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Current Clinical Strategies

Pediatric History and Physical Examination

Fourth Edition

Elizabeth K. Albright, MD

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Medical Documentation

Pediatric History

Identifying Data: Patient's name, age, sex; significant medical conditions, informant (parent).

Chief Complaint (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 (e.g., 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: Rash, 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 stool.

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, menstrual duration, amount of flow.

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, bruises, fontanelles (size, tension), dilated veins, facial asymmetry.

Eyes: Pupils equal round and react to light and accommodation (PERLLA); 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, dullness, bulging), hearing.

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

Mouth: Lips (thinness, downturning, fissures, chapped), teeth, mucous membrane color and moisture (leukoplakia, Epstein's pearls), tongue, clivus 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, 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, hernia, 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.

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, symphysis, pits, 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.

Motors 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 name 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.

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 symmetry.

Eyes: Scleral hemorrhages, cataracts, red reflex, pupils (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. Distinct 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), melena (yellow papules), Mongolian spots (bluish patches).

8P rogressN otes

Extremities: Extra digits, si mianl ines, pi lonidaldi mpleorcy st, sacral hai rtuft, hipdi slocation; a" click"fel tonrotati onofhi ps (Barlowm aneuver, devel opmentalhi pdi slocation).

Neurologic Examination: Tone, acti vity, sy mmetry of ex tremity movement, symmetry o ffa cial movements, alertness, co nsolability, Moro r eflex, su ck reflex, rootrefl ex, grasprefl ex, pl antarrefl ex.

ProgressN otes

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

Date/time:

Subjective: A ny problems and symptoms should be charted. A ppetite, pain or fussiness may be included.

Objective:

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.

Laboratory Evaluation: New test results. Circle abnormal values.

Current medications: List medications and dosages.

Assessment and Plan: This section should be organized by problem. Separate assessment and plan should be written for each problem.

Discharge Note

The discharge notes should be written prior to discharge.

Date/time:

Diagnoses:

Treatment: Briefly describe therapy provided during hospitalization, including antibiotics, surgery, and cardiovascular drugs.

Studies Performed: Electrocardiograms, Chest X-ray.

Discharge medications:

Follow-up Arrangements:

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 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.

Discharge 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 how ill the patient is at the time of discharge.

Discharge Medications: List medications and instructions for patient taking them.

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 clinician, consultants.

Prescription Writing

- Patient's name:
- Date:
- Drug name and preparation (eg, tabletts): Lasi x40mg
- Quantity of dispense: #40
- Frequency of administration: Sig: 1 po q AM
- Refills: None
- Signature

ProcedureNote

A procedurenote should be written in the chart after a procedure is performed. Procedure notes are brief reports of procedures.

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, anatomical 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

Age	Milestones
1 month	Raises head slightly when prone; alert to sound; regards face, moves extremities equally.
2-3 months	Smiles, holds head up, coos, reaches for familiar objects, recognizes parent.
4-5 months	Rolls front to back and back to front; sits well when propped; laughs, orient to voice; enjoys looking around; grasps rattle, bears some weight on legs.
6 months	Sits unsupported; passes cube from hand to hand; babbling; uses raking grasp; feeds self with fingers.
8-9 months	Crawls, cruises; pulls to stand; pincer grasp; plays pat-a-cake; feeds self with bottle; sits without support; explores environment.
12 months	Walking, talking a few words; understands no; says mama/dada discriminantly; throw objects; imitates actions, marks with crayon, drinks from cup.

Age	Milestones
15-18 months	Comes when called; scribbles; walks backward; uses 4-20 words; builds two blocks.
24-30 months	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 feed self, copies parents.
3 years	Dresses and undresses; walks up and down steps; draws a circle; knows more than 250 words; takes turns; shares. Group play.
4 years	Hops, skips, catches ball; memorizes songs; plays cooperatively; knows colors; uses plurals.
5 years	Jump over objects; prints first name; knows address and mother's name; follows game rules; draws a three-part man; hops on one foot.

12D 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 previous 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

Acute pain?
First time?
Systemic symptoms?
Duration of complaints?
Exertional?
Syncope? Palpitations?
Cough?
Localized?
Reproducible? How?
Associated symptoms?

Abdominal pain, limb pain, headaches?
Light-headedness, tetany, cramps, dizziness?
Dermatomal distribution?
Aggravated by resting or supine position?
Poor school attendance?
Stressful life events?

Physical Examination

General: Visible pain, apprehension, distress. Note whether the patient looks "ill" or well. Position that accentuates or relieves the pain.

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

Skin: Cool extremities, pallor.

Chest: Chest wall tenderness. Swelling, trauma, dermatomal lesions, breast development, gynecomastia, xiphoid process tenderness. Crackles, rhonchi, wheeze.

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.

DifferentialD iagnosisofC hestP ain

MusculoskeletalD isorders

- Costochondritis
- Chestwallsyndrom e
- Tietzesyndrom e
- Xiphoidcartil agesyndrom e
- Stitch
- Precordialcatchsyndrom e
- Slippingri bsyndrom e

IdiopathicDisorders:P sychogenic, hyperventilation

BreastDisorders:Gynecom astia, fibrocysticchanges

CardiovascularD isease

- Pericarditis
- Leftventricularoutflow obstruction,aorticm urmur
- Dysrhythmias

PulmonaryDisorders:P neumonia, pneumothorax,asthma

GastrointestinalDisorders: Esophagitis,gastroesophageal reflux, pepticulcerdisease

Vertebral/RadicularDisorders

- Spinalstenosis
- Herniateddisk
- Vertebralfracture

DyspneaandC ongestiveH eartFailur e

ChiefComplaint:Shortnessofbreath.

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 feeding, 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, sternal 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 anti-inflammatory 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, hyperpigmented lesions (von Recklinghausen's disease, tuberous sclerosis), lymphedema (Turner's syndrome), rashes (connective tissue disease), striae, hirsutism (Cushing's syndrome), plethora (pheochromocytoma).

HEENT: Puffy edema, thyromegaly (hyperthyroidism), moon faces (Cushing's syndrome); swelling 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). Lateral lydisplac 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 formetanephrine; plasma catecholamines (pheochromocytoma), lipid profile. ECG, renal ultrasound.

Chest X-ray: Cardiomegaly, indentation of aorta (coarctation), rib notching.

16H ypertension

Differential Diagnosis of Hypertension	
Renal	
Chronic pyelonephritis Chronic glomerulonephritis Hydronephrosis Congenital dysplastic kidney Multicystic kidney Solitary renal cyst Vesicoureteral reflux nephropathy	Segmental hyaline arteriosclerosis Ureteral obstruction Renal tumors Renal trauma Systemic lupus erythematosus (other connective tissue diseases)
Vascular	
Coarctation of the aorta Renal artery lesions Umbilical artery catheterization with thrombus formation	Neurofibromatosis Renal vein thrombosis Vasculitis
Endocrine	
Hyperthyroidism Hyperparathyroidism Congenital adrenal hyperplasia Cushing syndrome Hyperaldosteronism	Pheochromocytoma Neuroblastoma, ganglioneuroblastoma, ganglioneuroma Diabetic nephropathy Liddle syndrome
Central Nervous System	
Intracranial mass Hemorrhage	Brain injury Quadriplegia
Essential Hypertension	
Low renin Normal renin	High renin

Pulmonary Disorders

Wheezing and Asthma

Chief Complaint: Wheezing.

History of Present Illness: Onset, duration and progression of wheezing; current and basal flow rate; severity of attack compared to previous episodes; fever, frequency of hospitalizations; home nebulizer use; cough.

Aggravating factors: Exercise, cold air, viral respiratory infections, exposure to dust mites, animal dander. Season that provokes 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), pulse paradoxus (> 15 mm Hg significant pulmonary compromise).

Skin: Flurulent conjunctivae, urticaria.

Nose: Nasal flaring, chronic rhinitis, nasal polyps.

Mouth: Pharyngeal erythema, perioral cyanosis, grunting.

Chest: Sternum, clavicular, and intercostal retractions, intercostal 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 pulmonary 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.

DifferentialD iagnosisofW heezing

Infant	OlderChild
Vascularring Tracheoesophagealfistula Gastroesophagealreflux Asthma Viralinfection(bronchiolitis,upper respiratorytractinfection) Pertussis Cysticfibrosis Bronchopulmonarydysplasia Congenitalheartdisease	Asthma Aspiration(reflux,foreignbody) Epiglottitis Laryngotracheobronchitis(croup) Cysticfibrosis Hypersensitivitypneumonitis Tuberculosis Tumor Alpha ₁ -antitrypsindeficiency Vocalcorddysfunction

StridorandOropharyngealObstruction

ChiefComplaint: Difficultybreathing.

HistoryofPresentIllness: Timeofonsetofstridor,respiratorydistress. Fever, sorethroat, headache,malaise. Voicechanges(muffledvoice),drooling. Hoarseness,exposuretoinfections.Traumaorpreviousurgery.

Increasedstridorwithstress;worseninginthesupineposition;improvementwiththe neckextended(congenitallaryngomalacia). Cough,cyanosis,regurgitation, chokingwithfeedings,drooling,foreignbody. Historyofintubation(subglotticstenosis),hemangiomas.

Perinatal History: Abnormalpositioninutero,forcepsdelivery,shoulder dystocia.Respiratorydistressorstridoratbirth.

OropharyngealObstruction	Stridor
Fever,sorethroat,headache Muffledvoice Craniofacialanomalies Cutaneousabnormalities Neurologic symptoms	Gradualonset Acuteonset,fever Worsensupineposition Perinataltrauma Methodofdelivery Presentatbirth Feedingdifficulties Previousintubation

PhysicalExamination

GeneralAppearance: Adequacyofoxygenationandventilation,airwaystability. Anxiety,restlessness,fatigue,obtundation.Gruntingrespirations,muffledvoice,hoarseness, stridor.

