hepatomegaly.

Extremities: Joint swelling, edema.

Rectal: Sphincter tone, guaiac test.

Laboratory Evaluation: Electrolytes, CBC with differential. Gram's stain of stool for leukocytes. Cultures for enteric pathogens, stool for ova and parasites x 3; stool and blood for clostridium difficile toxin; blood cultures. Stool occult blood. Stool cultures for cholera, E. coli 0157:H7, Yersinia; rotavirus assay.

Differential Diagnosis of Acute Diarrhea: Rotavirus, Norwalk virus, salmonella, shigella, E coli, Campylobacter, Bacillus cereus, traveler's diarrhea, antibiotic-related diarrhea.

Chronic Diarrhea

Chief Complaint: Diarrhea.

History of Present Illness: Duration, frequency, and timing of diarrheal episodes. Volume of stool output (number of stools per day). Effect of fasting on diarrhea. Prior dietary manipulations and their effect on stooling. Formula changes, fever, abdominal pain, flatulence, tenesmus (painful urge to defecate), anorexia, vomiting, myalgias, arthralgias, weight loss, rashes.


Past Medical History: Pattern of stooling from birth. Growth deficiency, weight
gain. Three-day dietary record, ill contacts.

**Medications and Substances Associated with Diarrhea:** Laxatives, magnesium-containing antacids, cholinergic agents, milk (lactase deficiency), gum (sorbitol).

**Family History:** Family members with diarrhea, milk intolerance, coeliac disease.

**Social History:** Water supply, meal preparation, sanitation, pet or animal exposures.

### Historical Findings in Chronic Diarrhea

<table>
<thead>
<tr>
<th>Age of onset</th>
<th>Secretory symptoms: Large volume, watery diarrhea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool characteristics</td>
<td>Osmotic symptoms: Large numbers of soft stools</td>
</tr>
<tr>
<td>Diet (new food/formula)</td>
<td>Systemic symptoms: Fever, nausea, malaise</td>
</tr>
<tr>
<td>Growth delay</td>
<td></td>
</tr>
<tr>
<td>Family history of allergy; genetic, metabolic, or inborn errors</td>
<td></td>
</tr>
</tbody>
</table>

**Physical Examination**

**General Appearance:** Signs of dehydration or malnutrition. Septic appearance. Note whether the patient looks “ill,” well, or malnourished.

**Vital Signs:** Growth percentiles, pulse (tachycardia), respiratory rate, temperature (fever), blood pressure (hypertension, neuroblastoma; hypotension, dehydration).

**Skin:** Turgor, delayed capillary refill, jaundice, pallor (anemia), hair thinning, rashes, erythema nodosum, pyoderma gangrenosum, maculopapular rashes (inflammatory bowel disease), hyperpigmentation (adrenal insufficiency).

**Eyes:** Bitot spots (vitamin A deficiency), adenopathy.

**Mouth:** Oral ulcers (Crohn disease, coeliac disease), dry mucous membranes; cheilosis (cracked lips, riboflavin deficiency); glossitis (B12, folate deficiency); oropharyngeal candidiasis (AIDS).

**Lymph Nodes:** Cervical, axillary, inguinal lymphadenopathy.

**Chest:** Thoracic shape, crackles, wheezing.

**Abdomen:** Distention (malnutrition), hyperactive, bowel sounds, tenderness, masses, palpable bowel loops, palpable stool. Hepatomegaly, splenomegaly.

**Extremities:** Joint tenderness, swelling (ulcerative colitis); gluteal wasting (malnutrition), dependent edema.

**Genitalia:** Signs of child abuse or sexual activity.

**Perianal Examination:** Skin tags and fistulas.

**Rectal:** Perianal or rectal ulcers, sphincter tone, tenderness, masses, impacted stool, occult blood, sphincter reflex.

**Neurologic:** Mental status changes, peripheral neuropathy (B6, B12 deficiency), decreased perianal sensation. Ataxia, diminished deep tendon reflexes, decreased proprioception.
# Chronic Diarrhea

<table>
<thead>
<tr>
<th>Physical Examination Findings in Chronic Diarrhea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor growth</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Fever</td>
</tr>
<tr>
<td>Jaundice</td>
</tr>
<tr>
<td>Rash</td>
</tr>
<tr>
<td>Erythema nodosum</td>
</tr>
<tr>
<td>Pyoderma gangrenosa</td>
</tr>
<tr>
<td>Edema</td>
</tr>
</tbody>
</table>

**Laboratory Evaluation:** Electrolytes, CBC with differential. Wright's stain for fecal leucocytes; cultures for enteric pathogens, ova and parasites x 3; clostridium difficile toxin. Stool carbohydrate content. Stool for occult blood, neutral fat (maldigestion); split fat (malabsorption).

## Small Infants and Babies
- Chronic nonspecific diarrhea of infancy/postinfectious diarrhea
- Milk and soy protein intolerance
- Protracted infectious enteritis
- Microvillus inclusion disease
- Celiac disease
- Hirschsprung's disease
- Congenital transport defects
- Nutrient malabsorption
- Munchausen's syndrome by proxy

## Toddlers
- Chronic nonspecific diarrhea
- Protracted viral enteritis
- Giardiasis
- Sucrase isomaltase deficiency
- Tumors (secretory diarrhea)
- Celiac disease
- Ulcerative colitis

## School-Aged Children
- Inflammatory bowel disease
- Appendiceal abscess
- Lactase deficiency
- Constipation with encopresis
- Laxative abuse
- Giardiasis
Constipation

**Chief Complaint:** Constipation.

**History of Present Illness:** Stool frequency, consistency, size; stooling pattern
birth to the present. Encopresis, bulky, fatty stools, foul odor. Hard stools,
painful defecation, straining, streaks of blood on stools. Dehydration, urinary
incontinence, enuresis. Abdominal pain, fever. Recent change in diet. Soiling
characteristics and time of day. Are stools formed or scybalous (small, dry,
rabbit-like pellets)? Withholding behavior.

**Dietary History:** Excessive cow's milk or limited fiber consumption; breast-
feeding.

**Past Medical History:** Recent illness, bed rest, fever.

**Medications Associated with Constipation:** Opiate analgesics, aluminum-
containing antacids, iron supplements, antihistamines, antidepressants.

**Social History:** Recent birth of a sibling, emotional stress, housing move.

**Family History:** Constipation.

**Physical Examination**

**General Appearance:** Dehydration or malnutrition. Septic appearance, weak
cry. Note whether the patient looks “ill,” well, or malnourished.

**Vital Signs:** BP (hypertension, pheochromocytoma), pulse, respiratory rate,
temperature. Growth percentiles, poor growth.

**Skin:** Café au lait spots (neurofibromatosis), jaundice.

**Eyes:** Decreased pupillary response, icterus.

**Mouth:** Cheilosis (cracked lips, riboflavin deficiency), oral ulcers (inflammatory
bowel, coeliac disease), dry mucous membranes, glossitis (B12, folate
deficiency), oropharyngeal candidiasis (AIDS).

**Abdomen:** Distention, peristaltic waves, weak abdominal musculature
(muscular dystrophy, prune-belly syndrome). Hyperactive bowel sounds,
tenderness, hepatomegaly. Palpable stool, fecal masses above the pubic
symphysis and in the left lower quadrant.

**Perianal:** Anterior ectopic anus, anterior anal displacement. Anal fissures, ex-
coriation, dermatitis, perianal ulcers. Rectal prolapse. Soiling in the perianal
area. Sphincter reflex: Gentle rubbing of the perianal skin results in reflex
contraction of the external anal sphincter.

**Rectal:** Sphincter tone, rectal ulcers, tenderness, hemorrhoids, masses. Stool
in a cavernous ampulla, occult blood.

**Extremities:** Joint tenderness, joint swelling (ulcerative colitis).

**Neurologic:** Developmental delay, mental retardation, peripheral neuropathy
(B6, B12 deficiency), decreased perianal sensation.

**Laboratory Evaluation:** Electrolytes, CBC with differential, calcium.

**Abdominal X-ray:** Air fluid levels, dilation, pancreatic calcifications.
## Differential Diagnosis of Constipation in Neonates and Young Infants

<table>
<thead>
<tr>
<th>Meconium ileus</th>
<th>Hirschsprung disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meconium plug syndrome</td>
<td>Acquired aganglionosis</td>
</tr>
<tr>
<td>Functional ileus of the newborn</td>
<td>Tumors</td>
</tr>
<tr>
<td>Small left colon syndrome</td>
<td>Myelodysplasia</td>
</tr>
<tr>
<td>Volvulus</td>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>Intestinal web</td>
<td>Maternal opiates</td>
</tr>
<tr>
<td>Intestinal stenosis</td>
<td>Inadequate nutrition/fluids</td>
</tr>
<tr>
<td>Intestinal atresia</td>
<td>Excessive cow's milk consumption</td>
</tr>
<tr>
<td>Intestinal stricture (necrotizing</td>
<td>Absence of abdominal musculature</td>
</tr>
<tr>
<td>enterocolitis</td>
<td>(prune-belly syndrome)</td>
</tr>
<tr>
<td>Imperforate anus</td>
<td>Cerebral palsy</td>
</tr>
<tr>
<td>Anal stenosis</td>
<td></td>
</tr>
<tr>
<td>Anterior ectopic anus</td>
<td></td>
</tr>
<tr>
<td>Anterior anal displacement</td>
<td></td>
</tr>
</tbody>
</table>

## Differential Diagnosis of Constipation in Older Infants and Children

<table>
<thead>
<tr>
<th>Physiologic Causes</th>
<th>Endocrine and Metabolic Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast milk, cow's milk, low</td>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>roughage</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>Deficient fluid: Fever, heat,</td>
<td>Pheochromocytoma</td>
</tr>
<tr>
<td>immobility, anorexia nervosa</td>
<td>Hypokalemia</td>
</tr>
<tr>
<td>Voluntary Stool Withholding</td>
<td>Hypercalcemia</td>
</tr>
<tr>
<td>Megacolon</td>
<td>Hypocalcemia</td>
</tr>
<tr>
<td>Painful defecation: Anal fissure,</td>
<td>Diabetes insipidus</td>
</tr>
<tr>
<td>perianal dermatitis, hemorrhoids</td>
<td>Renal tubular acidosis</td>
</tr>
<tr>
<td>Behavioral issues</td>
<td>Porphyria</td>
</tr>
<tr>
<td>Mental retardation</td>
<td>Amyloidosis</td>
</tr>
<tr>
<td>Neurogenic Disorders</td>
<td>Lipid storage disorders</td>
</tr>
<tr>
<td>Hirschsprung disease</td>
<td></td>
</tr>
<tr>
<td>Intestinal pseudoobstruction</td>
<td></td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td></td>
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<tr>
<td>Myelomeningocele</td>
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<tr>
<td>Spinal cord injury</td>
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<tr>
<td>Transverse myelitis</td>
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<tr>
<td>Spinal dysraphism</td>
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<tr>
<td>Neurofibromatosis</td>
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<tr>
<td>Myopathies</td>
<td></td>
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<tr>
<td>Rickets</td>
<td></td>
</tr>
<tr>
<td>Prune-belly syndrome</td>
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</tr>
</tbody>
</table>

## Hematemesis and Upper Gastrointestinal Bleeding

**Chief Complaint:** Vomiting blood.

**History of Present Illness:** Duration and frequency of hematemesis, characteristics of vomitus (bright red blood, coffee ground material), volume of blood, hematocrit. Forceful retching prior to hematemesis (Mallory-Weiss tear).
Abdominal pain, melena, hematochezia; peptic ulcer, prior bleeding episodes, nose bleeds. Weight loss, anorexia, jaundice; bright red foods, drinks.

