

Sailer, Wasner

Differential Diagnosis pocket



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Publishing

Preface to the First Edition

Differential Diagnosis pocket is intended to help both students and physicians in their everyday clinical and private practice by placing at their disposal the basic materials for working through differential diagnostic questions. Here, for the first time, we have laid the groundwork by including clinical pictures as well as lab values, syndromes, cardinal symptoms, subjective complaints, and clinical signs. This forms the basis for the most comprehensive and broad-based approach possible with a single book.

We have placed special emphasis on manageable presentation. **Differential Diagnosis pocket** is arranged alphabetically, which makes it possible to locate items quickly. Related subjects or further explanations are cross-referenced by page number. The structured layout gives the reader a quick overview of a specific subject, and can then lead further to the details of possible differential diagnoses when required.

Each individual differential diagnosis begins with an introduction that contains important information, such as definitions, basic pathophysiology, incidence rates, or comments to get you off to a quick start. Reference ranges for lab values are also included.

We hope that **Differential Diagnosis pocket** will help you avoid the long, tedious process of searching out and compiling information from the various standard reference works. We would be happy to hear your criticism, ideas, and suggestions for improvement. Please write to us at sailer@media4u.com. We hope to hear from you!

Best wishes from

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September 2002

Abdominal Discomfort

Very common complaint. Pay attention to concomitant symptoms like fever (→ 143), diarrhea (→ 101), nausea, vomiting (→ 252), hemorrhage and peritoneal irritation. See Abdominal Pain, Acute → 7

Diffuse abdominal discomfort

- ▶ Gastroenteritis (→ 101)
- ▶ Peritonitis
- ▶ Pancreatitis
- ▶ Leukemia
- ▶ Sickle cell crisis
- ▶ Appendicitis
- ▶ Mesenteric adenitis
- ▶ Abdominal aortic aneurysm
- ▶ Intussusception
- ▶ Colitis
- ▶ Ileus (→ 206)
- ▶ Inflammatory bowel disease
- ▶ Metabolic, toxic, bacterial causes

Epigastric and upper quadrants

- ▶ Gastrointestinal
 - Dyspepsia
 - Gastroesophageal reflux disease
 - Peptic ulcer disease
 - Gastritis
 - Irritable stomach
 - Stomach emptying disorder
 - Gastric tumors
 - Colon cancer
 - Cholecystolithiasis
 - Postcholecystectomy syndrome
 - Tumors of the gall bladder and bile ducts
 - Pancreatitis
 - Pancreatic tumors
 - Ulcerative colitis
- ▶ Hepatopathy (→ 226)
 - Congested liver
 - Hepatic tumors
 - Parasitosis of the liver
 - Cholecystitis
- ▶ Miscellaneous

- Splenic rupture
- Splenic infarction
- Spleen tumors
- Kidney cancer
- Lymphomas
- Myocardial ischemia
- Basal pneumonia
- Pleuritis
- Pyelonephritis
- Pulmonary embolism
- Chronic infections
- Lamblia
- Tuberculosis
- Aortic aneurysms
- Diseases of the spine with pain radiating into the abdominal cavity

Left upper quadrant

- ▶ Splenomegaly
- ▶ Splenic rupture
- ▶ Splenic infarction
- ▶ Spleen tumor
- ▶ Renal pain
 - Pyelonephritis
 - Kidney cancer
- ▶ Gastritis
- ▶ Gastroduodenal ulcers
- ▶ Pancreatitis
- ▶ Pericarditis
- ▶ Empyema
- ▶ (Basal) pneumonia
- ▶ Pulmonary infarction
- ▶ Pleuritis

Right upper quadrant

- ▶ Cholecystitis
- ▶ Choledocholithiasis
- ▶ Pleuritis
- ▶ Pulmonary infarction
- ▶ Renal pain
- ▶ Pancreatitis
- ▶ Peptic ulcer
- ▶ Budd-Chiari syndrome (hepatic vein obstruction)
- ▶ Hepatomegaly
- ▶ Hepatic abscess
- ▶ Hepatic tumor