Vital Signs: Respiratoryrate, tachypnea,shallowbreathing.Pulseoximetry. Tachycardia,fever.Growthpercentiles.

Head: Congenitalanomalies.

Skin: Perioral cyanosis, nail cyanosis, clubbing.

Nose: Nasal flaring.

Mouth: Bifid uvula, cleft palate. Symmetrical palatal movement. Brisk gag reflex, tonsillar symmetry. Tongue symmetry, movements normal. Lid reactions, masses.

Neck: Masses, external fistulas, midline trachea.

Heart: Murmurs, abnormal palpitations, 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.

Anxiety, fatigue, lethargy Cyanosis Tachypnea Hyperpnea Shallow breaths Pulse oximetry < 95% Poor growth Clubbing Heart murmur Congenital head and neck anomalies Bifid uvula Enlarged tonsils Neck masses Asymmetric chest expansion Retractions	Increased anteroposterior chest diameter Accessory muscle use Mouth-breathing Grunting, nasal flaring Muffled voice Hyponasal speech Hypernasal speech Low-pitched, flutering sound Aponia Quiet, moist stridor Stridor Asymmetric wheezes Neck extended Opisthotonic posture Torticollis
---	---

Differential Diagnosis of Oropharyngeal Obstruction

Micrognathia Pierre Robin syndrome Treacher Collins syndrome Macroglossia Down syndrome Beckwith-Wiedemann syndrome Lymphangioma Hemangioma Lingual thyroid Tonsillitis/hypertrophy: bacterial, viral Uvulitis Peritonsillar abscess	Retropharyngeal abscess Parapharyngeal abscess Hemangioma Lymphangioma Ranula Lymphoma Lymphosarcoma Rhabdomyosarcoma Fibrosarcoma Epidermoid carcinoma Adenoid hypertrophy Palatal hypotonia Obesity
---	---

20H oarseness

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

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 cord polyps, vocal 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); previous 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, normal reflexes, masses. Cleft lip, cleft palate, bifid uvula, enlarged tonsils. Mouth-breathing, grunting, nasal flaring;

Neck: Congenital anomalies; neck mass, masses or external fistulas, midline 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.

Neonatal	Older Child
<p>Laryngomalacia Webs Subglotticstenosis Cystic lesions Excessive secretions (fistulas, gastroesophageal reflux) Vascular tumors (hemangioma, lymphangioma) Cricoid chondroma Vocal cord paralysis Vocal cord trauma Hypothyroidism, hypocalcemia, Farber disease Viral infection (laryngitis, croup)</p>	<p>Postnasal drip Epiglottitis Recurrent voice abuse (cord polyps, nodules) Siccoid syndromes Neoplasia (papilloma, hemangioma) Trauma (postsurgical, intubation) Gaucher disease, mucopolysaccharidosis Williams syndrome, Cornelia de Lange syndrome Conversion reaction</p>

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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, anti-convulsants.

Allergies: Drug allergies.

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

Social History: Alcohol use, smoking.

Review of Systems: Bacterial infection (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? Purpura or ulceration.
 Insect bites? Tick exposure, fleas 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? Animal medication.

Review of systems? Rash, joint complaints, cough, bowel movements.
 Blood, urine, stool, and throat cultures?
 Complete blood count? Inflammatory disorders, unusual lymphocyte count, leukocyte count. Falling count suggests 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: Rash, nodules, skin breaks, bruises, pallor. Lacerations, splinter hemorrhages; delayed capillary refill, petechiae (septic emboli, meningococemia),

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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's disease), rectal flocculence, 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

Electrolytes

Arterial blood gases

Blood urea nitrogen and creatinine

Urinalysis

INR, partial thromboplastin time, fibrinogen

Serum lactate

Cultures with antimicrobial sensitivities

Blood

Urine

Wound

Sputum, drains

Chest x-ray

Computed tomography, magnetic resonance imaging, abdominal x-ray

Differential Diagnosis of Fever

Infectious Disease (50% of diagnoses)

Localized Infection

Respiratory tract

Upper--rhinitis, pharyngitis, sinusitis

Lower--pneumonia, bronchitis, bronchiectasis, foreign body

Urinary tract infection

Osteomyelitis

Meningitis, encephalitis

Abdominal abscess, appendicitis

Generalized 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

Collagen/Connective Tissue Disorders*Juvenile rheumatoid arthritis**Kawasaki syndrome**Systemic lupus**Rheumatic fever***Other:** Vasculitis syndromes, Behçet's disease, mixed connective tissue disease**Neoplasia***Lymphoreticular malignancies**Sarcomas**Inflammatory Bowel Disease**Crohn disease***Periodic Fever**

Recurrent viral infections

Cyclic neutropenia, familial Mediterranean fever (serositis, arthritis), "pharyngitis with aphthous stomatitis" (Marshall's syndrome), Borrelia infection, familial dysautonomia

Pseudo-fever of Unknown Origin: Prolonged low-grade fevers without findings on examination, multiple vague complaints, normal laboratory tests

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, tuberculosis. Timing of the cough, frequency of cough; cough characteristics. Dry, "brassy" cough (tracheal or laryngeal rhytms). Cough that is most noticeable 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:** Influenza, 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:** 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.

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Throat: P haryngeal cobblestone follicles, pharyngeal erythema, masses, tonsillare nlargement.

Neck: Rigidity, masses, thyroid masses.

Chest: Chest wall deformities, asymmetry, unequal expansion. Increased vocal fremitus, dullness to percussion, wheezing, rhonchi, crackles; bronchi al 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.

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

Tuberculosis

Chief Complaint: Cough and fever.

History of Present Illness: Tuberculin skin test (PPD) results; duration of cough, sputum, fever, headache. Stiff neck, bone pain, joint pain. Prior treatment for tuberculosis. Exposure to tuberculosis. Chest roentgenogram results. Sputum color, quantity, consistency, hemoptysis. Urban, low-income population, homeless.

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 and 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: Rash, 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, ear, nose, and throat swabs for acid-fast bacilli stain and culture. Histologic examination of lymph nodes, pleura, liver, bone marrow biopsies.

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

Differential Diagnosis: A typical mycobacteria infection, active pulmonary tuberculosis, latent tuberculosis.

Otitis Media

Chief Complaint: Ear pain.

History of Present Illness: Ear pain, fever, irritability. Duration 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.

28P haryngitis

Allergies:Antibiotics.

Family History:Recurrent ear infections.

Physical Examination

Ears:Bulging, opaque, 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: Regular 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 epistaxis, otitis media, pneumonia, asthma, diabetes, immunosuppression.

Allergies:Antibiotics.

Family History:Streptococcal throat infections.

Physical Examination

General Appearance: Noted to be ill-appearing.

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. Tonsils enlarged.

Mouth: Foul breath.

Abdomen: Tenderness (mesenteric adenitis), hepatomegaly, splenomegaly.

Clinical Manifestations of P. haryngitis

	Group A streptococcus	Viral (other than EBV)	Epstein-Barr virus
Age	Generally 3 years or older	Any age	Over 5 yrs (especially late school age/adolescent)
Season	Fall to spring	Any	Any
Clinical	Tender cervical adenopathy, foul breath, tonsillar exudates, soft palate petechiae, abdominal pain (mesenteric adenitis), headache, rash ("sandpaper" feel, scarlet fever), no rhinorrhea, no cough, conjunctivitis (i.e., no URI symptoms)	Papular-vesicular lesions or tonsillar ulcers (e.g., herpangina, Coxsackievirus A), URI symptoms. Rash, often papulosquamous.	Indolent onset, tonsillar exudates, lymphadenopathy, fatigue, hepatosplenomegaly, atypical lymphocytes in peripheral smear. Rash with penicillin. Illness lasts more than 7-10 days (GABHS infection resolves within 7 days).

30P eritonsillar, R retropharyngeal P arapharyngeal Abscess

Laboratory Evaluation: Rapid antigen detection of streptococci, 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 Parapharyngeal Abscess

Chief Complaint: Throat pain.

History of Present Illness: Recent tonsillitis 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: Severely ill, drooling, stridor.

Throat: Trismus, "hot potato voice," uvula pointing toward unaffected side (peritonsillar abscess). Stridor, drooling, anterior pharyngeal wall displacement (retropharyngeal abscess).

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 influenzae immunization.

Physical Examination

General Appearance: Inspiratory stridor, "toxic" appearance. Respiratory distress (sitting upright, neck extended), apprehension.

Chest: Stridor, decreased breath sounds.

Heart: Murmurs.

Abdomen: Tenderness, splenomegaly.

Extremities: Cyanosis.

Laboratory Evaluation: Lateral neck X-rays

DifferentialDiag nosiso fE piglottitis

Epiglottitis	Virallaryngo-tracheitis	BacterialTracheitis
Highfever,dysphagia, drooling,"toxic"appearance,refusal to speak	Low-gradefever,coryza,barkingcough,hoarse voice	Improvingcroupthat worsens;highfever, stridor,anteriorneck tenderness:nodrooling

Croup(Virallaryngotracheobronchitis)

ChiefComplaint: Cough.

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

Past Medical History: Immunosuppression.

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

Medications: Antibiotics.

Vaccinations: Haemophilus influenzae immunization.

Physical Examination

General Appearance: Low-grade fever, non-toxic appearance. Comfortable at rest, barky, 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 (i.e., prematurity, bronchopulmonary dysplasia), heart disease, immunocompromise.

Medications: Bronchodilators.

Allergies: Aspirin, food allergies.

Family History: Asthma, hay fever, eczema.

Social History: Exposure to passive cigarette smoke.

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Physical Examination

General Appearance: Comfortable appearing, non-toxic.

Vital Signs: Temperature (low-grade fever), respirations, pulse, blood pressure.

Ears: Tympanic membrane everted.

Nose: Rhinorrhea.

Mouth: Filling of the nostrils.

Chest: Chest wall retractions, wheezing, fine crackles on inspiration, diminished air exchange.

Heart: Murmurs.