**Past Medical History:** Diabetes, bleeding disorders, renal failure, liver disease. Gastrointestinal surgery.

**Medications:** Alcohol, aspirin, nonsteroidal anti-inflammatory drugs, anticoagulants, steroids.

**Physical Examination**

**General Appearance:** Pallor, diaphoresis, confusion, dehydration. Note whether the patient looks “ill,” well, or malnourished.

**Vital Signs:** Supine and upright pulse and blood pressure (orthostatic hypotension) (resting tachycardia indicates a 10-20% blood volume loss; postural hypotension indicates a 20-30% blood loss), temperature.

**Skin:** Delayed capillary refill, pallor, petechiae. Hemorrhagic telangiectasia (Osler-Weber-Rendu syndrome), abnormal pigmentation (Peutz-Jeghers syndrome), jaundice, ecchymoses (coagulopathy), increased skin elasticity (Ehlers-Danlos syndrome).

**Eyes:** Scleral pallor.

**Mouth:** Oropharyngeal lacerations, nasal bleeding, labial and buccal pigmentation (Peutz-Jeghers syndrome).

**Chest:** Gynecomastia, breath sounds.

**Heart:** Systolic ejection murmur.

**Abdomen:** Dilated abdominal veins, bowel sounds, distention, tenderness, masses, hepatic atrophy, splenomegaly.

**Extremities:** Edema, cold extremities.

**Neurologic:** Decreased mental status, gait.

**Rectal:** Masses, hemorrhoids. Polyps, fissures; stool color, occult blood testing.

**Laboratory Evaluation:** CBC, platelet count, reticulocyte count, international normalized ratio (INR), partial thromboplastin time (PTT), bleeding time, electrolytes, BUN, creatinine, glucose. Type and cross-match for 2-4 units of packed RBC and transfuse as needed. ALT, AST, GGTP, glucose, electrolytes. Esophagogastroduodenoscopy, colonoscopy, Meckel's scan, bleeding scan.

<table>
<thead>
<tr>
<th>Age</th>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neonates (0-30 days)</strong></td>
<td>Swallowed maternal blood, gastritis, duodenitis</td>
<td>Coagulopathy, vascular malformations, gastric/esophageal duplication, leiomyoma</td>
</tr>
<tr>
<td><strong>Infants (30 days-1 year)</strong></td>
<td>Gastritis, gastric ulcer, esophagitis, duodenitis</td>
<td>Esophageal varices, foreign body, aortoesophageal fistula</td>
</tr>
<tr>
<td><strong>Children (1-12 years)</strong></td>
<td>Esophagitis, esophageal varices, gastritis, gastric ulcer, duodenal ulcer, Mallory-Weiss tear, nasopharyngeal bleeding</td>
<td>Leiomyoma, salicylates, vascular malformation, hematobilia, NSAIDs</td>
</tr>
</tbody>
</table>
60 Melena and Lower Gastrointestinal Bleeding

<table>
<thead>
<tr>
<th>Age</th>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents (12 years-adult)</td>
<td>Duodenal ulcer, esophagitis, esophageal varices, gastritis, Mallory-Weiss tear</td>
<td>Thrombocytopenia, Dieulafoy's ulcer, hematobilia</td>
</tr>
</tbody>
</table>

Melena and Lower Gastrointestinal Bleeding

Chief Complaint: Anal bleeding

History of Present Illness: Duration, quantity, color of bleeding (gross blood, streaks on stool, melena), recent hematocrit. Change in bowel habits, change in stool caliber, abdominal pain, fever. Constipation, diarrhea, anorectal pain. Epistaxis, anorexia, weight loss, malaise, vomiting. Fecal mucus, excessive straining during defecation. Colitis, peptic ulcer, hematemesis.

Past Medical History: Barium enema, colonoscopy, sigmoidoscopy, upper GI series.

Medications: Anticoagulants, aspirin, NSAIDs.

Physical Examination

General Appearance: Dehydration, pallor. Note whether the patient looks ill, well, or malnourished.

Vital Signs: BP (orthostatic hypotension), pulse, respiratory rate, temperature (tachycardia).

Skin: Delayed capillary refill, pallor, jaundice. Spider angiomata, rashes, purpura.

Eyes: Pale conjunctiva, icterus.

Mouth: Buccal mucosa discolorations or pigmentation (Henoch-Schönlein purpura or Peutz-Jeghers syndrome).

Chest: Breath sounds.

Heart: Systolic ejection murmurs.

Abdomen: Masses, distention, tenderness, hernias, liver atrophy, splenomegaly.

Genitourinary: Testicular atrophy.

Extremities: Cold, pale extremities.

Neurologic: Anxiety, confusion.

Rectal: Hemorrhoids, masses; fissures, polyps, ulcers. Gross or occult blood.

Laboratory Evaluation: CBC (anemia), liver function tests. Abdominal x-ray series (thumbprinting, air fluid levels).

<table>
<thead>
<tr>
<th>Age</th>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonates (0-30 days)</td>
<td>Anorectal lesions, swallowed maternal blood, milk allergy, necrotizing enterocolitis, midgut volvulus</td>
<td>Vascular malformations, Hirschsprung's enterocolitis, intestinal duplication, coagulopathy</td>
</tr>
<tr>
<td>Age</td>
<td>Common</td>
<td>Less Common</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Infants (30 days-1 year)</td>
<td>Anorectal lesions, midgut volvulus, intussusception (under 3 years)</td>
<td>Vascular malformations, intestinal duplication, acquired thrombocytopenia</td>
</tr>
<tr>
<td></td>
<td>Meckel's diverticulitis, infectious diarrhea, milk protein allergy</td>
<td></td>
</tr>
<tr>
<td>Children (1-12 years)</td>
<td>Juvenile polyps, Meckel's diverticulitis, intussusception (under 3 years), infectious diarrhea, anal fissure, nodular lymphoid hyperplasia</td>
<td>Henoch-Schönlein purpura, hemolytic-uremic syndrome, vasculitis (SLE), inflammatory bowel disease</td>
</tr>
<tr>
<td>Adolescents (12 years-adult)</td>
<td>Inflammatory bowel disease, polyps, hemorrhoids, anal fissure, infectious diarrhea</td>
<td>Arteriovascular malformation, adenocarcinoma, Henoch-Schönlein purpura, Pseudomembranous colitis</td>
</tr>
</tbody>
</table>
62 Melena and Lower Gastrointestinal Bleeding
Gynecologic Disorders

Amenorrhea

Chief Complaint: Missed period.

History of Present Illness: Date of last menstrual period. Primary amenorrhea (absence of menses by age 16) or secondary amenorrhea (cessation of menses after previously normal menstruation). Age of menarche, menstrual regularity; age of breast development; sexual activity, possibility of pregnancy, pregnancy testing. Symptoms of pregnancy (nausea, breast tenderness). Lifestyle changes, dieting, excessive exercise, drugs (marijuana), psychologic stress. Hot flushes (hypoestrogenism), galactorrhea (prolactinoma). Weight loss or gain, headaches, vision changes.

Past Medical History: History of dilation and curettage, postpartum infection (Asherman's syndrome), postpartum hemorrhage (Sheehan's syndrome); prior pregnancies.

Medications: Contraceptives, tricyclic antidepressants, digoxin, marijuana, chemotherapeutic agents.

Physical Examination

General Appearance: Secondary sexual characteristics, body habitus, obesity, deep voice (hyperandrogenism). Note whether the patient looks "ill" or well.

Vital Signs: Pulse (bradycardia), temperature (hypothermia, hypothyroidism), blood pressure, respirations.

Skin: Acne, hirsutism, temporal balding (hyperandrogenism, cool dry skin (hypothyroidism).

Eyes: Visual field defects, bitemporal hemianopsia (pituitary adenoma).

Neck: Thyroid enlargement or nodules.

Chest: Galactorrhea, impaired breast development, breast atrophy.

Heart: Bradycardia (hypothyroidism).

Abdomen: Abdominal striae (Cushing's syndrome).

Gyn: Pubic hair distribution, inguinal or labial masses, clitoromegaly, imperforate hymen, vaginal septum, vaginal atrophy, uterine enlargement, ovarian cysts or tumors.

Extremities: Tremor (hyperthyroidism).

Neurologic: Focal motor deficits.

Abnormal Vaginal Bleeding

**Chief Complaint:** Abnormal vaginal bleeding.

**History of Present Illness:** Last menstrual period, number of soaked pads per day; menstrual regularity, age of menarche, duration and frequency of menses; passing of clots; postcoital or intermenstrual bleeding; abdominal pain, fever, lightheadedness; possibility of pregnancy, sexual activity, hormonal contraception.

Psychologic stress, weight changes, exercise. Changes in hair or skin texture.

**Past Medical History:** Obstetrical history. Thyroid, renal, or hepatic disease; coagulopathies, endometriosis, dental bleeding.

**Family History:** Coagulopathies, endocrine disorders.

**Physical Examination**

**General Appearance:** General body habitus, obesity. Note whether the patient looks "ill" or well.

**Vital Signs:** Assess hemodynamic stability, tachycardia, hypotension, orthostatic vitals; signs of shock.

**Skin:** Pallor, hirsutism, petechiae, skin texture; fine thinning hair (hypothyroidism).

**Neck:** Thyroid enlargement.

**Breasts:** Masses, galactorrhea.

**Chest:** Breath sounds.

**Heart:** Murmurs.

**Gyn:** Cervical motion tenderness, adnexal tenderness, uterine size, cervical lesions.

**Laboratory Evaluation:** CBC, platelets, beta-HCG, type and screen, cervix culture for N. gonorrhoeae, Chlamydia test, von Willebrand's screen, INR/PTT, bleeding time, pelvic ultrasound. Endometrial biopsy.

**Differential Diagnosis of Abnormal Vaginal Bleeding:** Chronic anovulation, pelvic inflammatory disease, cervicitis, pregnancy (ectopic pregnancy, spontaneous abortion, molar pregnancy). Hyperthyroidism, hypothyroidism, adrenal disease, diabetes mellitus. Hyperprolactinemia, polycystic ovary syndrome, oral contraceptives, medroxyprogesterone, anticoagulants, NSAIDs. Cervical polyps, uterine myoma endometriosis, retained tampon, trauma, Von Willebrand's disease.

<table>
<thead>
<tr>
<th>Differential Diagnosis of Amenorrhea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pregnancy</strong>&lt;br&gt;Hormonal contraception</td>
</tr>
<tr>
<td>Hypothalamic-related: Stress, athlet-&lt;br&gt;ics, eating disorder, obesity, drugs&lt;br&gt;tumor</td>
</tr>
<tr>
<td>Pituitary-related: Hypopituitarism,&lt;br&gt;tumor, infiltration, infarction</td>
</tr>
<tr>
<td>Ovarian-related: Dysgenesis, agen-&lt;br&gt;esis, ovarian failure</td>
</tr>
<tr>
<td>Other endocrine causes</td>
</tr>
</tbody>
</table>
Pelvic Pain and Ectopic Pregnancy

Chief Complaint: Pelvis pain.

History of Present Illness: Pelvic or abdominal pain (bilateral or unilateral), positive pregnancy test, missed menstrual period, abnormal vaginal bleeding (quantify). Date of last menstrual period. Symptoms of pregnancy (breast tenderness, bloating); menstrual interval, duration, age of menarche, characteristics of pelvic pain; onset, duration, shoulder pain. Fever or vaginal discharge.