▶ Hepatitis

Mesogastrium

▶ Mesenteric infarction

▶ Ileus (→ 206)

▶ Invagination

▶ Sigmoid volvulus

Lower quadrants

▶ Non-organic

• Intestinal motility disorders

• Irritable colon

• chronic constipation

▶ Organic

• Gastrointestinal

◦ Diverticulosis

◦ Inflammatory bowel disease

◦ Ischemic colitis

◦ Adhesions

◦ Neoplastic

• Urologic, nephrologic

◦ Urolithiasis

◦ Pyelonephritis

◦ Glomerulonephritis

◦ Hydronephrosis

◦ Polycystic kidneys

◦ Renal artery stenosis

• Gynecologic

◦ Adnexitis

◦ Cystitis

◦ Ovarian cysts

◦ Endometriosis

• Miscellaneous

◦ Vertebral problems

◦ Hernias

◦ Anorectal diseases (hemorrhoids, anal fissures)

◦ Lactose intolerance

◦ Opiate withdrawal

◦ Porphyria

◦ Aortic aneurysms

◦ Familial Mediterranean fever

◦ Lead intoxication

◦ Retroperitoneal fibrosis

◦ Retroperitoneal hemorrhage

◦ Diseases of the spine with pain radiating into the abdominal cavity

Right lower quadrant

▶ Appendicitis

▶ Inflamed ileal diverticulum

▶ Terminal ileitis/Crohn's disease (Inflammatory bowel disease)

▶ Adnexitis

▶ Ovarian cyst or torsion

▶ Ectopic pregnancy

▶ Ureteral colic

▶ Endometriosis

▶ Salpingitis

▶ Mittelschmerz

▶ Inguinal hernia

▶ Psoas abscess

▶ Seminal vesiculitis

▶ Renal pain

▶ Uteral colic

▶ Perforated ulcer

▶ Colon carcinoma

▶ Leaking aortic aneurysm

Left lower quadrant

▶ Diverticulitis

▶ Intestinal obstruction

▶ Appendicitis

▶ Gastritis

▶ Ureteral colic

▶ Psoas abscess

▶ Seminal vesiculitis

▶ Renal pain

▶ Adnexitis

▶ Ectopic pregnancy

▶ Ovarian cyst or torsion

▶ Endometriosis

▶ Salpingitis

▶ Mittelschmerz

▶ Ureteral colic

▶ Inguinal hernia

▶ Colon carcinoma

▶ Leaking aortic aneurysm

▶ Inflammatory bowel disease

▶ Splenomegaly

Flank pain

Dorsolateral origin with possible inguinal radiation, See Flank Pain → 146.

Abdominal distention, See Ileus → 206

Abdominal Enlargement

Sudden or progressive enlargement of the abdomen. Localized or generalized, intermittent or persistent.

Abdominal mass (localized abdominal enlargement, swelling)

- ▶ Hepatomegaly (→ 179)
- ▶ Cholecystitis
- ▶ Splenomegaly (→ 337)
- ▶ Pancreatic abscess
- ▶ Pancreatic pseudocyst
- ▶ Abdominal aortic aneurysm
- ▶ Crohn's disease
- ▶ Bowel obstruction
- ▶ Diverticulitis
- ▶ Volvulus
- ▶ Tumor
 - Colon cancer
 - Stomach cancer
 - Kidney cancer
 - Liver cancer
 - Gallbladder tumor
 - Neuroblastoma
 - Uterine leiomyoma (fibroids)
- ▶ Bladder distention
- ▶ Hydronephrosis
- ▶ Ovarian cyst
- ▶ Ureteropelvic junction obstruction

Generalized abdominal enlargement

- ▶ Ascites (→ 43)
- ▶ Ileus (→ 206)
- ▶ Large abdominal cyst
- ▶ Generalized peritonitis
- ▶ Congenital megacolon
- ▶ Large retroperitoneal tumor

Abdominal Pain, Acute

Acute abdomen

The acute abdomen is a serious acute intra-abdominal condition with pain, tenderness, and muscular rigidity. Emergency surgery must be considered.