Abdomen: Paradoxical abdominal wall motion with respiration (i.e., abdominal collapses with expiration).

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 household influenza or other serotypes of meningitis.

Physical Examination

General Appearance: Level of consciousness; obtundation, labored respirations. Not lethargic. Appears "ill," well, or malnourished.

Vital Signs: Temperature (fever), pulse (tachycardia), respiratory rate (tachypnea), blood pressure (hypotension).

Skin: Capillary refill, rashes, petechiae, purpura (meningococemia).

Head: Bulging or sunken fontanelle.

Eyes: Extraocular movements, papilloedema, pupillary reactivity, icterus.

Neck: Nuchal rigidity. Brudzinksi's sign (neck flexion causes hip flexion); Kernig's sign (flexing hip causes neck 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				
Disease	Color	Protein	Cells	Glucose
Normal CSF fluid	Clear	<50 mg/100 mL	<5 lymphs/mm ³	>40 mg/100 mL, 1/2-2/3 of blood glucose level
Bacterial meningitis Tuberculous meningitis	Cloudy	Elevated 50-1500	>100 WBC/mm ³ predominantly neutrophils. Bacteria present on Gram's stain.	Low, < 1/2 of blood glucose
Tuberculous, fungal, partially treated bacterial, syphilitic meningitis, meningeal metastases	Clear opalescent	Elevated usually <500	10-500 WBC with predominant lymphs	20-40, low
Viral meningitis, partially treated bacterial meningitis, encephalitis, toxoplasmosis	Clear opalescent	Slightly elevated or normal	10-500 WBC with predominant lymphs	Normal to low

Urinary Tract Infection

Chief Complaint: Pain with urination.

History of Present Illness: Dysuria, frequency (voiding repeated in 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.

Age	Signs/Symptoms
Neonate/infant	Hypothermia, hyperthermia, failure to thrive, vomiting, diarrhea, sepsis, irritability, lethargy, jaundice, malodorous urine
Toddler	Abdominal pain, vomiting, diarrhea, constipation, abnormal voiding pattern, malodorous urine, fever, poor growth

34 Ly mphadenopathy and Ly mphadenitis

Age	Signs/Symptoms
Schoolage	Dysuria, frequency, urgency, abdominal pain, incontinence or secondary enuresis, constipation, malodorous urine, fever
Adolescent	Dysuria, frequency, urgency, abdominal pain, malodorous urine, fever

Physical Examination

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

Vital Signs: Temperature (high fever [$> 38^{\circ}\text{C}$] pyelonephritis), respiratory rate, pulse, B.P.

Chest: Breath sounds.

Heart: Rhythm, murmurs.

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

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

Laboratory Evaluation: Urine Gram stain, urine C & S. CBC with differential, electrolytes. Ultrasound, voiding cystourethrogram, renal nuclear scan.

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

Differential Diagnosis of Urinary Tract Symptoms

Urinary tract infection

Urethritis

Urethral irritation by soaps, detergents, bubble bath

Vaginal foreign bodies

Emotional disturbances

Vulvovaginitis

Trauma (sexual abuse)

Pinworms

Lymphadenopathy and Lymphadenitis

Chief Complaint: Swollen lymph nodes.

History of Present Illness: Duration of generalized or regional adenopathy. Fever, pattern, spiking fevers, relapsing fever, rash, arthralgias. Sore throat, nasal discharge, cough, travel history. Animal exposure (cat scratch, kittens). Localized trauma or skin infection, exposure to tuberculosis, blood product exposure. Conjunctivitis, recurrent infections.

Past Medical History: Developmental delay, growth failure.

Social History: Intravenous drug use, high-risk sexual behavior.

Medications: Phenytoin.

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

Historical Evaluation of Lymphadenopathy

Generalized or regional adenopathy
Fever
Rash
Exposure to infection
Travel

Animal exposure
Blood product exposure
Arthralgia/arthritis
Delayed growth/development
Weight loss, night sweats
Lesions at birth

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: Lesions in the area(s) drained by affected lymph nodes. Sandpapery rash (scarlet fever), punctum, pustules, splinter hemorrhages (endocarditis), exanthematous eruptions, macular 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.

Generalized or regional adenopathy
Growth failure
Fever
Tachycardia, wide pulse pressure, brisk reflexes
Rash/exanthem

Hepatosplenomegaly
Skin pustule/puncture
Conjunctivitis/uveitis
Midline neck mass that retracts with tongue protrusion
Masses posterior triangle
Supraclavicular mass

36Lymphadenopathy and Lymphadenitis

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

Differential Diagnosis of Generalized Lymphadenopathy

Systemic Infections

Bacterial infections	Tuberculosis
Scarlet fever	Syphilis
Viralexanthems (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
	HIV infection

Immune-Mediated Inflammatory

Disorders

Systemic lupus erythematosus	Kawasaki syndrome
Juvenile rheumatoid arthritis	HyperIgD syndrome
Serum sickness	HyperIgE syndrome

Storage Diseases

Gaucherdi sease Niemann-Pickdi sease	Tangierdi sease
Malignancies	
Leukemia Lymphoma Neuroblastoma	HistiocytosisX X-linked lymphoproliferative syndrome
Metabolic Disorders	
Hyperthyroidism	Adrenal insufficiency
Miscellaneous	
Drug reactions (phenytoin, allopurinol) Hemolytic anemia Immunoblastic lymphadenopathy	Sarcoidosis Sinus histiocytosis

Laboratory Evaluation: Throat culture, EBV, CMV, toxoplasmosis titers, CBC and differential, ESR, PPD. Blood cultures, chest X-ray, VDRL. Needle aspiration of the node, after saline infusion, for Gram's stain and acid-fast stains, and culture for aerobic, anaerobic, and mycobacteria. Cat scratch bacillus (*Bartonella henselae*) titer.

Differential Diagnosis of Cervical Lymphadenopathy

Viral upper respiratory tract infection (EBV or CMV infection)	Systemic disorders
Suppurative infections (staphylococcal, streptococcal)	Kawasaki syndrome
Cold inflammation	Kikuchi's disease
Cat-scratch disease	HyperIgD syndrome
Atypical mycobacterial adenitis	HyperIgE syndrome
Toxoplasmosis	Sinus histiocytosis
	Sarcoidosis
	Drugs

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.

Review of Systems: Animal exposure (pets), travel history, drug therapy.

Family History: Diabetes, cancer.

Social History: Home situation.

Physical Examination

General Appearance: Noted the patient looks "ill" overall.

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, petechiae, ecthyma gangrenosum (purpura of Pseudomonas), pustules, abscesses.

Lymph Nodes: A denopathy 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 x2, electrolytes, glucose, BUN, creatinine, UA, urine Gram stain, C&S; skin lesion cultures. Needle aspiration of abscess for Gram stain and culture. Antigen detection studies.

Differential Diagnosis: Cellulitis, erysipelas, dermatitis, dermatophytosis.

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, sepsis, stroke.

Past Medical History: Congenital heart disease.

Physical Examination

General Appearance: Noted to be ill-appearing, toxic.

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: History of influenza immunization, sickle cell anemia, Mycobacterium 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, petechiae.

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), C or M RI. Aspiration for cell count, Gram 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

	WBC Count/mm ³	% PMN	Joint Fluid: Blood Glucose Ratio
Septic arthritis	>50,000	≥ 90	Decreased
Juvenile rheumatoid arthritis	<15,000-20,000	60	Normal to decreased
Lyme arthritis	15,000-100,000	50+	Normal

Differential Diagnosis: Septic arthritis, Lyme disease, juvenile rheumatoid arthritis, systemic lupus erythematosus, acute rheumatic fever, inflammatory bowel disease, leukemia (bone pain), 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 (Pasteurella multocida), human bites, immunocompromise, tuberculosis.

40Osteo myelitis

Past Medical History: Diabetes mellitus, sickle cell disease; surgery , prosthetic devices.

Medications: Immunosuppressants.

Social History: Intravenous drug abuse.

Physical Examination

General Appearance: Noted to have hepatomegaly, 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 spinous processes.

Abdomen: Tenderness, rectal mass.

Feet: Punctate wounds.

Laboratory Evaluation: CBC (elevated WBC), ESR (>50), blood culture; X-rays (soft tissue edema), CT MRI. Technetium bone scan.

Differential Diagnosis: Cellulitis, skeletal osteomyelitis (Ewing's sarcoma, leukemia), bone infarction (hemoglobinopathy), hemophilia with bleeding, thrombophlebitis, chondritis/trauma, syphilis.

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. Effects of eating, defecation, urination, movement. Characteristic of last bowel movement. Relation to last menstrual period.

Relationship to problems. What does the patient know about the pain? Fever, chills, nausea, vomiting (bilious, undigested food, blood, sore throat, constipation, diarrhea, hematochezia, melena, anorexia, weight loss).

Past Medical History: Diabetes, 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, drug or alcohol.

Review of Systems: Growth delay, weight gain, emesis, bloating, distension. Headache, fatigue, weakness, stress-related symptoms.

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, petechiae, 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).

Illosoas 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 occult blood.

Perianal Examination: Fissures, fistulas, hemorrhoids, skin tags, soiling (fecal

42R ecurrentA bdominalP ain

oruri naryi ncontinence).

MaleGen itale Xamination: 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, distal clubbing.

Neurologic: Observation of the patient moving and off 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 peritonitis (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, urethritis, 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 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 school, change in water and food consumption, marital discord, recent losses (grandparent, pet), general family function. Review of activity pattern, 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-related symptoms.

Physical Examination

General Appearance: Degree of distress, septal 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 with note of 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 incontinence).

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

Male Genital Examination: Hernias, undescended testes, hypospadias.

Female Genital Examination: Hygiene, urethral opening, trauma, imperforate hymen, urethra, distal vagina. Pelvic examination: pubertal girls. Cervical discharge, adnexal tenderness, masses, cervical motion tenderness.