Past Medical History: Surgical history, sexually transmitted diseases, Chlamydia, gonorrhea, obstetrical history. Prior pelvic infection, endometriosis, prior ectopic pregnancy, pelvic tumor, intrauterine device.

Medications: Oral contraceptives.

Physical Examination

General Appearance: Moderate or severe distress. Note whether the patient looks “ill” or well.

Vital Signs: BP (orthostatic hypotension), pulse (tachycardia), respiratory rate (tachypnea), temperature (low fever).

Skin: Cold skin, pallor, delayed capillary refill.

Chest: Breath sounds.

Heart: Murmurs.

Abdomen: Cullen's sign (periumbilical darkening, intraabdominal bleeding), local then generalized tenderness, rebound tenderness.

Pelvic: Cervical discharge, cervical motion tenderness; Chadwick's sign (cervical cyanosis, pregnancy); Hegar's sign (softening of uterine isthmus, pregnancy); enlarged uterus, adnexal tenderness, cul-de-sac fullness.

Laboratory Evaluation: Quantitative beta-HCG, transvaginal ultrasound. Type and hold, Rh type, CBC, UA with micro; GC, chlamydia culture. Laparoscopy.

Differential Diagnosis of Pelvic Pain

Pregnancy-Related Causes: Ectopic pregnancy, spontaneous abortion, threatened abortion, incomplete abortion, intrauterine pregnancy with corpus luteum bleeding.

Gynecologic Disorders: Pelvic inflammatory disease, endometriosis, ovarian cyst hemorrhage or rupture, adnexal torsion, Mittelschmerz, primary dysmenorrhea, tumor.

Nonreproductive Causes of Pelvic Pain

Gastrointestinal: Appendicitis, inflammatory bowel disease, mesenteric adenitis, irritable bowel syndrome.

Urinary Tract: Urinary tract infection, renal calculus.
66 Pelvic Pain and Ectopic Pregnancy
Neurologic Disorders

Headache

Chief Complaint: Headache

History of Present Illness: Quality of pain (dull, band-like, sharp, throbbing), location (retro-orbital, temporal, suboccipital, bilateral or unilateral); age of onset; time course of typical headache episode; rate of onset (gradual or sudden); time of day, effect of supine posture. Increasing frequency. Progression in severity. Does the headache interfere with normal activity or cause the child to stop playing? Awakening from sleep; analgesic use. “The worst headache ever” (subarachnoid hemorrhage).

Aura or Prodrome: Visual scotomata, blurred vision; nausea, vomiting, sensory disturbances.

Associated Symptoms: Numbness, weakness, diplopia, photophobia, fever, nasal discharge (sinusitis), neck stiffness (meningitis).

Aggravating or Relieving Factors: Relief by analgesics or sleep. Exacerbation by light or sounds, straining, exercising, or changing position. Exacerbation by foods (cheese), emotional upset, menses.

Past Medical History: Growth delay, development delay, allergies, past illnesses. Head injuries, motion sickness. Anxiety or depression.

Medications: Dosage, frequency of use, and effect of medications. Birth control pills.

Family History: Migraine headaches in parents. Parental description of their headaches.

Social History: School absences. Stressful events. Emotional problems at home or in school. Cigarettes, alcohol, illegal drugs.

Review Systems: Changes in personality, memory, intellectual skills, vision, hearing, strength, gait, or balance. Postural lightheadedness, weakness, vertigo.

Physical Examination

General Appearance: Note whether the patient looks “ill” or well; interaction with parents; sad or withdrawn?

Vital Signs: BP (hypertension), pulse, temperature (fever), respiratory rate. Height, weight, head circumference; growth percentiles. Weight loss, lack of linear growth.

Skin: Pallor, petechiae, bruises. Alopecia, rashes, and painless oral ulcers. Café au lait spots in the axillae or inguinal areas (neurofibromatosis). Facial angiofibromas (adenoma sebaceum).

Head: Macrocephaly, cranial tenderness, temporal tenderness. Dilated scalp veins, frontal bossing. Sinuses tenderness (sinusitis) to percussion, temporal bruits (arteriovenous malformation).

Eyes: Downward deviation of the eyes ("sunset-ring" increased intracranial pressure), extraocular movements, pupil reactivity; papilledema, visual field deficits. Conjunctival injection, lacrimation (cluster headache).

Nose: Rhinorrhea (cluster headache).

Mouth: Tooth tenderness, gingivitis, pharyngeal erythema. Masseter muscle spasm, restricted jaw opening (TMJ dysfunction).

Neck: Rigidity, neck muscle tenderness.
68 Seizures, Spells and Unusual Movements

Extremities: Absent femoral pulses, lower blood pressures in the legs (coarctation of the aorta).

Neurologic Examination: Mental status, cranial nerve function, motor strength, sensation, deep tendon reflexes. Disorientation, memory impairment, extraocular muscle dysfunction, spasticity, hyperreflexia, clonus, Babinski sign, ataxia, coordination.

Laboratory Evaluation: Electrolytes, ESR. CBC with differential, INR/PTT, MRI scan.

### Recurrent and Chronic Headaches: Temporal Patterns

<table>
<thead>
<tr>
<th>Acute Recurrent Headache</th>
<th>Chronic Progressive Headache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraine</td>
<td>Central nervous system infection</td>
</tr>
<tr>
<td>Cluster headache</td>
<td>Hydrocephalus</td>
</tr>
<tr>
<td>Acute sinusitis</td>
<td>Pseudotumor cerebri</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Brain tumor</td>
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<tr>
<td>Intermittent hydrocephalus</td>
<td>Vascular malformation</td>
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<tr>
<td>Vascular malformation</td>
<td>Subdural hematoma</td>
</tr>
<tr>
<td>Subarachnoid hemorrhage</td>
<td>Arnold-Chiari malformation</td>
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<tr>
<td>Carbon monoxide poisoning</td>
<td>Lead poisoning</td>
</tr>
</tbody>
</table>

**Chronic Nonprogressive Headache**
- Tension-type headache
- Chronic sinusitis
- Ocular disorder
- Dental abscess, temporomandibular joint syndrome
- Postlumbar puncture
- Posttraumatic headache

### Seizures, Spells and Unusual Movements

**Chief Complaint:** Seizure

**History of Present Illness:** Time of onset of seizure, duration, tonic-clonic movements, description of seizure, frequency of episodes, loss of consciousness. Past seizures, noncompliance with anticonvulsant medication. Aura before seizure (irritability, behavioral change, lethargy), incontinence of urine or feces, post-ictal weakness or paralysis, injuries. Can the patient tell when an episode will start? Warning signs, triggers for the spells (crying, anger, boredom, anxiety, fever, trauma). Does he speak during the spell? Does the child remember the spells afterward? What is the child like after the episode (confused, alert)? Can the child describe what happens?

**Past Medical History:** Illnesses, hospitalizations, previous functioning, rheumatic fever. Electroencephalograms, CT scans.

**Medications:** Antidepressants, stimulants, antiseizure medications.

**Family History:** Similar episodes in family, epilepsy, migraine, tics, tremors, Tourette syndrome, sleep disturbance. Rheumatic fever, streptococcal infection liver disease, metabolic disorders.
Physical Examination

General Appearance: Post-ictal lethargy. Note whether the patient looks well or ill. Observe the patient performing tasks (tying shoes, walking).

Vital Signs: Growth percentiles, BP (hypertension), pulse, respiratory rate, temperature (hyperpyrexia).

Skin: Café-au-lait spots, neurofibromas (Von Recklinghausen's disease). Unilateral port-wine facial nevus (Sturge-Weber syndrome); facial angiofibromas (adenoma sebaceum), hypopigmented ash leaf spots (tuberosus sclerosis).

HEENT: Head trauma, pupil reactivity and equality, extraocular movements; papilledema, gum hyperplasia (phenytoin); tongue or buccal lacerations; neck rigidity.

Chest: Rhonchi, wheeze (aspiration).

Heart: Rhythm, murmurs.

Extremities: Cyanosis, fractures, trauma.

Perianal: Incontinence of urine or feces.

Neuro: Dysarthria, visual field deficits, cranial nerve palsies, sensory deficits, focal weakness (Todd's paralysis), Babinski's sign, developmental delay.

Laboratory Evaluation: Glucose, electrolytes, CBC, urine toxicology, anticonvulsant levels, RPR/VDRL, EEG, MRI, lumbar puncture.

<table>
<thead>
<tr>
<th>Differential Diagnosis of Seizures, Spells, and Unusual Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epilepsy</strong></td>
</tr>
<tr>
<td><strong>Movement disorders</strong></td>
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<tr>
<td><strong>Tics</strong></td>
</tr>
<tr>
<td>Myoclonic syndromes</td>
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<tr>
<td>Sleep</td>
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<tr>
<td>Benign</td>
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<tr>
<td>Hyperreflexia (exaggerated startle response)</td>
</tr>
<tr>
<td>Myoclonus-opsoconus</td>
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<tr>
<td>Shuddering spells</td>
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<tr>
<td><strong>Dystonia</strong></td>
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<tr>
<td>Torsion</td>
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<td>Transient torticollis</td>
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<td>Sandifer syndrome</td>
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<tr>
<td>Drugs</td>
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<tr>
<td>Dyskinesias</td>
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<tr>
<td>Metabolic/genetic</td>
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<tr>
<td>Reflex dystrophy</td>
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<tr>
<td>Nocturnal</td>
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<tr>
<td>Physiologic</td>
</tr>
<tr>
<td><strong>Behavioral/Psychiatric Disorders</strong></td>
</tr>
<tr>
<td><strong>Pseudoseizures</strong></td>
</tr>
<tr>
<td><strong>Automatisms</strong></td>
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<tr>
<td><strong>Dyscontrol syndrome</strong></td>
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<tr>
<td><strong>Attention-deficit hyperactivity disorder</strong></td>
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<tr>
<td><strong>Benign paroxysmal vertigo</strong></td>
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<tr>
<td><strong>Migraine</strong></td>
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<tr>
<td><strong>Parasomnias</strong></td>
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<tr>
<td><strong>Syncope</strong></td>
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<tr>
<td><strong>Breathholding spells</strong></td>
</tr>
</tbody>
</table>

Apnea

Chief Complaint: Apnea.

History of Present Illness: Length of pause in respiration. Change in skin color (cyanosis, pallor), hypotonia or hypertonia, resuscitative efforts (rescue breaths, chest compressions). Stridor, wheezing, body position during the event, state of consciousness before, during and after the event. Unusual movements, incontinence, postical confusional state. Regurgitation after feedings. Vomitus in oral cavity during the event.
70 Apnea

Loud snoring, nocturnal enuresis, excessive daytime sleepiness; prior acute life-threatening events (ALTEs). Medications accessible to the child in the home.  
**Past Medical History:** Abnormal growth, developmental delay, asthma.  
**Perinatal History:** Prenatal exposure to infectious agents, maternal exposure to opioids, difficulties during labor and delivery. Respiratory difficulties after birth.  
**Immunizations:** Pertussis.  
**Family History:** Genetic or metabolic disorders, mental retardation, consanguinity, fetal loss, neonatal death, sudden infant death syndrome, elicit drugs, alcohol.  
**Social history:** Physical abuse, previous involvement of the family with child protective services.  