Extremities: Bony tenderness, femoral pulses, edema. Digital clubbing, loss of nail bed angle (osteoarthritis).

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

Laboratory Evaluation: CBC, electrolytes, BUN, liver function tests, amylase,

44 Persistent Vomiting

lipase, U A, pregnancy test.

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

X-ray of Abdomen (acute abdomen series): Free air, distended loops of bowel, air fluid levels, masses, calcifications, fecaliths.

Differential Diagnosis of Recurrent Abdominal Pain

Gastrointestinal Causes

Antral gastritis, peptic ulcer
Constipation
Crohn's disease
Carbohydrate malabsorption
Pancreatitis
Cholelithiasis
Malrotation and volvulus
Intestinal parasitic infection (Giardia lamblia)

Urinary Tract Disorders

Ureteropelvic junction obstruction
Urinary tract infection
Urolithiasis

Psychogenic Causes

Conversion reaction
Somatization disorder
Anxiety disorder

Other Causes

Intervertebral disk disease
Spinal disease
Musculoskeletal trauma
Migraine or cyclical vomiting
Abdominal epilepsy

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, 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 vomiting. Aneurosis 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.

Historical Findings in Persistent Vomiting

Appearance of Vomitus

Large volume, bilious
 Uncurdled milk, food
 Bile
 Feculent emesis
 Bloody, coffee-grounds

Character of Emetic Act

Effortless, nonbilious
 Tongue thrusting
 Fingersucking, gagging
 Projectile vomiting

Timing of Emesis

Early morning
 Related to meals or foods

Other Gastrointestinal Symptoms

Nausea
 Swallowing difficulties
 Constipation
 Pain
 Jaundice

Neurologic Symptoms

Headache
 Seizures

General

Respiratory distress
 Travel, animal/pet exposure
 Ill family members
 Stress

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 (applied 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, hypotension, 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-rays.

Functional

Innocent vomiting
Gastroesophageal reflux
Postcibal handling
Improper meal preparation
Aerophagia

Gastrointestinal Obstruction

Esophageal: obstructive atresia, stenosis, vascular ring, tracheal
esophageal fistula, cricopharyngeal incoordination, achalasia, congenital
diaphragmatic hernia
Torsion of the stomach
Malrotation of the bowel
Volvulus
Intestinal atresia, stenosis, meconium ileus with cystic fibrosis, meconium plug
webs
Annular pancreas
Paralytic ileus (peritonitis, postoperative, acute infection, hypokalemia)
Hirschsprung disease
Imperforate anus
Enteric duplication

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

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

Renal: Obstructive uropathy, renal insufficiency

Infection: Systemic infections, pyelonephritis

Metabolic: Urea cycle deficiencies, amino acidopathies, disorders of carbohydrate
metabolism, acidosis, congenital adrenal hyperplasia, tetany, hypercalcemia

Drugs/toxins: Theophylline, caffeine, digoxin

Blood: Scurvy, iron deficiency, gastritis, ulcers

Pneumonia

Dysautonomia

Postoperative anesthesia

Gastroesophageal reflux, esophagitis

Functional

Innocent
 Improper formulation
 Aerophagia
 Postcibal handling
 Nervous
 Rumination

Esophageal: Foreign body, stenosis, vascular ring, tracheoesophageal fistula, cricopharyngeal incoordination, achalasia, hiatal hernia

Stomach: bezoar, lactobezoar

Intestinal obstruction, pyloric stenosis, malrotation, Meckel's diverticulitis, intussusception, incarcerated hernia, Hirschsprung's disease, appendicitis, intestinal duplications

Other gastrointestinal causes: Annular pancreas, paralytic ileus, hypokalemia, Helicobacter infection, peritonitis, pancreatitis, celiac disease, viral and bacterial enteritis, lactose intolerance, milk-soy protein intolerance, cholecystitis, gallstones, pseudo-obstruction

Neurologic: Increased intracranial (subdural hematoma, hydrocephalus, cerebral edema)

Renal: Obstructiveuropathy, renal insufficiency, stones

Infectious: Meningitis, sepsis, pyelonephritis, otitis media, sinusitis, pertussis, hepatitis, parasitic infestation

Metabolic: Urea cycle deficiencies, amino acidopathies, disorders of carbohydrate metabolism, acidosis, congenital adrenal hyperplasia, tetany, hypercalcemia

Drugs/toxins: Theophylline, digoxin, iron, ipecac

Blood

Hydrometrocolpos

Radiation/chemotherapy

Reyes syndrome

Psychogenic vomiting

Munchausen syndrome by proxy

Differential Diag nosiso fV omiting in Ch ildren Old erT han 12M onths ofA ge

Gastroesophageal reflux

Gastrointestinal obstruction

Esophagus: Esophagitis, foreign body, corrosive ingestion, hiatal hernia

Stomach: Foreign body, bezoar, chronic gastritis

Intestinal obstruction: Pyloric channel ulcer, intramural hematoma, malrotation, volvulus, Meckel's diverticulitis, malrotation, congenital cystic fibrosis, incarcerated hernia, intussusception, Hirschsprung's disease, ulcerative colitis, Crohn's disease, superior mesenteric artery syndrome

Other gastrointestinal causes: Annular pancreas, pyloric stenosis, hypokalemia, Helicobacter pylori infection, peritonitis, pancreatitis, celiac disease, viral bacterial enteritis, hepatobiliary disease, gallstones, Henoch-Schönlein purpura.

Neurologic: Increased intracranial pressure, Leigh's disease, migraine, motion sickness, seizures

Renal: Obstructive uropathy, renal insufficiency, stones

Infection: Meningitis, sepsis, pyelonephritis, otitis media, sinusitis, hepatitis, parasitic infestation, streptococcal pharyngitis, labyrinthitis

Metabolic: Inborn errors of metabolism, acidosis, diabetic ketoacidosis, adrenal insufficiency

Drugs/toxins: Aspirin, digoxin, iron, lead, pesticides, illicit drugs

Torsion of the testis - rare

Blood

Radiation/chemotherapy

Reyes syndrome

Postoperative vomiting

Cyclic vomiting

Pregnancy

Psychologic: Bulimia nervosa, anorexia nervosa, stress, Münchhausen syndrome by proxy

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-fed jaundice), blood products, raw shellfish, daycare 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, alpha₁-antitrypsin deficiency. History of perinatal infant death (metabolic disorders).

Social History: Alcohol use, alcohol, exposure to hepatitis.

Historical Findings in Jaundice

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

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, discoid lesions (lupus), erythematous scaly papules (cytotoxic drugs).

Lymph nodes: Cervical or inguinal lymphadenopathy.

Head: Cephalohematoma, hydrocephalus, high forehead, large fontanelle, protruding 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 (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, PT

Stool color

50Jaundi ceandH epatitis

AssessmentLabs

Infection

Culturesofbl ood,uri ne,cerebrospi nalfl uid

Serologies:T oxoplasmosis,rubel la,cy tomegalovirus,herpes,hepati tis panel,sy philis,E pstein-Barrvirus

Metabolic

Alpha₁-antitrypsinl evelandP ity ping

Thyroxineandthy roidsti mulatinghorm one

Metabolicsscreen:U rine/serumam inoaci ds

Sweatchl oridetest

Ceruloplasmin,uri narycopperex cretion

Toxicologyscreen

Structural

24-hourduodenalintubationforbilirubinex cretion

Ultrasound

Radionuclideorhepatobiliary scan

Operativechol angiogram

Autoimmune/inflammatory: ESR, ANA

PathologicD iagnosis

Liverbi opsy

Bonem arrowbi opsy(enz ymedefi ciencia,hem oglobinopathies,hem olytic anemias)

Nonpathologic causes

Physiologic jaundice
Breastmilk 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**Anatomic**

Extrahepatic
 Biliary atresia
 Bile duct stenosis
 Choledochal cyst
 Bile duct perforation
 Biliary stricture
 Biliary stone or neoplasm
Intrahepatic
 Alagille syndrome
 Nonsyndromic interlobular ductal hypoplasia
 Caroli disease
 Congenital hepatic fibrosis
 inspissated bile

Conjugated hyperbilirubinemia (continued)**Metabolic/genetic**

Alpha₁-antitrypsin deficiency
Galactosemia
Fructose intolerance
Glycogen storage disease
Tyrosinemia
Zellweger syndrome
Cystic fibrosis

Excretory defects

Dubin-Johnson syndrome
Rotor syndrome
Summerskills 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

52H epatosplenomegaly

DifferentialDiag nosiso fJau ndicein Old erCh ildren

Metabolic/Genetic

Gilbertsyndrom e
Dubin-Johnsonsyndrom e
Rotorisyndrom e
Cysticfi brosis
Indianchi ldhoodci rrhosis
Wilsondi sease
Tyrosinemia
Alpha₁-antitrypsindefi ciency

Anatomic

Carolidi sease
Congenitalhepati cfi brosis
Choledochalcyst
Cholelithiasis
Pancreasandpancreati cduct
abnormalities

Infections

Viral
Hepatitis(A ,B ,C ,D ,E),C MV
Epstein-Barrv irus

Infections(con tinued)

Viral
Herpessi mplexv irus
Varicella-zosterv irus
Adenovirus
Enterovirus
Rubellavir us
Arbovirus
HIV
Echovirus
Bacterial
Sepsis
Toxicshocksyndrom e
Lymedi sease
Rockym ountain spotted
fever
Miscellaneous
Viscerall arvalm igrans
Schistosomiasis
Reyesyndrom e

Hepatosplenomegaly

ChiefCo mplaint: Liverorspl eenenl arged.

Historyof P resent Illness: Durationofenl argementofthel iverorspl een.
Acuteorchroni cillness,fever,j aundice, pallor, bruising, weightl oss,fati gue,
joint pain, joint stiffness. Nutritional history, grow th del ay.
Neurodevelopmentaldel ayorl ossofdevel opmentalm ilestones.

PastM edicalH istory:P reviousorganomegaly, neurologic symptoms.General
health.

PerinatalHi story:P renatalcom plications,neonatal j aundice.

Medications:C urrentandpastdrugs,anti convulsants,tox ins.

FamilyH istory:S toragedi seases,m etabolic disorders, hepatic fibrosis,al pha-
antitrypsindefi ciency.H istoryofneonatal death.

SocialH istory: Infections,tox in,ex posures,drugSORalcohol.

PhysicalE xamination

GeneralA ppearance:W asting,illappearance,m alnutrition.

VitalSi gns:B loodpressure,tem perature,pul se,respri rations.Grow thcurve.

HEENT: H ead si ze and shape, i cterus, cataracts (gal actosemia), K ayser-
Fleischer ri ngs (W ilson di sease). Coarsening of faci al features
(mucopolysaccharidoses).

Skin:E xcoriations,spi derangi omas(chroni cl iverdi sease, bilary obstruction of
the biliary tract); pallor, petech iae, bruising (m alignancy, chronic liver
disease);ery themanodosum (i nflamatorybow eldi sease,sarcoi dosis).

LymphN odes:Locati onandsi zeofl ymphadenopathy.

Lungs: Crackles,w heeze,rhonchi .

Abdomen: Distension,prom inentsuperficialveins(portalhy pertension), umbilic-
calherni a,brui ts.P ercussionoffl anksforshi ftingdul Inness.Li ver span by

percussion, hepatomegaly. Liver consistency and texture. Splenomegaly 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's disease)
 Nodes--generalized lymphadenopathy
 Chest--adventitious sounds
 Heart--gallop, tachycardia, rub, pulsus paradoxus
 Abdomen--ascites, enlarged spleen, 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

Predominant Splenomegaly	Predominant Hepatomegaly
<p>Infection Viral—Epstein-Barr, cytomegalovirus, parvovirus B 19 Bacterial--endocarditis, shunt infection Protozoal--malaria, babesiosis</p> <p>Hematologic Hemolytic anemias Porphyrias Osteopetrosis, myelofibrosis</p> <p>Vascular Portal vein anomalies Hepatic sclerosing fibrosis</p> <p>Tumor and Infiltration Cysts, hemangiomas, hamartomas Lymphoreticular malignancies Neuroblastoma</p>	<p>CMV, syphilis, neonatal hepatitis Hepatitis--A, B, C, D, E, tuberculosis, sarcoidosis, chronic granulomatous disease Drugs--alcohol, phenytoin Sclerosing cholangitis, infectious cholangitis Abscess Chronic active hepatitis Cardiac--failure, pericarditis Budd-Chiari syndrome Paroxysmal nocturnal hemoglobinuria Biliary tree anomalies Choledochal cyst Congenital hepatic fibrosis Child abuse--trauma Galactosemia, glycogen storage disease, fructose intolerance Tyrosinemia, urea cycle disorders Cystic fibrosis Alpha₁-antitrypsin deficiency Wilson's disease, hemochromatosis Fatty change: Malnutrition, obesity, alcohol, corticosteroids, diabetes Primary or metastatic tumors</p>

AcuteD iarrhea

ChiefCo mplaint: Diarrhea.

History of P resent Illness: Duration and frequency, of diarrhea; number of stools per day, characteristics of stools (bloody, mucous, 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: Crohn's 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: Blood pressure (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 stain of stool for leukocytes. Cultures for enteric pathogens, stool for ova and parasites x3; stool and blood for Clostridium difficile toxin; blood cultures.

Stool occult blood. Stool cultures for cholera, E. coli O157: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.

Stool Appearance: Watery, formed, bloody, mucous, oily, foul odor.

Travel history, laxative abuse, inflammatory bowel disease. Sexual exposures, AIDS risk factors. Exacerbation by stress.

Past Medical History: Pattern of stooling from birth. Growth deficiency, weight

gain. Three-day dietary record, ilico ntacts.

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

Family History: Family members with diarrhea, milk intolerance, colic disease.

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

Historical Findings in Chronic Diarrhea

Age of onset
Stool characteristics
Diet (new food/formula)
Growth delay
Family history of allergy; genetic, metabolic, or inborn errors

Secretory symptoms: Large volume, watery diarrhea
Osmotic symptoms: Large amount of soft stools
Systemic symptoms: Fever, nausea, malaise

Physical Examination

General Appearance: Signs of dehydration or malnutrition. Sepsis 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's spots (vitamin A deficiency), adenopathy.

Mouth: Oral ulcers (Crohn's disease, colitis), 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 chlordia 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.

56C Chronic Diarrhea

Physical Examination Findings in Chronic Diarrhea

Poor growth Hypertension Fever Jaundice Rash Erythema nodosum Pyoderma gangrenosum Edema	Clubbing Lung crackles, wheezing Abdominal mass Organomegaly Abnormal genitalia Perianal tags Rectal impaction Ataxia, decreased deep tendon reflexes
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Laboratory Evaluation: Electrolytes, CBC with differential. WBCs stain for fecal leukocytes; cultures for enteric pathogens, ova and parasites x3; clostridium difficile toxin. Stool carbohydrate content. Stool for occult blood, neutral fat (malabsorption); splint fat (malabsorption).

Small Infants and Babies

Chronic nonspecific diarrhea of infancy/postinfectious diarrhea
Milk and soy protein intolerance
Prolonged infectious enteritis
Microvillous inclusion disease
Celiac disease
Hirschsprung's disease
Congenital transport defects
Nutrient malabsorption
Munchausen's syndrome by proxy

Toddlers

Chronic nonspecific diarrhea
Prolonged 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; stool in 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. Stooling characteristics and time of day. A rest stool soft or med or syc balous (small, dry, rabbit-like pellets)? Withholding behavior.

Dietary History: Excessive cow's milk or limited fiber consumption; breastfeeding.

Past Medical History: Recent illness, bedrest, fever.

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

Social History: Recent birth of 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 rectopigmentation, anterior anal displacement. Anal fissures, excoriation, dermatitis, perianal ulcers. Rectal prolapse. Stooling in the perianal area. Sphincter reflex: Gentle rubbing of the perianal skin in result 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

Meconium ileus
 Meconium plug syndrome
 Functional ileus of the newborn
 Small intestine syndrome
 Volvulus
 Intestinal web
 Intestinal stenosis
 Intestinal atresia
 Intestinal stricture (necrotizing enterocolitis)
 Imperforate anus
 Anal stenosis
 Anterior rectopycnosis
 Anterior anal displacement

Hirschsprung disease
 Acquired ganglioneuromatosis
 Tumors
 Myelodysplasia
 Hypothyroidism
 Maternal opiates
 Inadequate nutrition/fluids
 Excessive cow's milk consumption
 Absence of abdominal musculature (prune-belly syndrome)
 Cerebral palsy

Differential Diagnosis of Constipation in Older Infants and Children

Physiologic Causes

Breast milk, cow's milk, low roughage
 Deficient fluid: Fever, heat, immobility, anorexia nervosa

Voluntary Stool Withholding

Megacolon
 Painful defecation: Anal fissure, perianal dermatitis, hemorrhoids
 Behavioral issues
 Mental retardation

Neurogenic Disorders

Hirschsprung disease
 Intestinal pseudo-obstruction
 Cerebral palsy
 Myelomeningocele
 Spinal cord injury
 Transverse myelitis
 Spinal dysraphism
 Neurofibromatosis
 Myopathies
 Rickets
 Prune-belly syndrome

Endocrine and Metabolic Disorders

Hypothyroidism
 Diabetes mellitus
 Pheochromocytoma
 Hypokalemia
 Hypercalcemia
 Hypocalcemia
 Diabetes insipidus
 Renal tubular acidosis
 Porphyria
 Amyloidosis
 Lipid storage disorders

Miscellaneous Disorders

Anal or rectal stenosis
 Anteriorly placed anus
 Appendicitis
 Celiac disease
 Scleroderma
 Lead poisoning
 Viral hepatitis
 Salmonellosis
 Tetanus
 Chagas disease
 Drugs

Hematemesis and Upper Gastrointestinal Bleeding

Chief Complaint: Vomiting blood.

History of Present Illness: Duration and frequency of hematemesis, characteristic 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, priors bleeding episodes, nosebleeds. Weight loss, anorexia, jaundice; bright red stools, 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, hepatomegaly, splenomegaly.

Extremities: Edema, clonus.

Neurologic: Decreased mental status, gait.

Rectal: Masses, hemorrhoids. Prolapse, 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 RBCs and transfuse as needed. ALT, AST, GGT, P, glucose, electrolytes. Esophagogastroduodenoscopy, colonoscopy, Meckel's scan, bleeding scan.

Age	Common	Less Common
Neonates (0-30 days)	Swallowed maternal blood, gastritis, duodenitis	Coagulopathy, vascular malformations, gastric/esophageal duplication, leiomyoma
Infants (30 days - 1 year)	Gastritis, gastric ulcer, esophagitis, duodenitis	Esophageal varices, foregut body, aorto-esophageal fistula
Children (1-12 years)	Esophagitis, esophageal varices, gastritis, gastric ulcer, duodenal ulcer, Mallory-Weiss tear, nasopharyngeal bleeding	Leiomyoma, salicylates, vascular malformation, hematemesis, NSAIDs

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Age	Common	LessC ommon
Adolescents(12 years-adult)	Duodenalul cer,esopha-gitis,esophageal vari ces, gastritis,M allory-Weiss tear	Thrombocytopenia,D ieula-foy'su lcer,h ematobilia

MelenaandLow erG astrointestinalIB leeding

ChiefCo mplaint: Analbl eeding

HistoryofP resentIllness: D uration,quanti ty,co lorofbl eeding(grossbl ood, streaksonstool ,m elena),recent hematocrit. Change inbow elhabi ts,change instool cal iber,abdom inalpai n, fever.C onstipation,di arrhea,anorectal pai n. Epistaxis,anorex ia,w eightl oss,m alaise,vom iting.