**Physical Examination**  
**General Appearance:** Septic appearance, level of consciousness.  
**Vital Signs:** Length, weight, head circumference percentiles. Pulse, blood pressure, respirations, temperature.  
**Skin:** Cool, mottled extremities; delayed capillary refill, bruises, scars.  
**Nose:** Nasal flaring, nasal secretions, mucosal erythema, obstruction, septal deviation or polyps.  
**Mouth:** Structure of the lips, tongue, palate; tonsillar lesions, masses.  
**Neck:** Masses, enlarged lymph nodes, enlarged thyroid.  
**Chest:** Increased respiratory effort, intercostal retractions, barrel chest. Irregular respirations, periodic breathing, prolonged pauses in respiration, stridor. Grunting, wheezing, crackles.  
**Heart:** Rate and rhythm, S1, S2, murmurs. Preductal and postductal pulse delay (right arm and leg pulse comparison).  
**Abdomen:** Hepatomegaly, nephromegaly.  
**Extremities:** Dependent edema, digital clubbing.  
**Neurologic:** Mental status, muscle tone, strength. Cranial nerve function, gag reflex.  
**Laboratory Evaluation:** Glucose, electrolytes, BUN, creatinine, calcium, magnesium, CBC, ECG, O₂ saturation.
Delirium, Coma and Confusion

**Differential Diagnosis of Apnea**

<table>
<thead>
<tr>
<th>Central Nervous System</th>
<th>Upper Airway (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dandy-Walker malformation</td>
<td>Adenotonsillar hypertrophy</td>
</tr>
<tr>
<td>Arnold-Chiari malformation</td>
<td>Epiglottitis</td>
</tr>
<tr>
<td>Seizures</td>
<td>Post-extubation</td>
</tr>
<tr>
<td>Hypotonia, weakness</td>
<td>Vocal cord paralysis</td>
</tr>
<tr>
<td>Ondine's curse</td>
<td>Anaphylaxis</td>
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<tr>
<td><strong>Metabolic/Toxic</strong></td>
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<tr>
<td>Hypoglycemia</td>
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<td>Hypocalcemia</td>
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<tr>
<td>Hyponatremia</td>
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<tr>
<td>Acidosis</td>
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<tr>
<td>Hypomagnesemia</td>
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<td>Opioids</td>
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<tr>
<td>Medium-chain acyl-CoA dehydrogenase deficiency</td>
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<tr>
<td><strong>Upper Airway</strong></td>
<td></td>
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<tr>
<td>Craniofacial syndromes</td>
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<tr>
<td>Laryngomalacia</td>
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<tr>
<td>Rhinitis</td>
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<tr>
<td>Choanal stenosis/ataresia</td>
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<tr>
<td>Croup</td>
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</tbody>
</table>

**Delirium, Coma and Confusion**

**Chief Complaint:** Confusion.

**History of Present Illness:** Level of consciousness, obtundation (awake but not alert), stupor (unconscious but awakable with vigorous stimulation), coma (cannot be awakened). Confusion, impaired concentration, agitation. Fever, headache. Activity and symptoms prior to onset.

**Past Medical History:** Suicide attempts or depression, epilepsy (post-ictal state).

**Medications:** Insulin, narcotics, drugs, anticholinergics.

**Physical Examination**

**General Appearance:** Incoherent speech, lethargy, somnolence. Dehydration, septic appearance. Note whether the patient looks “ill” or well.

**Vital Signs:** BP (hypertensive encephalopathy), pulse, temperature (fever), respiratory rate.

**Skin:** Cyanosis, jaundice, delayed capillary refill, petechia, splinter hemorrhages; injection site fat atrophy (diabetes).

**Head:** Skull tenderness, lacerations, ptosis, facial weakness. Battle's sign (ecchymosis over mastoid process), raccoon sign (periorbital ecchymosis, skull fracture), hemotympanum (basal skull fracture).

**Eyes:** Pupil size and reactivity, extraocular movements, papilledema.

**Mouth:** Tongue or cheek lacerations; atrophic tongue, glossitis (B12 deficiency).

**Neck:** Neck rigidity, masses.

**Chest:** Breathing pattern (Cheyne-Stokes hyperventilation), crackles, wheezes.

**Heart:** Rhythm, murmurs, gallops.

**Abdomen:** Hepatomegaly, splenomegaly, masses.

**Neuro:** Strength, cranial nerves 2-12, mini-mental status exam; orientation to person, place, time, recent events; Babinski's sign, primitive reflexes (snout,
suck, glabella, palmomental grasp).

**Laboratory Evaluation:** Glucose, electrolytes, BUN, creatinine, $O_2$ saturation, liver function tests. CT/MRI, urine toxicology screen.

**Differential Diagnosis of Delirium:** Hypoxia, meningitis, encephalitis, systemic infection, electrolyte imbalance, hyperglycemia, hypoglycemia (insulin overdose), drug intoxication, stroke, intracranial hemorrhage, seizure; dehydration, head trauma, uremia, vitamin B12 deficiency, ketoacidosis, factitious coma.
Renal and Endocrinologic Disorders

Polyuria, Enuresis and Urinary Frequency

Chief Complaint: Excessive urination.

History of Present Illness: Time of onset of excessive urination. Constant daytime thirst or waking at night to drink. Poor urinary stream, persistent dribbling of urine; straining to urinate. Excessive fluid intake, dysuria, recurrent urinary tract infections; urgency, daytime and nighttime enuresis, fever. Gait disturbances, history of lumbar puncture, spinal cord injury. Lower extremity weakness; back pain, leg pain. Use of harsh soaps for bathing. Feeding schedule, overfeeding, growth pattern, dehydration. Vomiting, constipation. Abdominal and perineal pain, constipation, encopresis

Past Medical History: Urinary tract infections, diabetes, renal disease.

Social History: History of foreign body insertion or sexual abuse.

Family History: Family members with polydipsia, polyuria; early infant deaths, infants with poor growth or dehydration; genitourinary disorders. Parental age of toilet training.

Physical Examination

General Appearance: Signs of dehydration, septic appearance.


Chest: Breath sounds.

Heart: Murmurs, third heart sound.

Abdomen: Masses, palpable bladder. Perineal excoriation; lumbosacral midline defects, sacral hairy patch, sacral hyperpigmentation, sacral dimple or sinus tract, hemangiomas.

Rectal Examination: Rectal sphincter laxity, anal reflex (sacral nerve function).

Extremities: Asymmetric gluteal cleft, gluteal lipoma, gluteal wasting.

Neurologic Examination: Deep tendon reflexes, muscle strength in the legs and feet. Perineal sensation, gait disturbance.

<table>
<thead>
<tr>
<th>Water Diuresis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary polydipsia</td>
</tr>
<tr>
<td>Diabetes insipidus</td>
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<tr>
<td>Obstruction by posterior urethral valves, uteropelvic junction obstruction, ectopic ureter, nephrolithiasis</td>
</tr>
<tr>
<td>Renal infarction secondary to sickle-cell disease</td>
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<tr>
<td>Chronic pyelonephritis</td>
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</tbody>
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<table>
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<tr>
<th>Solute Diuresis:</th>
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<tbody>
<tr>
<td>Glucose, urea, mannitol, sodium chloride, mineralocorticoid deficiency or excess, alkali ingestion</td>
</tr>
</tbody>
</table>
Hematuria

**Chief Complaint:** Blood in urine.

**History of Present Illness:** Color of urine, duration and timing of hematuria.

- Frequency, dysuria, suprapubic pain, flank pain (renal colic), abdominal or perineal pain, fever, menstruation.
- Foley catheterization, stone passage, tissue passage in urine, joint pain.

**Causes of Red Urine:** Pyridium, phenytoin, ibuprofen, cascara laxatives, rifampin, berries, flava beans, food coloring, rhubarb, beets, hemoglobinuria, myoglobinuria.

**Past Medical History:** Recent sore throat (group A streptococcus), streptococcal skin infection (glomerulonephritis). Recent or recurrent upper respiratory illness (adenovirus).

**Medications Associated with Hematuria:** Warfarin, aspirin, ibuprofen, naproxen, phenobarbital, phenytoin, cyclophosphamide.

**Perinatal History:** Birth asphyxia, umbilical catheterization.

**Family History:** Hematuria, renal disease, sickle cell anemia, bleeding disorders, hemophilia, deafness (Alport's syndrome), hypertension.

**Social History:** Occupational exposure to toxins.

**Physical Examination**

**General Appearance:** Signs of dehydration. Note whether the patient looks “ill” or well.

**Vital Signs:** Hypertension (acute renal failure, acute glomerulonephritis), fever, respiratory rate, pulse.

**Skin:** Pallor, malar rash, discoid rash (systemic lupus erythematosus); ecchymoses, petechiae (Henoch-Schönlein purpura).

**Face:** Periorbital edema (nephritis, nephrotic syndrome).

**Eyes:** Lens dislocation, dot-and-fleck retinopathy (Alport's syndrome).

**Throat:** Pharyngitis.

**Chest:** Breath sounds.

**Heart:** Rhythm, murmurs, gallops.

**Abdomen:** Masses, nephromegaly (Wilms' tumor, polycystic kidney disease, hydromecephalic), abdominal bruits, suprapubic tenderness.

**Back:** Costovertebral angle tenderness (renal calculus, pyelonephritis).

**Genitourinary:** Discharge, foreign body, trauma, meatal stenosis.

**Extremities:** Peripheral edema (nephrotic syndrome), joint swelling, joint tenderness (rheumatic fever), unequal peripheral pulses (aortic coarctation).

**Laboratory Evaluation:** Urinalysis with microscopic, urine culture; creatinine,
BUN, CBC; sickle cell screen; urine calcium-to-creatinine ratio, INR/PTT. Urinalysis of first-degree relatives (Alport's syndrome or benign familial hematuria), renal ultrasonography.

**Specific Laboratory Evaluation:** Complement levels, anti-streptolysin-O and anti-DNAse B (poststreptococcal glomerulonephritis), antinuclear antibody, audiogram (Alport's syndrome), antiglomerular basement membrane antibodies (Goodpasture's syndrome), antineutrophil cytoplasmic antibodies, purified protein derivative (PPD).

**Advanced Laboratory Evaluation:** Voiding cystourethrogram, intravenous pyelography, CT scan, MRI scan, renal scan, renal biopsy.