Fecal m ucus, ex cessive strai ning duri ng defecati on. C olitis, pepti c ul cer, hematemesis.

PastM edicalH istory:B ariumenem a,col onoscopy, sigmoidoscopy, upper GI series.

Medications:A nticoagulants,aspi rin,N SAIDs.

PhysicalE xamination

GeneralA ppearance:De hydration,p allor.No tew hetherth ep atientlo oksill, well,orm alnourished.

VitalSi gns:B P(orthostati chy potension),pul se,respi ratoryrate,tem perature (tachycardia).

Skin: Delay ed capillary refill, pallor, jaundice. S pider angiom ata, ras hes, purpura.

Eyes:P aleconjunctiva,icterus.

Mouth: B uccal m ucosa di scolorations or pi gmentation (H enoch-Schönlein purpuraorP eutz-Jegherssy ndrome).

Chest:B reathsounds.

Heart:S ystolicej ectionm urmurs.

Abdomen: M asses, di stention, tender ness, hernias, liver atrophy, splenomegaly.

Genitourinary:T esticularatrophy .

Extremities:C old,pal eex tremities.

Neurologic:A nxiety,confusi on.

Rectal:H emorrhoids,m asses;fi ssures,pol yps,ul cers.Grossoroc cultbl ood.

LaboratoryE valuation:C BC(anem ia),l iverfuncti ontests.A bdominal x-ray series(thum bprinting,ai rfl uidl evels).

Age	Common	LessC ommon
Neonates(0-30 days)	Anorectall esions,sw allowedm aternalbl ood, milka llergy,n ecrotizing enterocolitis,m idgut volvulus	Vascularm alformations, Hirschsprung'senterocolitis,in testinald uplica-tion,coagul opathy

Melena and Lower Gastrointestinal Bleeding

Age	Common	Less Common
Infants (30 days - 1 year)	Anorectal lesions, meckel's diverticulum (under 3 years), Meckel's diverticulitis, infectious diarrhea, milk protein allergy	Vascular malformations, intestinal duplication, acquired thrombocytopenia
Children (1-12 years)	Juvenile polyps, Meckel's diverticulitis, intussusception (under 3 years), infectious diarrhea, anal fissure, nodular lymphoid hyperplasia	Henoch-Schönlein purpura, hemolytic-uremic syndrome, vasculitis (SLE), inflammatory bowel disease
Adolescents (12 years - adult)	Inflammatory bowel disease, polyps, hemorrhoids, anal fissure, infectious diarrhea	Arteriovascular malformation, adenocarcinoma, Henoch-Schönlein purpura, Pseudomembranous colitis

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Gynecologic Disorders

Amenorrhea

Chief Complaint: Missed periods.

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 test results. Symptoms of pregnancy (nausea, breast tenderness). Lifestyle changes, dieting, excessive exercise, drugs (marijuana), psychological stress. History of hypothyroidism, galactorrhea (prolactinoma). Weight loss, 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, diazepam, marijuana, chemotherapeutic agents.

Physical Examination

General Appearance: Secondary sexual characteristics, body habitus, obesity, deep voice (hypogonadism). Note of the patient's appearance "ill" or well.

Vital Signs: Pulse (bradycardia), temperature (hypothermia, hyperthyroidism), 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.

Laboratory Evaluation: Pregnancy test, prolactin, TSH, free T₄, progesterone challenge test.

Differential diagnosis of abnormal vaginal bleeding

Pregnancy**Hormonal contraception**

Hypothalamic-related: Stress, athletic activities, eating disorders, obesity, drugs, tumor

Pituitary-related: Hypopituitarism, tumor, infarction

Ovarian-related: Dysgenesis, agenesis, ovarian failure

Outflow tract-related

Imperforate hymen

Transverse vaginal septum

Agenesis of the vagina, cervix, uterus

Uterine synechiae

Androgen excess

Polycystic ovarian syndrome

Adrenal tumor

Adrenal hyperplasia

Ovarian tumor

Other endocrine causes

Thyroid disease

Cushing syndrome

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; passage of clots; postcoital or intermenstrual bleeding; abdominal pain, fever, lightheadedness; possibility of pregnancy, sexual activity, hormonal contraception.

Psychologic stress, weight changes, exercise. Changes in risk intercourse.

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 vital 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, anti-coagulants, NSAIDs. Cervical polyps, uterine myoma, endometriosis, retained tampon, trauma, von Willebrand's disease.

Pelvic Pain and Ectopic Pregnancy

Chief Complaint: Pelvic pain.

History of Present Illness: Pelvic 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 observed distress. Noteworthy patient looks "ill" overall.

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

Skin: Cool skin, pallor, delayed capillary refill.

Chest: Breath sounds.

Heart: Murmurs.

Abdomen: Cullen's sign (periumbilical darkening, intraabdominal bleeding), local 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 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.

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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 activities or cause the child to stop playing? A waking 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, developmental delay, allergies, past illnesses. Head injuries, motion sickness. Anxiety or depression.

Medications: Dose, 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 tilting, head nodding, 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 axilla or inguinal areas (neurofibromatosis). Facial angiofibromas (adenoma sebaceum).

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

Eyes: Downward deviation of the eyes ("sunset-ring" increased intracranial pressure), extraocular movements, pupillary 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.

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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

Acute Recurrent Headache

Migraine
Cluster headache
Acute sinusitis
Hypertension
Intermittent hydrocephalus
Vascular malformation
Subarachnoid hemorrhage
Carbon monoxide poisoning

Chronic Nonprogressive Headache

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

Chronic Progressive Headache

Central nervous system infection
Hydrocephalus
Pseudotumor cerebri
Brain tumor
Vascular malformation
Subdural hematoma
Arnold-Chiari malformation
Lead poisoning

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). Do spells occur during the sleep? Does the child remember the spells afterward? What does 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, anti-seizure 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: Postictal lethargy. Note whether the patient enters the room with a normal or ill appearance. Observe the patient perform a task (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 (tuberous sclerosis).

HEENT: Head trauma, pupillary reactivity and equality, extraocular movements; papilledema, gum hyperplasia (phenytoin), tongue or buccal ulcerations; 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.

Differential Diagnosis of Seizures, Spells, and Unusual Movements

Epilepsy

Movement Disorders

Tics

Myoclonic syndromes

Sleep

Benign

Hyperplexia (exaggerated startle response)

Myoclonus-opsoclonus

Shuddering spells

Dystonia

Torsion

Transient torticollis

Sandifer syndrome

Drugs

Dyskinesias

Metabolic/genetic

Reflex dystrophy

Nocturnal

Physiologic

Choreoathetosis

Benign

Familial

Paroxysmal

Sydenham chorea

Huntington chorea

Drugs

Behavioral/Psychiatric Disorders

Pseudoseizures

Automatisms

Dyscontrol syndrome

Attention-deficit hyperactivity disorder

Benign paroxysmal vertigo

Migraine

Parosomnias

Syncope

Breathholding spells

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). Snoring, wheezing, body position during the event, state of consciousness before, during and after the event. Unusual movements, incontinence, postictal confusional state. Regurgitation after feedings. Vomitus in oral cavity during the event.

70A pneumonia

Loud snoring, nocturnal enuresis, excessive daytime sleepiness; prior acute life-threatening events (A-LTEs). 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 metabolic disorders, mental retardation, consanguinity, fetal loss, neonatal death, sudden infant death syndrome, illicit drugs, alcohol.

Social History: Physical abuse, previous involvement of the family with child protective services.

Physical Examination

General Appearance: Sick 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, paradoxical 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.

Differential Diagnosis of A pneumonia

Central Nervous System

Dandy-Walker malformation
 Arnold-Chiari malformation
 Seizures
 Hypotonia, weakness
 Ondine's curse

Metabolic/Toxic

Hypoglycemia
 Hypocalcemia
 Hyponatremia
 Acidosis
 Hypomagnesemia
 Opioids
 Medium-chain acyl-CoA
 dehydrogenase deficiency

Upper Airway

Craniofacial syndromes
 Laryngomalacia
 Rhinitis
 Choanal stenosis/atresia
 Croup

Upper Airway (continued)

Adenotonsillar hypertrophy
 Epiglottitis
 Post-extubation
 Vocal cord paralysis
 Anaphylaxis

Lower Airway

Pneumonia
 Bronchiolitis
 Pertussis

Cardiovascular

Structural disease
 Dysrhythmia

Gastrointestinal

Gastroesophageal reflux

Miscellaneous

Sepsis
 Meningitis
 Munchausen syndrome by proxy

Delirium, Coma and Confusion

Chief Complaint: Confusion.

History of Present Illness: Level of consciousness, obtundation (awake but not alert), stupor (unconscious but awake 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. Noteworthily the patient looks "ill" overall.

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

Skin: Cyanosis, jaundice, delayed capillary refill, petechia, splinter hemorrhages; injections of fat atrophy (diabetics).

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

Eyes: Pupils size and reactivity, extraocular movements, papilledema.

Mouth: Tongue or cheek lacerations; atrophy of tongue, glossitis (B12 deficiency).

Neck: Neck rigidity, masses.

Chest: Breathing pattern (Cheyne-Stokes or perverted ventilation), crackles, wheezes.

Heart: Rhythm, murmurs, gallops.

Abdomen: Hepatomegaly, splenomegaly, masses.

Neuro: Strength, cranial nerves 2-12, mini-mental state exam; orientation to person, place, time, recent events; Babinski's sign, primitive reflexes (snout,

72 Delirium, Common Delirium

suck, grab, pull, momentary grasp).

Laboratory Evaluation: Glucose, electrolytes, BUN, creatinine, O₂ 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. Low 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.

Vital Signs: Blood pressure (hypertension), pulse (tachycardia), temperature, respirations. Growth percentiles, growth failure.

Chest: Breath sounds.

Heart: Murmurs, third heart sound.

Abdomen: Masses, palpable bladder. Perineal excoriation; lumbosacral midline defects, sacral hair patch, sacral hyperpigmentation, sacral dimples 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.