### Differential Diagnosis of Microscopic Hematuria

<table>
<thead>
<tr>
<th>Glomerular Diseases</th>
<th>Nonglomerular Diseases</th>
</tr>
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<tbody>
<tr>
<td>Benign familial or sporadic hematuria (thin membrane nephropathy)</td>
<td>Strenuous exercise</td>
</tr>
<tr>
<td>Acute postinfectious glomerulonephritis</td>
<td>Dehydration</td>
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<tr>
<td>Hemolytic-uremic syndrome</td>
<td>Fever</td>
</tr>
<tr>
<td>IgA nephropathy (Berger's disease)</td>
<td>Menstruation</td>
</tr>
<tr>
<td>Alport's syndrome (familial nephritis)</td>
<td>Foreign body in urethra or bladder</td>
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<tr>
<td>Focal segmental glomerulonephritis</td>
<td>Urinary tract infection: bacterial, adenovirus, tuberculosis</td>
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<td></td>
<td>Hypercalciuria</td>
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<td>Urolithiasis</td>
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<td>Sickle cell trait or disease</td>
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<td>Trauma</td>
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<td>Drugs and toxins</td>
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<td>Masturbation</td>
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<td>Tumors</td>
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<tr>
<td></td>
<td>Wilms' tumor</td>
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<td></td>
<td>Tuberous sclerosis</td>
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<td>Renal or bladder cancer</td>
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<td></td>
<td>Membranoproliferative glomerulonephritis</td>
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<td></td>
<td>Systemic lupus erythematosus</td>
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<tr>
<td></td>
<td>Henoch-Schönlein nephritis</td>
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<td></td>
<td>Polyarteritis</td>
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<tr>
<td></td>
<td>Hepatitis-associated glomerulonephritis</td>
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<td></td>
<td>Leukemia</td>
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<tr>
<td></td>
<td>Coagulopathy</td>
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<tr>
<td></td>
<td>Anatomical abnormalities</td>
</tr>
<tr>
<td></td>
<td>Hydronephrosis</td>
</tr>
<tr>
<td></td>
<td>Ureteropelvic junction obstruction</td>
</tr>
<tr>
<td></td>
<td>Cystic kidneys</td>
</tr>
<tr>
<td></td>
<td>Polycystic kidney disease</td>
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<tr>
<td></td>
<td>Medullary cystic disease</td>
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<td></td>
<td>Vascular malformations</td>
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<tr>
<td></td>
<td>Arteriovenous fistula</td>
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<tr>
<td></td>
<td>Renal vein thrombosis</td>
</tr>
<tr>
<td></td>
<td>Nutcracker syndrome</td>
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<td></td>
<td>Papillary necrosis</td>
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<td></td>
<td>Parenchymal infarction</td>
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<td>Munchausen syndrome-by-proxy</td>
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</tbody>
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### Proteinuria

**Chief Complaint:** Proteinuria.

**History of Present Illness:** Protein of 1+ (30 mg/dL) on a urine dipstick. Protein above 4 mg/m²/hour in a timed 12- to 24-hour urine collection (significant proteinuria). Prior proteinuria, hypertension, edema; short stature, hearing deficits.

**Past Medical History:** Renal disease, heart disease, arthralgias.

**Medications:** Chemotherapy agents.

**Family History:** Renal disease, deafness.
76 Proteinuria

Physical Examination
General Appearance: Signs of dehydration. Note whether the patient looks “ill” or well.
Vital Signs: Temperature (fever).
Ears: Dysmorphic pinnas.
Skin: Café-au-lait spots, hypopigmented macules, rash.
Extremities: Joint tenderness, joint swelling.

<table>
<thead>
<tr>
<th>Functional/Transient (&lt;2+ on urine dipstick)</th>
</tr>
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<tbody>
<tr>
<td>Fever</td>
</tr>
<tr>
<td>Strenuous exercise</td>
</tr>
<tr>
<td>Cold exposure</td>
</tr>
<tr>
<td>Congestive heart failure</td>
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<tr>
<td>Seizures</td>
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<tr>
<td>Emotional stress</td>
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<table>
<thead>
<tr>
<th>Isolated Proteinuria</th>
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<tbody>
<tr>
<td>Orthostatic proteinuria (60% of cases)</td>
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<tr>
<td>Persistent asymptomatic proteinuria</td>
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<table>
<thead>
<tr>
<th>Glomerular Disease</th>
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<tbody>
<tr>
<td>Minimal change nephrotic syndrome</td>
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<tr>
<td>Glomerulonephritis</td>
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<tr>
<td>Postinfectious</td>
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<tr>
<td>Membranoproliferative</td>
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<tr>
<td>Membranous</td>
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<tr>
<td>IgA nephropathy</td>
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<tr>
<td>Henoch-Schönlein purpura</td>
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<tr>
<td>Systemic lupus erythematosus</td>
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<tr>
<td>Hereditary nephritis</td>
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<tr>
<th>Tubulointerstitial Disease</th>
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<tbody>
<tr>
<td>Reflux nephropathy</td>
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<tr>
<td>Interstitial nephritis</td>
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<tr>
<td>Hypokalemic nephropathy</td>
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<tr>
<td>Cystinosis</td>
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<tr>
<td>Fanconi's syndrome</td>
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<tr>
<td>Tyrosinemia</td>
</tr>
</tbody>
</table>
Swelling and Edema

**Chief Complaint:** Swollen ankles.

**History of Present Illness:** Duration of edema; distribution (localized or generalized); intermittent or persistent swelling, pain, redness. Renal disease; shortness of breath, malnutrition, chronic diarrhea (protein losing enteropathy), allergies. Periorbital edema, ankle edema, weight gain.

Poor exercise tolerance, fatigue, inability to keep up with other children. Poor feeding, fussiness, restlessness. Bloody urine (smoky or red), decreased urine output, jaundice. Poor protein intake (Kwashiorkor), dietary history.

**Past Medical History:** Menstrual cycle, sexual activity, premenstrual bloating, pregnancy, rash.

**Medications:** Over-the-counter drugs, diuretics, oral contraceptives, antihypertensives, estrogen, lithium.

**Allergies:** Allergic reactions to foods (cow's milk).

**Family History:** Lupus erythematosus, cystic fibrosis, renal disease, Alport syndrome, hereditary angioedema, deafness.

**Social History:** Exposure to toxins, illicit drugs, alcohol, chemicals.

**Physical Examination**

**General Appearance:** Respiratory distress, pallor. Note whether the patient looks “ill” or well.

**Vitals:** BP (upright and supine), pulse (tachycardia), temperature, respiratory rate (tachypnea). Growth percentiles, poor weight gain. Decreased urine output.

**Skin:** Xanthomata, spider angioma, cyanosis. Rash, insect bite puncta, erythema.

**HEENT:** Periorbital edema. Conjunctival injection, scleral icterus, nasal polyps, sinus tenderness, pharyngitis.

**Chest:** Breath sounds, crackles, dullness to percussion.

**Heart:** Displacement of point of maximal impulse; silent precordium, S3 gallop, friction rub, murmur.

**Abdomen:** Distention, bruits, hepatomegaly, splenomegaly, shifting dullness.

**Extremities:** Pitting or non-pitting edema (graded 1 to 4+), erythema, pulses, clubbing.

**Laboratory Evaluation:** Electrolytes, liver function tests, triglycerides, albumin, CBC, chest x-ray, urine protein.
Diabetic Ketoacidosis

**Chief Complaint:** Malaise.

**History of Present Illness:** Initial glucose level, ketones, anion gap. Duration of polyuria, polyphagia, polydipsia, lethargy, dyspnea, weight loss; noncompliance with insulin; blurred vision, infection, dehydration, abdominal pain (appendicitis). Cough, fever, chills, ear pain (otitis media), dysuria (urinary tract infection).

**Factors that May Precipitate Diabetic Ketoacidosis.** New onset of diabetes, noncompliance with insulin, infection, pancreatitis, myocardial infarction, stress, trauma, pregnancy.

**Past Medical History:** Age of onset of diabetes; renal disease, infections, hospitalization.

**Physical Examination**

- **General Appearance:** Somnolence, Kussmaul respirations (deep sighing breathing), dehydration. Note whether the patient looks “toxic” or well.
- **Vital Signs:** BP (hypotension), pulse (tachycardia), temperature (fever, hypothermia), respiratory rate (tachypnea).
- **Skin:** Decreased skin turgor, delayed capillary refill, intertriginous candidiasis, erythema, localized fat atrophy (insulin injections).
- **Eyes:** Diabetic retinopathy (neovascularization, hemorrhages), decreased visual acuity.
- **Mouth:** Acetone breath odor (musty, apple odor), dry mucous membranes (dehydration).
- **Ears:** Tympanic membrane erythema (otitis media).
- **Chest:** Rales, rhonchi (pneumonia).
- **Heart:** Murmurs.
- **Abdomen:** Hypoactive bowel sounds (ileus), right lower quadrant tenderness.
(appendicitis), suprapubic tenderness (cystitis), costovertebral angle tenderness (pyelonephritis).

**Extremities**: Abscesses, cellulitis.

**Neurologic**: Confusion, hyporeflexia.

**Laboratory Evaluation**: Glucose, sodium, potassium, bicarbonate, chloride, BUN, creatinine, anion gap, phosphate, CBC, serum ketones; UA (proteinuria, ketones). Chest x-ray.

**Differential Diagnosis**

**Ketosis-causing Conditions**: Alcoholic ketoacidosis or starvation.

**Acidosis-causing Conditions**

- **Increased Anion Gap Acidoses**: Lactic acidosis, uremia, salicylate or methanol poisoning.

- **Non-Anion Gap Acidoses**: Diarrhea, renal tubular acidosis.

**Diagnostic Criteria for DKA**. Glucose ≥250, pH <7.3, bicarbonate <15, ketone positive >1:2 dilutions.
80 Diabetic Ketoacidosis
**Dermatologic, Hematologic and Rheumatologic Disorders**

**Rash**

**Chief Complaint:** Rash.

**History of Present Illness:** Time of rash onset, location, pattern of spread (chest to extremities). Location where the rash first appeared; what it resembled; what symptoms were associated with it; what treatments have been tried. Fever, malaise, headache; conjunctivitis, coryza, cough. Exposure to persons with rash, prior history of chicken pox. Sore throat, joint pain, abdominal pain. Exposure to allergens or irritants. Sun exposure, cold, psychologic stress.

**Past Medical History:** Prior rashes, asthma, allergic rhinitis, urticaria, eczema, diabetes, hospitalizations, surgery.

**Medications:** Prescription and nonprescription, drug reactions.

**Family History:** Similar problems among family members.

**Immunizations:** Vaccination status, measles, mumps, rubella.

**Social History:** Drugs, alcohol, home situation.

**Physical Examination**

**General Appearance:** Respiratory distress, toxic appearance.

**Vital Signs:** Temperature, pulse, blood pressure, respirations.

**Skin:** Complete skin examination, including the nails and mucous membranes. Color or surface changes, texture changes, warmth. Distribution of skin lesions (face, trunk, extremities), shape of the lesions, arrangement of several lesions (annular, serpiginous, dermatomal); color of the lesions, dominant hue and the color pattern, surface characteristics (scaly, verrucous), erythema, papules, induration, flat, macules, vesicles, ulceration, margin character, lichenification, excoriations, crusting.

**Eyes:** Conjunctival erythema.

**Ears:** Tympanic membranes.

**Mouth:** Soft palate macules; buccal mucosa lesions.

**Throat:** Pharyngeal erythema.

**Lymph Nodes:** Cervical, axillary, inguinal lymphadenopathy.

**Chest:** Rhonchi, crackles, wheezing.

**Heart:** Murmurs.

**Abdomen:** Tenderness, masses, hepatosplenomegaly.

**Extremities:** Rash on hands, feet, palms, soles; joint swelling, joint tenderness.

**Differential Diagnosis:** Varicella, rubella, measles, scarlet fever, eczema, dermatitis, rocky mountain spotted fever, drug eruption, Kawasaki’s disease.

**Laboratory Diagnosis:** Virus isolation or antigen detection (blood, nasopharynx, conjunctiva, urine). Acute and convalescent antibody titers.
82 Bruising and Bleeding

**Bruising and Bleeding**

**Chief Complaint:** Bruising

**History of Present Illness:** Time of onset of bruising; trauma, spontaneous ecchymoses, petechiae; bleeding gums, bleeding into joints, epistaxis, hematemesis, melena. Bone pain, joint pain, abdominal pain. Is the bleeding lifelong or of recent onset? Hematuria, extensive bleeding with trauma. Weight loss, fever, pallor, jaundice, recurring infections.

**Past Medical History:** Oozing from the umbilical stump after birth, bleeding at injection sites. Prolonged bleeding after minor surgery (circumcision) or after loss of primary teeth.

**Family History:** Bleeding disorders, anticoagulant use, availability of rodenticides or antiplatelet drugs (eg, aspirin or other nonsteroidals) in the home. Child abuse.

**Social History:** History of child abuse, family stress.

**Physical Examination**

**General Appearance:** Ill-appearance.

**Vital Signs:** Tachypnea, tachycardia, fever, blood pressure (orthostatic changes), cachexia.

**Skin:** Appearance and distribution of petechiae (color, size, shape, diffuse, symmetrical), ecchymotic patterns (eg, belt buckle shape, doubled-over phone cord); folliculitis (neutropenia). Hyperextensible skin (Ehlers-Danlos syndrome). Partial albinism (Hermansky-Pudlak syndrome). Palpable purpura on legs (vasculitis, Henoch-Schönlein purpura).

**Lymph Nodes:** Cervical or axillary lymphadenopathy

**Eyes:** Conjunctival pallor, erythema.

**Nose:** Epistaxis, nasal eschar.

**Mouth:** Gingivitis, mucous membrane bleeding, oozing from gums, oral petechiae.

**Chest:** Wheezing, rhonchi.

**Heart:** Murmurs.

**Abdomen:** Hepatomegaly, splenomegaly, nephromegaly.

**Rectal:** Stool occult blood.

**Extremities:** Muscle hematomas; anomalies of the radius bone (thrombocytopenia absent radius [TAR] syndrome). Bone tenderness, joint tenderness, hemarthroses; hypermobile joints (Ehlers-Danlos syndrome).

**Past Testing:** X-ray studies, endoscopy.
**Kawasaki Disease**

**Chief Complaint:** Fever.

**History of Present Illness:** Fever of unknown cause, lasting 5 days or more; irritability, chest pain. Eye redness. Redness, dryness or fissuring of lips, strawberry tongue. Diarrhea, vomiting, abdominal pain, arthritis/arthralgias. Absence of cough, rhinorrhea, vomiting.

**Physical Examination**

**General Appearance:** Ill appearance, irritable.

**Vital Signs:** Pulse (tachycardia), blood pressure (hypotension), respirations, temperature (fever).

**Skin:** Diffuse polymorphous rash (macules, bullae, erythematous exanthem) of the trunk; morbilliform or scarlatiniform rash.

**Eyes:** Bilateral conjunctival congestion (dilated blood vessels without purulent discharge), erythema, conjunctival suffusion, uveitis.

**Mouth:** Erythema of lips, fissures of lips; swollen, erythematous tongue. Diffuse injection of oral and pharyngeal mucosa.

**Lymph Nodes:** Cervical lymphadenopathy.

**Chest:** Breath sounds.

**Heart:** Murmur, gallop rhythm, distant heart sounds.

**Abdomen:** Tenderness, hepatomegaly, splenomegaly.

**Extremities:** Edema, erythema of the hands and feet; warm, red, swollen hands and feet. Joint swelling, joint tenderness. Desquamation of the fingers or toes, usually around nails and spreading over palms and soles (late).

**Laboratory Evaluation:** CBC with differential, platelet count, electrolytes, liver function tests, ESR, CRP, throat culture, antistreptolysin-O titer, blood cultures.

**Urinalysis:** Proteinuria, increase of leukocytes in urine sediment (sterile pyuria)

**ECG:** Prolonged PR, QT intervals, abnormal Q wave, low voltage, ST-T changes, arrhythmias.

**CXR:** Cardiomegaly

**Echocardiography:** Pericardial effusion, coronary aneurysm, myocardial

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**Differential Diagnosis of Bruising and Bleeding**

<table>
<thead>
<tr>
<th>Hemolytic uremic syndrome</th>
<th>Takayasu arteritis</th>
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</thead>
<tbody>
<tr>
<td>Thrombotic thromboctopenic purpura</td>
<td>Polyarteritis nodosa</td>
</tr>
<tr>
<td>Uremia</td>
<td>Kawasaki syndrome</td>
</tr>
<tr>
<td>Paraproteinemia</td>
<td>Henoch-Schönlein purpura</td>
</tr>
<tr>
<td>Myelodysplastic syndrome</td>
<td>Leukocytoclastic (“hypersensitivity”) vasculitis</td>
</tr>
<tr>
<td>Phenyltoin, valproic acid, quinidine, heparin</td>
<td>Wegener granulomatosis</td>
</tr>
<tr>
<td>A fibrinogenemia/dysfibrinogenemia</td>
<td>Churg-Strauss syndrome</td>
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<tr>
<td>Clotting factor deficiencies (hemophilia A, B, Christmas disease)</td>
<td>Essential cryoglobulinemia</td>
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<tr>
<td>Von Willebrand disease</td>
<td>Systemic lupus erythematosus</td>
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<tr>
<td>Vitamin K deficiency</td>
<td>Juvenile rheumatoid arthritis</td>
</tr>
<tr>
<td>Hemorrhagic disease of the newborn</td>
<td>Mixed connective tissue disease</td>
</tr>
<tr>
<td>Trauma</td>
<td>Dermatomyositis, scleroderma</td>
</tr>
<tr>
<td>Vasculitis</td>
<td>Bacterial or viral infection, spirochetal infection</td>
</tr>
<tr>
<td>Giant cell (temporal) arteritis</td>
<td>Rickettsial infection</td>
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<tr>
<td></td>
<td>Malignancy</td>
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</tbody>
</table>
84 Kawasaki Disease

infarction.

**Differential Diagnosis:** Scarlet fever (no hand, foot, or conjunctival involvement), Stevens-Johnson syndrome (mouth sores, cutaneous bullae, crusts), measles (rash occurs after fever peaks and begins on head/scalp), toxic shock syndrome, viral syndrome, drug reaction.
Behavioral Disorders and Trauma

Failure to Thrive

Chief Complaint: Inadequate growth.

History of Present Illness: Weight loss, change in appetite, vomiting, abdominal pain, diarrhea, fever. Date when the parents became concerned about the problem, previous hospitalizations. Polyuria, polydipsia; jaundice; cough.

Nutritional History: Appropriate caloric intake, 24-hour diet recall; dietary calendar; types and amounts of food offered. Proper formula preparation. Parental dietary restrictions (low fat).

Past Medical History: Excessive crying, feeding problems. Poor suck and swallow, fatigue during feeding. Unexplained injuries.

Developmental History: Developmental delay, loss of developmental milestones.

Perinatal History: Delayed intrauterine growth, maternal illness, medications or drugs (tobacco, alcohol). Birth weight, perinatal jaundice, feeding difficulties.

Family History: Short stature, parental heights and the ages at which the parents achieved puberty. Siblings with poor growth. Deaths in siblings or relatives during early childhood (metabolic or immunologic disorders).

Social History: Parental HIV-risk behavior (bisexual exposure, intravenous drug abuse, blood transfusions). Parental histories of neglect or abuse in childhood; current stress within the family, financial difficulties, marital discord.

### Historical Findings in Failure to Thrive

<table>
<thead>
<tr>
<th>Poor Caloric Intake</th>
<th>Diarrhea, dysentery, fever</th>
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<tbody>
<tr>
<td>Breast-feeding mismanagement</td>
<td>Inflammatory bowel disease</td>
</tr>
<tr>
<td>Lactation failure</td>
<td>Radiation, chemotherapy</td>
</tr>
<tr>
<td>Improper formula preparation</td>
<td>Hypoguesia, anorexia</td>
</tr>
<tr>
<td>Maternal stress, poor diet, illness</td>
<td>Recurrent infections</td>
</tr>
<tr>
<td>Eating disorders</td>
<td>Rash, arthritis, weakness</td>
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<tr>
<td>Aberrant parental nutritional beliefs</td>
<td>Jaundice</td>
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<tr>
<td>Food faddism</td>
<td>Polyuria, polydipsia, polyphagia</td>
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<tr>
<td>Diaphoresis or fatigue while eating</td>
<td>Irritability, constipation</td>
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<tr>
<td>Poor suck, swallow</td>
<td>Mental retardation, swallowing difficulties</td>
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<tr>
<td>Vomiting, hyperkinesis</td>
<td>Intrauterine growth delay</td>
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<tr>
<td>Bilious vomiting</td>
<td></td>
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<tr>
<td>Recurrent pneumonias, steatorrhea</td>
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Physical Examination

General Appearance: Cachexia, dehydration. Note whether the patient looks “ill,” well, or malnourished. Observation of parent-child interaction; affection, warmth. Passive or withdrawn behavior. Decreased vocalization, expressionless facies; increased hand and finger activities (thumb sucking), infantile posture; motor inactivity (congenital encephalopathy or rubella).

Developmental Examination: Delayed abilities for age on developmental screening test.

Vital Signs: Pulse (bradycardia), BP, respiratory rate, temperature (hypother-
86 Failure to Thrive

...mia). Weight, length, and head circumference; short stature, growth percentiles.

**Skin:** Pallor, jaundice, skin laxity, rash.

**Lymph Nodes:** Cervical or supraclavicular lymphadenopathy.

**Head:** Temporal wasting, congenital malformations.

**Eyes:** Cataracts (rubella), icterus, dry conjunctiva.

**Mouth:** Dental erosions, oropharyngeal lesions, cheilosis (cobalamin deficiency), glossitis (Pellagra).

**Neck:** Thyromegaly.

**Chest:** Barrel shaped chest, rhonchi.

**Heart:** Displaced point of maximal impulse, patent ductus arteriosus murmur, aortic stenosis murmur.

**Abdomen:** Protuberant abdomen, decreased bowel sounds (malabsorption, obstructive uropathy), tenderness. Periumbilical adenopathy. Masses (pyloric stenosis or obstructive uropathy), hepatomegaly (galactosemia), splenomegaly.

**Extremities:** Edema, muscle wasting.

**Neuro:** Decreased peripheral sensation.

**Rectal:** Occult blood, masses.

**Genitalia:** Hypospadias (obstructive uropathy).

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### Physical Examination Findings in Growth Deficiency

<table>
<thead>
<tr>
<th>Findings</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Micrognathia, cleft lip and palate</td>
<td>Short stature</td>
</tr>
<tr>
<td>Poor suck, swallow</td>
<td>Cachexia, mass</td>
</tr>
<tr>
<td>Hyperkinesis</td>
<td>Rash, joint erythema, tenderness, weakness</td>
</tr>
<tr>
<td>Bulging fontanelle, papilledema</td>
<td>Jaundice, hepatomegaly</td>
</tr>
<tr>
<td>Nystagmus, ataxia</td>
<td>Ambiguous genitalia, masculinization</td>
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<tr>
<td>Abdominal distension</td>
<td>Irritability</td>
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<tr>
<td>Fever</td>
<td></td>
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<tr>
<td>Clubbing</td>
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<tr>
<td>Perianal skin tags</td>
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</table>

**Laboratory Evaluation:** CBC, electrolytes, protein, albumin, transferrin, thyroid studies, liver function tests.

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### Poor Caloric Intake

- Breast-feeding mismanagement
- Lactation failure
- Maternal stress, poor diet, illness
- Eating disorders (older children)
- Aberrant parental nutritional beliefs
- Food faddism
- Improper formula preparation
- Micrognathia, cleft lip, cleft palate
- Cardiopulmonary disease
- Hypotonia, CNS disease
- Diencephalic syndrome
### Developmental Delay

**Chief Complaint:** Delayed development.

**Developmental History:** Age when parents first became concerned about delayed development. Rate and pattern of acquisition of skills; developmental regressions. Parents' description of the child's current skills. How does he move around? How does he use his hands? How does he let you know what he wants? What does he understand of what you say? What can you tell him to do? What does he like to play with? How does he play with toys? How does he interact with other children?