Water Diuresis

Primary polydipsia

Diabetes insipidus

Obstruction by posterior urethral valve, uterovaginal junction obstruction, ectopic ureter, nephrolithiasis

Renal infarction secondary to sickle-cell disease

Chronic pyelonephritis

Solute Diuresis: Glucose, urea, mannitol, sodium chloride, mineralocorticoid deficiency or excess, alkaline ingestion

Differential diagnosis of E nuresis and U rinary Fr equency

Infection
 Uteropelvic junction obstruction
 Obstructive ectopic ureter
 Posterior urethral valve
 Nephrolithiasis
 Diabetes mellitus

Diabetes insipidus
 Wilms tumor
 Neuroblastoma
 Pelvic tumors
 Fecal impaction

Hematuria

Chief Complaint: Blood in urine.

History of Present Illness: C olor of urine, duration and timing of hematuria. Frequency, dysuria, suprapubic pain, flank pain (renal colic), abdominal or perineal pain, fever, m enstruation.

Foley catheterization, stone passage, tissue passage in urine, joint pain.

Strenuous exercise, dehydration, recent trauma. Rash, arthritis (systemic lupus erythematosus, Henoch-Schönlein purpura). Bloody diarrhea (hemolytic-uremic syndrome), hepatitis B or C exposure.

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

Past Medical History: Recent sore throat (group A streptococcus), streptococcal 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-flare retinopathy (Alport's syndrome).

Throat: Pharyngitis.

Chest: Breath sounds.

Heart: Rhythm, murmurs, gallops.

Abdomen: Masses, nephromegaly (Wilms' tumor, polycystic kidney disease, hydronephrosis), 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, uric acid; creatinine,

BUN, C BC; si ckle cel I screen; uri ne cal cium-to-creatinine rati o, I NR/PTT. Urinalysis of first-degree relatives (Alport's syndrome or benign familial hematuria), renal ultrasound.

Specific Laboratory Evaluation: Complement levels, anti-streptolysin-O and anti-DNAse B (poststreptococcal glomerulonephritis), antinuclear antibody, audiogram (Alport's syndrome), anti-glomerular basement membrane antibodies (Goodpasture's syndrome), anti-neutrophil 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

Glomerular Diseases

Benign familial sporadic hematuria (thin membrane nephropathy)	Membranoproliferative glomerulonephritis
Acute postinfectious glomerulonephritis	Systemic lupus erythematosus
Hemolytic-uremic syndrome	Henoch-Schönlein nephritis
IgA nephropathy (Berger's disease)	Polyarteritis
Alport's syndrome (familial nephritis)	Hepatitis-associated glomerulonephritis
Focal segmental glomerulonephritis	

Nonglomerular Diseases

Strenuous exercise	Leukemia
Dehydration	Coagulopathy
Fever	Anatomical abnormalities
Menstruation	Hydronephrosis
Foreign body in urethra or bladder	Ureteropelvic junction obstruction
Urinary tract infection: bacterial, adenovirus, tuberculosis	Cystic kidneys
Hypercalciuria	Polycystic kidney disease
Urolithiasis	Medullary cystic disease
Sickle cell trait or disease	Vascular malformations
Trauma	Arteriovenous fistula
Drugs and toxins	Renal vein thrombosis
Masturbation	Nutcracker syndrome
Tumors	Papillary necrosis
Wilms' tumor	Parenchymal infarction
Tuberculous sclerosis	Munchausen syndrome by proxy
Renal or bladder cancer	

Proteinuria

Chief Complaint: Proteinuria.

History of Present Illness: Protein of 1+(30 mg/dL) on a urinalysis. Protein above 4 mg/m²/hour in a timed 12- to 24-hour urinalysis (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.

76P roteinuria

Physical Examination

General Appearance: Signs of dehydration. Noteworthy: the patient looks "ill" overall.

Vital Signs: Temperature (fever).

Ears: Dysmorphic pinnae.

Skin: Café-au-lait spots, hypopigmented macules, rash.

Extremities: Joint tenderness, joint swelling.

Laboratory Evaluation: Urinalysis for spot protein/creatinine ratio. Random and ambulatory urinalyses. CBC, electrolytes, BUN, creatinine, total protein, albumin, cholesterol, anti-streptolysin-O titer (ASO), antinuclear antibody, complement levels. Renal ultrasound, voiding cystourethrogram.

Functional/Transient (< 2+ on urinalysis)

Fever

Strenuous exercise

Cold exposure

Congestive heart failure

Seizures

Emotional stress

Isolated Proteinuria

Orthostatic proteinuria (60% of cases)

Persistent asymptomatic proteinuria

Glomerular Disease

Minimal change nephrotic syndrome

Glomerulonephritis

Postinfectious

Membranoproliferative

Membranous

IgA nephropathy

Henoch-Schönlein purpura

Systemic lupus erythematosus

Hereditary nephritis

Tubulointerstitial Disease

Reflux nephropathy

Interstitial nephritis

Hypokalemic nephropathy

Cystinosis

Fanconi's syndrome

Tyrosinemia

Lowes syndrome

Tubular toxins

Drugs (eg, aminoglycosides and penicillins)

Heavy metals

Ischemic tubular injury

SwellingandEdema

Chief Complaint: Swollenank les.

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" overall.

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

Skin: Xanthomata, spider angiomas, 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.

78D iabeticK etoacidosis

DifferentialD iagnosisofE dema

IncreasedH ydrostaticP ressure

Congestiveheartfai lure
Pericarditis
Superiorvenacavasyn drom e
Arteriovenousfi stula
Venousthrom bosis
Lymphaticobstructi onbytum ors
Syndromeofi nappropriateA DHsecretion
Steroids
Excessivelatrogeni cfl uidadm inistration

IncreasedCap illaryP ermeability

RockyM ountainspottedfever
Stevens-Johnsonsyndrom e

DecreasedOn coticP ressure

(Hypoproteinemia)
Nephroticsyndrom e
Liverdi sease(al pha₁-antitrypsindefi -
ciency,i nfectioushepati tis)
Cirrhosis
Galactosemia
Kwashiorkor
Marasmus
Cysticfi brosis
Inflammatorybow eldi sease
Protein-losingenteropathy(cow 'sm ilk
allergy)
Intestinal lymphangiectasia
Celiacdi sease
Bezoar
Infection(Gi ardiasp.)
Pancreaticpseudocyst
Severeanem ia
Zincdefi ciency

DiabeticK etoacidosis

ChiefCo mplaint: Malaise.

HistoryofP resentIllness: I nitialgl ucosel evel,k etones,ani ongap.D uration of polyuria, polyphagia,pol ydipsia,l ethargy,dy spnea,w eightl oss,noncom pli-
ance w ith i nsulin; bl urred vi sion, i nfection, dehy dration, abdom inal pain
(appendicitis).Cough,fev er,chills,earpain(otitism edia),dy suria(urinary
tractinfection).

FactorsthatM ay Precipitate DiabeticK etoacidosis.N ewonsetofdi abetes,
noncompliance w ith i nsulin, i nfection, pancreati tis, m yocardial i nfarction,
stress,traum a,pregnancy .

Past M edical H istory: Age of onset of di abetes; r enal d isease, i nfections,
hospitalization.

PhysicalE xamination

General A ppearance: S omnolence, K ussmaul r espirations (deep si gning
breathing),dehy dration.N otew hetherthepati entl ooks "toxic"o rw ell.

Vital Si gns: B P (hy potension), pul se (tachy cardia), tem perature (fever,
hypothermia),respi ratoryrate(tachy pnea).

Skin:Decreasedsk inturgor,delay edcapillary refill,intertriginouscandi diasis,
erythrasma,l ocalizedfatatrophy (i nsulini njections).

Eyes:D iabeticreti nopathy(neovascul arization,h emorrhages),decreasedvi sual
acuity.

Mouth: A cetone breath odor (musty, appl e odor), dry m ucousm embranes
(dehydration).

Ears:T ympanicm embraneery thema(oti tism edia).

Chest:R ales,rhonchi (pneum onia).

Heart:Mu rmurs.

Abdomen:H ypooactivebow elsounds(i leus), rightl owerquadranttenderness

(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, CO_2 , serum ketones; UA (proteinuria, ketones). Chest x-ray.

Differential Diagnosis

Ketosis-causing Conditions: Alcoholism, 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.

80D iabetic 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 chickenpox. Sore throat, joint pain, abdominal pain. Exposure to allergens or irritants. Sun exposure, cold, psychological stress.

Past Medical History: Prior 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 and 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: Sore palate macules; buccal mucosal 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). Acutely and convalescent antibody tests.

BruisingandBleeding

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 injections 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 nonsteroidal) 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 (or thostatic 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.

Differential Diagnosis of Kawasaki Disease

Hemolytic uremic syndrome	Takayasu arteritis
Thrombotic thrombocytopenic purpura	Polyarteritis nodosa
Uremia	Kawasaki syndrome
Paraproteinemia	Henoch-Schönlein purpura
Myelodysplastic syndrome	Leukocytoclastic ("hypersensitivity") vasculitis
Phenytoin, valproic acid, quinidine, heparin	Wegener granulomatosis
Afibrinogenemia/dysfibrinogenemia	Churg-Strauss syndrome
Clotting factor deficiencies (hemophilia A, B, Christmas disease)	Essential cryoglobulinemia
Von Willebrand disease	Systemic lupus erythematosus
Vitamin K deficiency	Juvenile rheumatoid arthritis
Hemorrhagic disease of the newborn	Mixed connective tissue disease
Trauma	Dermatomyositis, scleroderma
Vasculitis	Bacterial or viral infection, syphilis, Rocky Mountain spotted fever, rickettsial infection
Giant cell (temporal) arteritis	Malignancy

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, wrist and ankle, red swollen hands and feet. Joint swelling, joint tenderness. Desquamation of the fingers and toes, usually around nail spread during convalescence.