Behavior in early infancy (quality of alertness, responsiveness). Developmental quotient (DQ): Developmental age divided by the child's chronologic age x 100. Vision and hearing deficits.

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#### Poor Caloric Retention
- Increased intracranial pressure
- Labyrinthine disorders
- Esophageal obstruction, gastroesophageal reflux, preampillary obstruction
- Intestinal obstruction, volvulus, Hirschsprung disease
- Metabolic disorders

#### Poor Caloric Digestion/Assimilation/Absorption
- Cystic fibrosis
- Shwachman-Diamond syndrome
- Fat malabsorption
- Enteric infections
- Infection
- Inflammatory bowel disease
- Cancer treatment
- Gluten-sensitive enteropathy
- Carbohydrate malabsorption
- Intestinal lymphangiecctasia
- Zinc deficiency

#### Increased Caloric Demands
- Chronic infection
- HIV infection
- Malignancies
- Autoimmune disorders
- Chronic renal disease
- Chronic liver disease
- Diabetes mellitus
- Adrenal hyperplasia
- Hypercalcemia
- Hypothyroidism
- Metabolic errors

#### Miscellaneous
- CNS impairment
- Prenatal growth failure
- Short stature
- Lagging-down
- Normal thinness
88 Developmental Delay

Perinatal History: In utero exposure to toxins or teratogens, maternal illness or trauma, complications of pregnancy. Quality of fetal movement, poor fetal weight gain (placental dysfunction). Apgar scores, neonatal seizures, poor feeding, poor muscle tone at birth. Growth parameters at birth, head circumference.

Past Medical History: Illnesses, poor feeding, vomiting, failure to thrive. Weak sucking and swallowing, excessive drooling.

Medications: Anticonvulsants, stimulants.

Family History: Illnesses, hearing impairment, mental retardation, mental illness, language problems, learning disabilities, dyslexia, consanguinity.

Social History: Home situation, toxin exposure, lead exposure.

Physical Examination

Observation: Facial expressions, eye contact, social, interaction with caretakers and examiner. Chronically ill, wasted, malnourished appearance, lethargic/fatigued.

Vital Signs: Respirations, pulse, blood pressure, temperature. Height, weight, head circumference, growth percentiles.

Skin: Café au lait spots, hypopigmented macules (neurofibromatosis), hemangiomas, telangiectasias, axillary freckling. Cyanosis, jaundice, pallor, skin turgor.

Head: Frontal bossing, low anterior hairline; head size, shape, circumference, microcephaly, macrocephaly, asymmetry, cephalohematoma; short palpebral fissure, flattened mid-face (fetal alcohol syndrome), chin shape (prominent or small).

Eyes: Size, shape, and distance between the eyes (small palpebral fissures, hypotelorism, hypertelorism, upslanting or downslanting palpebral fissures). Retinopathy, cataracts, corneal clouding, visual acuity. Lens dislocation, corneal clouding, strabismus.

Ears: Size and placement of the pinnae (low-set, posteriorly rotated, cupped, small, prominent). Tympanic membranes, hearing.

Nose: Broad nasal bridge, short nose, anteverted nares.

Mouth: Hypoplastic philtrum. Lip thinness, downturned corners, fissures, cleft, teeth (caries, discoloration), mucus membrane color and moisture.

Lymph Nodes: Location, size, tenderness, mobility, consistency.

Neck: Position, mobility, swelling, thyroid nodules.

Lungs: Breathing rate, depth, chest expansion, crackles.

Heart: Location and intensity of apical impulse, murmurs.

Abdomen: Contour, bowel sounds, tenderness, tympany; hepatomegaly, splenomegaly, masses.

Genitalia: Ambiguous genitalia (hypogonadism).

Extremities: Posture, gait, stance, asymmetry of movement. Edema, clinodactyly, syndactyly, nail deformities, palmar or plantar simian crease.

Neurological Examination: Behavior, level of consciousness, intelligence, emotional status. Equilibrium reactions (slowly tilting and observing for compensatory movement). Protective reactions (displacing to the side and observing for arm extension by 7 to 8 months).

Motor System: Gait, muscle tone, muscle strength (graded 0 to 5), deep tenon reflexes.

Primitive Reflexes: Palmar grasp, Moro, asymmetric tonic neck reflexes.

Signs of Cerebral Palsy: Fisting with adducted thumbs, hyperextension and scissoring of the lower extremities, trunk arching. Poor suck-swallow, excessive drooling.
Diagnostic Studies: Karyotype for fragile X syndrome, fluorescent in situ hybridization (FISH), DNA probes. Magnetic resonance imaging (MRI) or CT scan.

Metabolic Studies: Ammonia level, liver function tests, electrolytes, total CO₂, venous blood gas level. Screen for amino acid and organic acid disorders. Organic acid assay, amino acid assay, mucopolysaccharides assay, enzyme deficiency assay.

Other Studies: Audiometry, free-thyroxine (T4), thyroid-stimulating hormone (TSH), blood lead levels, electrotomyography, nerve conduction velocities, muscle biopsy.

<table>
<thead>
<tr>
<th>Differential Diagnosis of Developmental Delay</th>
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<tbody>
<tr>
<td>Static global delay/mental retardation</td>
</tr>
<tr>
<td>- Idiopathic mental retardation</td>
</tr>
<tr>
<td>- Chromosomal abnormalities or genetic syndromes</td>
</tr>
<tr>
<td>- Hypoxic-ischemic encephalopathy</td>
</tr>
<tr>
<td>- Structural brain malformation</td>
</tr>
<tr>
<td>- Prenatal exposure to toxins or teratogens</td>
</tr>
<tr>
<td>- Congenital infection</td>
</tr>
<tr>
<td>Progressive global delay</td>
</tr>
<tr>
<td>- Inborn errors of metabolism</td>
</tr>
<tr>
<td>- Neurodegenerative disorders</td>
</tr>
<tr>
<td>- Rett syndrome</td>
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<tr>
<td>- AIDS encephalopathy</td>
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<tr>
<td>- Congenital hypothyroidism</td>
</tr>
<tr>
<td>Language disorders</td>
</tr>
<tr>
<td>- Hearing impairment</td>
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<tr>
<td>- Language processing, expressive language disorders</td>
</tr>
<tr>
<td>- Pervasive developmental disorder or autistic disorder</td>
</tr>
<tr>
<td>Gross motor delay</td>
</tr>
<tr>
<td>- Cerebral palsy</td>
</tr>
<tr>
<td>- Peripheral neuromuscular disorders</td>
</tr>
</tbody>
</table>

Syndromes Associated With Development Delay
- Down Syndrome
- Fragile X Syndrome
- Prader-Willi Syndrome
- Turner Syndrome
- Williams Syndrome
- Noonan syndrome
- Sotos Syndrome
- Klinefelter Syndrome
- Angelman Syndrome
- Cornelia de Lange Syndrome
- Beckwith-Wiedemann Syndrome

Psychiatric History

I. Identifying Information: Age, gender.
II. Chief Complaint: Reason for the referral.
   A. History of the Present Illness (HPI)
      1. Developmental Level: Cognitive, affective, interpersonal development.
      2. Neurodevelopmental Delay: Cerebral palsy, mental retardation,
90 Psychiatric History

congenital neurologic disorders.

(3) **Organic Dysfunction**: Problems with perception, coordination, attention, learning, emotions, impulse control.

(4) **Thought Disorders**: Delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, negative symptoms (eg, affective flattening, paucity of thought or speech).

(5) **Anxiety and Behavioral Symptoms**: Phobias, obsessive-compulsive behaviors, depression.

(6) **Temperamental Difficulty**: Adaptability, acceptability, demandingness.

(7) **Psychophysiological Disorders**: Psychosomatic illnesses, conversion disorder.

(8) **Unfavorable Environment**: Family or school problems.

(9) **Causative Factors**
   a. **Genetic Disorders**: Dyslexia, attention-deficit hyperactivity disorder, mental retardation, autism.
   b. **Organic Disorders**: Malnutrition, intrauterine drug exposure, prematurity, head injury, central nervous system infections/tumors, metabolic conditions, toxins.
   c. **Developmental Delay**: Immaturity and attachment problems. Relationships with parents and siblings; developmental milestones, peer relationships, school performance.
   d. **Inadequate Parenting**: Deprivation, separation, abuse, psychiatric disorders.
   e. **Stress Factors**: Illness, injury, surgery, hospitalizations, school failure, poverty.
   f. **Biological Function**: Appetite, sleep, bladder and bowel control, growth delay.
   g. **Relationships**: Family and peer problems.
   h. **Significant Life Events**: Separation and losses.
   i. **Previous Evaluations**: Previous psychiatric and neurological problems and assessments.
   j. **Parental Psychiatric State**: Status of each parent and their marriage. Relatives with psychiatric disorders, suicide, alcohol or substance abuse.

III. Mental Status Examination

A. **Physical Appearance**
   (1) **Stature**: Age-appropriate appearance, precocity, head circumference.
   (2) **Dysmorphic Features**: Down syndrome, fragile X, fetal alcohol syndrome.
   (3) **Neurological Signs**: Weakness, cranial nerve palsies.
   (4) **Bruising**: Child abuse.
   (5) **Nutritional State**: Obesity, malnutrition, eating disorder.
   (6) **Movements**: Tics, biting of lips, hair pulling (ie, Tourette’s disorder, anxiety).
   (7) ** Spells**: Momentary lapses of attention, staring, head nodding, eye blinking (ie, epilepsy, hallucinations).
   (8) **Dress, Cleanliness, Hygiene**: Level of care and grooming.
   (9) **Mannerisms**: Thumb sucking, nail biting

B. **Separation**: Excessive difficulty in separation.

C. **Orientation**
(1) To person: Verbal children should know their names.
(2) To place: Young children should know whether they are away or at home.
(3) To time: A sense of time is formed by age 8 or 9. Young children can tell whether it is day or night.

D. Central Nervous System Function: Soft signs (persistent neurodevelopmental immaturities):
(1) Gross Motor Coordination Deficiency: Impaired gait.
(2) Fine Motor Coordination: Copies a circle at age 2 to 3, cross at age 3 to 4, square at age 5, rhomboid at age 7.
   a. Laterality: Right and left discrimination by age 5.
   b. Rapid Alternating Movements: Hopping on one foot by age 7.
   c. Attention Span: Distractibility, hyperactivity.

E. Reading or Writing Difficulties: Dyslexia, dysgraphia.

F. Speech and Language Difficulties: Autism, mental retardation, deprivation, regression.

G. Intelligence: Vocabulary, level of comprehension, ability to identify body parts by age 5, drawing ability, mathematical ability.

H. Memory: Children can count five digits forward and two backwards.

I. Thinking Process: Logical and coherent thoughts, hallucinations, suicidal ideation, homicidal ideation, phobias, obsessions, delusions.

J. Fantasies and Inferred Conflicts: Dreams, naming three wishes, drawing, spontaneous play.

K. Affect: Anxiety, anger, depression, apathy.

L. Defense Organization: Denial, projection, introversion, extroversion.

M. Judgment and Insight: The child’s opinion of the cause of the problem. How upset is the child about the problem?

N. Adaptive Capacities: Problem-solving ability, resiliency.

Attempted Suicide and Drug Overdose

History of Present Illness: Time suicide was attempted and method. Quantity of pills; motive for attempt. Alcohol intake; where was substance obtained. Precipitating factor for suicide attempt (death, divorce, humiliating event); further desire to commit suicide. Is there a definite plan? Was the action impulsive or planned?