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

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

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

CXR: Cardiomegaly

Echocardiography: Pericardial effusion, coronary aneurysm, myocardial

84K 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 Treatment

Failure to Thrive

Chief Complaint: Inadequate growth.

History of Present Illness: Weight loss, change in appetite, vomiting, abdominal pain, diarrhea, fever. Dejected; 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. Poor performance on parental dietary restrictions (low fat).

Past Medical History: Excessive crying, feeding problems. Poor suck and swallow, frequent 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 (biological 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

Poor Caloric intake
Breast-feeding mismanagement
Lactation failure
Improper formula preparation
Maternal stress, poor diet, illness
Eating disorders
Aberrant parental nutritional beliefs
Food faddism
Diaphoresis or fatigued appearance
Poor suck, swallow
Vomiting, hyperkinesia
Bilious vomiting
Recurrent pneumonia, steatorrhea

Diarrhea, dysentery, fever
Inflammatory bowel disease
Radiation, chemotherapy
Hypoguesia, anorexia
Recurrent infections
Rash, arthritis, weakness
Jaundice
Polyuria, polydipsia, polyphagia
Irritability, constipation
Mental retardation, swallowing difficulties
Intrauterine growth delay

Physical Examination

General Appearance: Cachexia, dehydration. Not well-appearing. Observation of parent-child interaction; affection, warmth. Passive or withdrawn behavior. Decreased vocalization, expressionless faces; increased hand and finger activities (thumb sucking), infantile posture; motor activity (congenital talipes equinovarus).

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

Vital Signs: Pulse (bradycardia), BP, respiratory rate, temperature (hypothermia)

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mia). W eight, l ength, and head ci rcumference; short st ature, grow th percentiles.

Skin:P allor,j aundice,sk inl axity,rash.

LymphN odes:C ervicalorsupracl avicularl ymphadenopathy.

Head:T emporalw asting,congeni talm alformations.

Eyes:C ataracts(rubel la),i cterus,dry conj unctiva.

Mouth: D ental erosi ons, orophary ngeal l esions, chei losis (cobal amin defi - ciency),gl ossitis(P ellagra).

Neck:T hyromegaly.

Chest:B arrelshapedchest,rhonchi .

Heart:D isplacedpoi nt ofm aximali mpulse,patentductusarteri osusm urmur, aorticstenosi sm urmur.

Abdomen: Protuberant abdomen,decreasedbow el sounds(m alabsorption, obstructiveuropathy), tenderness. Periumbilicaladenopathy .M asses(py loric stenosis or obstructi ve uropathy), hepatomegaly (gal actosemia), spl eno- megaly.

Extremities:E dema,m usclew asting.

Neuro:D ecreasedperi pheralsensati on.

Rectal:Occul tbl ood,m asses.

Genitalia:H ypospadias(obstructi veuropathy).

PhysicalE xaminationF indingsin Gr owthDeficien cy

Micrognathia,cl eftl ipandpal ate	Shortstature
Poorsuck ,sw allow	Cachexia,m ass
Hyperkinesia	Rash,j ointery thema,tenderness,
Bulgingfontanel le,papi lledema	weakness
Nystagmus,ataxia	Jaundice,hepatomegaly
Abdominaldi stension	Ambiguousgenitalia,m as-
Fever	culinization
Clubbing	Irritability
Perianalsk intags	

LaboratoryE valuation:C BC,el ectrolytes,protei n, albumin, transferrin, thyroid studies,l iverfuncti ontests.

PoorC aloricI ntake

Breast-feedingm ismanagement
Lactationfai lure
Maternalstress,poordi et, illness
Eatingdi sorders(ol derchi ldren)
Aberrantparental nutri tionalbel iefs
Foodfaddi sm
Improperform ulapreparati on
Micrognathia,cl eftl ip,cl eftpal ate
Cardiopulmonarydi sease
Hypotonia,C NSdi sease
Diencephalicsyndrom e

Poor Caloric Retention

Increased intracranial pressure
 Labyrinthine disorders
 Esophageal obstruction, gastroesophageal reflux, prearranged obstruction
 Intestinal obstruction, volvulus, Hirschsprung disease
 Metabolic disorders

Poor Caloric Digestion/Absorption

Cystic fibrosis
 Shwachman-Diamond syndrome
 Fat malabsorption
 Enteric infections
 Infection
 Inflammatory bowel disease
 Cancer treatment
 Gluten-sensitive enteropathy
 Carbohydrate malabsorption
 Intestinal lymphangiectasia
 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

Developmental Delay

Chief Complaint: Delayed development.

Developmental History: A 6-year-old child whose 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 play with other children now that 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?

Behavioral profile (qualitative) of alertness, responsiveness). Developmental quotient (DQ): Developmental age divided by the child's chronological age x 100. Vision and hearing deficits.

Perinatal History: In utero exposure to 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, toxic 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, skinturgor.

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 ear (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), mucous 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 (hypospadias).

Extremities: Posture, gait, stance, asymmetry of movement. Edema, clinodactyly, syndactyly, nail deformities, palmar/plantar creases.

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

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

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

Signs of Cerebral Palsy: Flitting 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, electrocardiography, nerve conduction velocities, muscle biopsy.

Differential Diagnosis of Developmental Delay

Static Global Delay/Mental Retardation

Idiopathic mental retardation
 Chromosomal abnormalities or genetic syndromes
 Hypoxic-ischemic encephalopathy
 Structural brain malformation
 Prenatal exposure to teratogens
 Congenital infection

Progressive Global Delay

Inborn error of metabolism
 Neurodegenerative disorders
 Rett syndrome
 AIDS encephalopathy
 Congenital hypothyroidism

Language Disorders

Hearing impairment
 Language processing, expressive language disorders
 Pervasive developmental disorder or autistic disorder

Gross Motor Delay

Cerebral palsy
 Peripheral neuromuscular disorders

Syndromes Associated With Developmental 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,

90P psychiatric history

congenital neurological disorders.

- (3) **Organic Disorders:** 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 disorders.
- (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 Status:** 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 Status:** Obesity, malnutrition, eating disorders.
- (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) **Toperson:** Verbal child-ren should know their names.
 - (2) **Toplace:** Young child-ren should know whether they are way or at home.
 - (3) **Timeline:** A sense of time is formed by age 8 or 9. Young child-ren cannot live with their time day or night.
- D. Central Nervous System Function:** Signs (persistent neurodevelopmental immaturities):
- (1) **Gross Motor Coordination Efficiency:** Impaired gait.
 - (2) **Fine Motor Coordination:** Copies 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 and 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 cannot find directions forward and backward.
- I. Thinking Process:** Logical and coherent thoughts, hallucinations, suicidal ideation, homicidal ideation, phobias, obsessions, delusions.
- J. Fantasies and Interconflicts:** 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, resilience.

Attempted Suicide and Drug Overdose

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

Vital Signs: Blood pressure (hypertension), pulse (bradycardia), temperature, respiratory

92Toxicological Emergencies

rate.

HEENT: Signs of trauma, ecchymoses; pupils 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, urinalysis, 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 phenylephrine).

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 (alcohol, oral hypoglycemics, aspirin, beta-blockers, insulin; high iron, late aspirin), hypokalemia (lithium). Arterial blood gases. Liver function tests, WBC, toxicology screen of urine and serum. Methemoglobin test of blood. Ferric chloride test for aspirin.

Kidney, Ureter and Bladder (KUB) X-ray: Radiopaque pill fragments are seen with calcium, chloral hydrate, heavy metals (lead), iron, piperazine, phenothiazines, enteric-coated pills.

ECG: Prolonged QT corrected (tricyclic antidepressants).

Toxin	Clinical Findings
Iron	Diarrhea, bloody stool, metabolic acidosis, hematemesis, abdominal pain, leukocytosis, hyperglycemia
Opioids	Coma, respiratory depression, miosis, track marks, bradycardia, decreased bowel sounds

Organophosphates	Miosis, cramps, salivation, urination, bronchorrhoea, lacrimation, defecation, bradycardia
Salicylates	Hyperventilation, fever, diaphoresis, tinnitus, hypoglycaemia, haematemesis, altered mental status, metabolic acidosis, respiratory alkalosis
Phencyclidine (PCP)	Muscle twitching, rigidity, agitation, nystagmus, hypertension, tachycardia, psychosis, blank stare, myoglobinuria, increased creatine phosphokinase
Tricyclic antidepressants	Dry mouth, vasodilation, hypotension, seizures, ileus, altered mental status, pupillary dilation, arrhythmias, widened QRS
Theophylline	Nausea, vomiting, tachycardia, tremor, convulsions, metabolic acidosis, hypokalaemia, ECG abnormalities
Adrenergic storm (cocaine, amphetamines, phenylpropanolamine)	Pupillary dilation, hyperthermia, agitation, diaphoresis, seizures, tremor, anxiety, tactile hallucinations, dysrhythmias, aortic dissection, tachycardia, hypertension
Sedative/hypnotics	Respiratory depression, coma, hypothermia, disconjugate eye movements
Anticholinergics	Dry mouth, skin dryness, tachycardia, fever, arrhythmias, urinary and fecal retention, mental status change, pupillary dilation, flushing

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 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 extremities gross motor function, sensory deficits.

E. **Exposure:** Completely undressed 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, pupillary reactivity, exophthalmos, enophthalmos, hyphema, globe laceration, extraocular movements, lens dislocation.

D. **Ears:** Laceration, hematoma, cerebrosplinal 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 tenderness/deformity, tracheal deviation, subcutaneous emphysema, bruit, stridor.

H. **Chest:** Symmetry, flail segments, laceration, rib fracture, tenderness or deformity, subcutaneous emphysema, bilateral breath sounds, heart sounds.

I. **Abdomen:** Laceration, ecchymosis, scars, tenderness, distention, bowel sounds, pelvic 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, spinal tenderness, range of motion.

N. **Neurological Examination:** Level of consciousness, pupillary 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)

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