Feelings of sadness, guilt, hopelessness, helplessness. Reasons that the patient has to wish to go on living. Did the patient believe that he would succeed in suicide? Is the patient upset that he is still alive?

Past Psychiatric History: Previous suicide attempts or threats.

Medications: Antidepressants.

Family History: Depression, suicide, psychiatric disease, marital conflict, family support.

Social History: Personal or family history of emotional, physical, or sexual abuse; alcohol or drug abuse, sources of emotional stress. Availability of other dangerous medications or weapons.

Physical Examination

General Appearance: Level of consciousness, delirium; presence of potentially dangerous objects (belts, shoe laces).

Vital Signs: BP (hypotension), pulse (bradycardia), temperature, respiratory
92 Toxicological Emergencies

rate.
HEENT: Signs of trauma, ecchymoses; pupil size and reactivity, mydriasis, nystagmus.
Chest: Abnormal respiratory patterns, rhonchi (aspiration).
Heart: Arrhythmias, murmurs.
Abdomen: Decreased bowel sounds, tenderness.
Extremities: Wounds, ecchymoses, fractures.
Neurologic: Mental status exam; tremor, clonus, hyperactive reflexes.
Laboratory Evaluation: Electrolytes, BUN, creatinine, glucose. Alcohol, acetaminophen levels; chest X-ray, urine toxicology screen.

Toxicological Emergencies

History of Present Illness: Substance ingested, time of ingestion, quantity ingested (number of pills/volume of liquid). Was this a suicide attempt or gesture? Vomiting, lethargy, seizures, altered consciousness.
Past Medical History: Previous poisonings; heart, lung, kidney, gastrointestinal, or central nervous system disease.

Physical Examination
Vital Signs: Tachycardia (stimulants, anticholinergics), hypoventilation (narcotics, depressants), fever (anticholinergics, aspirin, stimulants).
Skin: Dry mucosa (anticholinergic); very moist skin (cholinergic or sympathomimetic).
Mouth:
Breath: Alcohol, hydrocarbon, cyanide odor.
Eyes: Miosis, mydriasis, nystagmus (phenytoin or phencyclidine).
Chest: Breath sounds.
Cardiac: Bradycardia (beta-blocker, cholinergic, calcium channel blocker).
Abdomen: Decreased bowel sounds (anticholinergic or narcotic).
Neurological: Gait, reflexes, mental status, stimulation, sedation.
Laboratory Evaluation: Glucose (low in alcohols, oral hypoglycemics, aspirin, beta-blockers, insulin; high in iron, late aspirin), hypokalemia (lithium). Arterial blood gases. Liver function tests, WBC, toxicity screen of urine and serum. Methemoglobin test of blood. Ferric chloride urine test for aspirin.
Kidney, Ureter and Bladder (KUB) X-ray: Radiopaque pill fragments are seen with calcium, chloral hydrate, heavy metals (lead), iron, Pepto Bismol, phenothiazines, enteric-coated pills.
ECG: Prolonged QTc or widened QRS (tricyclic antidepressants).

<table>
<thead>
<tr>
<th>Toxin</th>
<th>Clinical Findings</th>
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<tbody>
<tr>
<td>Iron</td>
<td>Diarrhea, bloody stools, metabolic acidosis, hematemesis, coma, abdominal pain, leukocytosis, hyperglycemia</td>
</tr>
<tr>
<td>Opioids</td>
<td>Coma, respiratory depression, miosis, track marks, bradycardia, decreased bowel sounds</td>
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<tr>
<td>Substance</td>
<td>Symptoms</td>
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<td>-------------------------</td>
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<tr>
<td>Organophosphates</td>
<td>Miosis, cramps, salivation, urination, bronchorrhea, lacrimation, defecation, bradycardia</td>
</tr>
<tr>
<td>Salicylates</td>
<td>Hyperventilation, fever, diaphoresis, tinnitus, hypo- or hyperglycemia, hematemesis, altered mental status, metabolic acidosis, respiratory alkalosis</td>
</tr>
<tr>
<td>Phencyclidine (PCP)</td>
<td>Muscle twitching, rigidity, agitation, nystagmus, hypertension, tachycardia, psychosis, blank stare, myoglobinuria, increased creatinine phosphokinase</td>
</tr>
<tr>
<td>Tricyclic anti-depressants</td>
<td>Dry mucosa, vasodilation, hypotension, seizures, ileus, altered mental status, pupillary dilation, arrhythmias, widened QRS</td>
</tr>
<tr>
<td>Theophylline</td>
<td>Nausea, vomiting, tachycardia, tremor, convulsions, metabolic acidosis, hypokalemia, ECG abnormalities</td>
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<tr>
<td>Adrenergic storm (cocaine, amphetamines, phenylpropanolamine)</td>
<td>Pupillary dilatation, hyperthermia, agitation, diaphoresis, seizures, tremor, anxiety, tactile hallucinations, dysrhythmias, active bowel sounds, track marks, hypertension</td>
</tr>
<tr>
<td>Sedative/hypnotics</td>
<td>Respiratory depression, coma, hypothermia, disconjugate eye movements</td>
</tr>
<tr>
<td>Anticholinergics</td>
<td>Dry mucous membranes and skin, tachycardia, fever, arrhythmias, urinary and fecal retention, mental status change, pupillary dilation, flushing</td>
</tr>
</tbody>
</table>

**Trauma**

**History:** Allergies, Medications, Past medical history, Last meal, and Events leading up to the injury (AMPLE). Determine the mechanism of injury and details of the trauma.

I. **Primary Survey: ABCDEs**
   A. **Airway:** Check for signs of obstruction (noisy breathing, inadequate air exchange). Normal speech indicates a patent airway.
   B. **Breathing:** Observe chest excursion. Auscultate chest.
   C. **Circulation:** Heart rate, blood pressure, pulse pressure, level of consciousness, capillary refill.
   D. **Disability**
      1. **Level of Consciousness:** Alert, response to verbal stimuli, response to painful stimuli, unresponsive.
(2) Neurological Deficit: Four extremity gross motor function, sensory deficits.

E. Exposure: Completely undress the patient.

II. Secondary Survey
   A. Head: Raccoon eyes, Battle's sign, laceration, hematoma, deformity, skull fracture.
   B. Face: Laceration, deformity/asymmetry, bony tenderness.
   C. Eyes: Visual acuity, pupil reactivity, exothalmos, enophthalmos, hyphema, globe laceration, extraocular movements, lens dislocation.
   D. Ears: Laceration, hemotympanum, cerebrospinal fluid otorrhea.
   E. Nose: Laceration, nosebleed, septal hematoma, CSF rhinorrhea.
   F. Mouth: Lip laceration, tongue laceration, gum laceration, loose or missing teeth, foreign body, jaw tenderness/deformity.
   G. Neck: Laceration, hematoma, tracheal deviation, venous distention, carotid pulsation, cervical spine tenderness/deformity, tracheal deviation, subcutaneous emphysema, bruist, stridor.
   H. Chest: Symmetry, flail segments, laceration, rib and clavicle tenderness or deformity, subcutaneous emphysema, bilateral breath sounds, heart sounds.
   I. Abdomen: Laceration, ecchymosis, scars, tenderness, distention, bowel sounds, pelvis symmetry, deformity, tenderness, femoral pulse.
   J. Rectal: Sphincter tone, prostate position, occult blood.
   K. Genitourinary: Meatal blood, hematoma, laceration, tenderness, hematuria.
   L. Extremities: Color, deformity, laceration, hematoma, temperature, pulses, bony tenderness, capillary refill.
   M. Back: Ecchymosis, laceration, spine or rib tenderness, range of motion.
   N. Neurological Examination: Level of consciousness, pupil reactivity, sensation, reflexes, Babinski sign.

III. Radiographic Evaluation of the Blunt Trauma Patient
   A. Standard trauma series
      (1) Cervical spine
      (2) Chest X ray
      (3) Pelvic radiograph
      (4) Computed Tomography (CT)
# Index

Abdominal pain 41
Acute abdomen 41
Acute Diarrhea 54
Adenoma sebaceum 67
Amenorrhea 63
Apnea 69
Asthma 17
Bleeding 82
Bronchiolitis 31
Brudzinski's sign 32
Bruising 82
CBC 7
Cellulitis 37
Cerebral Spinal Fluid 33
Chest pain 13
Chief Compliant 5
Chronic Diarrhea 54
Coma 71
Confusion 71
Congestive Heart Failure 14
Constipation 57
Cough 24-26
Croup 31
Cystitis 33
Delirium 71
Developmental Delay 87
Developmental milestones 10
Developmental quotient 87
Diabetic ketoacidosis 78
Diabetic retinopathy 78
Diarrhea 54
Discharge Note 8
Discharge summary 9
Drug Overdose 91
Dyspnea 14
Ear pain 27
Ecchyma gangrenosum 24, 38
Ectopic Pregnancy 65
Edema 77
Electrolytes 7
Endocarditis 38
Enuresis 73
EOMI 6
Epiglottitis 30
Epistaxis 60
Failure to Thrive 85
Fever 23
Frequency 73
Gastrointestinal bleeding
   lower 60
   upper 58
Gum hyperplasia 69
Headache 67
Heart Failure 14
Hegar's sign 65
Hematemesis 58
Hematochezia 41, 42
Hematuria 74
Hepatitis 48
Hepatosplenomegaly 52
History 5
History of Present Illness 5
Hoarseness 20
Hypertension 15
Hypertensive retinopathy 15
Iliopsoas sign 41
Infectious diseases 23
Iron 93
Jaundice 48
Kawasaki's Disease 83
Kernig's sign 32
Laryngotraeobronchitis 31
Lower Gastrointestinal Bleeding 60
Lymphadenitis 34
Lymphadenopathy 34
McBurney's point 41, 43
Melena 41, 42, 60
Meningitis 32, 33
Nephrology 73
Nephromegaly 74
Neurology 67
Newborn examination 7
Obstipation 41, 42
Obtundation 71
Obturator sign 41
Opioids 93
Organophosphates 93
Oropharyngeal Obstruction 18
Orthostatic hypotension 59
Osteomyelitis 39
Otitis Media 27
Parapharyngeal abscess 30
Past Medical History 5
PCP 93
Pediatric history 5
Pelvic Pain 65
Peritonsillar abscess 30
PERRLA 6
Phencyclidine 93
Physical Examination 6
Pneumonia 24, 25
Polyuria 73
Port-wine nevus 69
Postural hypotension 59
Prescription Writing 9
Procedure Note 10
Progress Notes 8
Proteinuria 75
Psychiatric History 90
Pulmonology 17
Pulsus paradoxicus 17
Pyelonephritis 33
Rash 81
Recurrent Abdominal Pain 42
Renal bruit 15
Retropharyngeal abscess 30
Rovsing's sign 41, 43
RRR 6
Salicylates 93
Seizures 68
Septic Arthritis 39
Spells 68
Stridor 18
Stupor 71
Sturge-Weber syndrome 69
Suicide 91
Swelling 77
Tactile fremitus 26
Todd's paralysis 69
Toxicological Emergencies 92
Toxidromes 93
Trauma 94
Tuberculosis 27
Tuberculou 33
UA 7
Unusual Movements 68
Upper Gastrointestinal Bleeding 58
Urinary Frequency 73
Urinary tract infection 33
Urine analysis 7
Uterine bleeding 64
Vaginal Bleeding 64
Vomiting 44
Von Recklinghausen's disease 69
Wheezing 17
Wilson's disease 49