Most common causes

- ▶ Acute appendicitis
- ▶ Acute gastroenteritis
- ▶ Acute cholecystitis
- ▶ Acute diverticulitis
- ▶ Acute pancreatitis
- ▶ Ileus (→ 206)
- ▶ Perforated gastric or duodenal ulcer
- ▶ Mesenteric infarction
- ▶ Gynecologic diseases

Abdominal pain in surgical emergencies

- ▶ Twisted ovarian cyst
- ▶ Ectopic pregnancy
- ▶ Intestinal obstruction
- ▶ Appendicitis
- ▶ General peritonitis from unknown cause
- ▶ Perforated peptic ulcer
- ▶ Perforated diverticulitis
- ▶ Leaking abdominal aneurysm
- ▶ Mesenteric embolism or thrombosis
- ▶ Biliary tract disease
- ▶ Pancreatitis
- ▶ Kidney stone

Abdominal pain in neonates, infants, and children

- ▶ Meconium peritonitis
- ▶ Intestinal obstruction from
 - Atresia
 - Stenosis
 - Esophageal webs
 - Volvulus
 - Imperforate anus
- ▶ Enterocolitis

Abdominal pain in women

- ▶ Dysmenorrhea
- ▶ Mittelschmerz (middle pain)
- ▶ Pelvic inflammatory disease (→ 279)

- ▶ Endometriosis
- ▶ Intrauterine contraceptive device (migration)

Intra-abdominal causes

- ▶ Infection and inflammation
 - Acute appendicitis
 - Acute cholecystitis
 - Acute gastroenteritis
 - Acute pancreatitis
 - Necrotic pancreatitis
 - Acute peritonitis
 - Acute diverticulitis (poss. Meckel's diverticulum)
 - Inflammatory bowel disease
 - Crohn's disease
 - Ulcerative colitis
 - Abscess (subphrenic)
 - Pyelonephritis
 - Acute adnexitis
 - Splenic abscess
 - ▶ Perforation, hemorrhage or rupture
 - Gastric ulcer
 - Duodenal ulcer
 - Anastomotic ulcer
 - Gastric carcinoma
 - Abdominal aneurysm
 - Acute appendicitis
 - Acute cholecystitis
 - Diverticulum
 - Spleen, liver or kidney rupture
 - After blunt abdominal trauma
 - Tubal pregnancy
 - ▶ Obstruction of a hollow organ
 - Ileus (→ 206)
 - Mechanical
 - *Colon tumor*
 - *Stenoses*
 - *Hernias*
 - *Volvulus*
 - *Invagination (children)*
 - Paralytic
 - *Toxic (peritonitis)*
 - *Reflex (postoperative)*
 - Metabolic
 - *Hypokalemia*
 - Spastic
 - *Lead intoxication*
 - *Porphyria*
 - Obstruction of the bile ducts
 - Cholelithiasis
 - Choledocholithiasis
 - Stenosis of the bile papilla
 - Obstruction of the urinary passages
 - Kidney stones (renal colic)
 - Ureter stones (ureter colic)
 - Ureteral stenosis
 - Urinary tract obstruction
 - Misplaced urinary catheter
 - Prostate hypertrophy/hyperplasia
 - Prostatitis
 - Testicular torsion
 - Twisted ovarian cyst
 - Ovarian tumor rotation
- ▶ Vascular
 - Abdominal bleeding
 - Abdominal angina
 - Mesenteric artery infarction
 - Mesenteric vein thrombosis
 - Omental ischemia
 - Portal vein thrombosis
 - Renal artery infarction
 - Aortic aneurysm
 - Splenic infarction
- ▶ Gynecologic
 - PID
 - Acute adnexitis
 - Extrauterine pregnancy
 - Ovulation (intermenstrual pain)
 - *Mittelschmerz*
 - Dysmenorrhea
 - Ovarian cysts
 - Ovarian torsion
 - Ovarian tumor rotation
- ▶ Cancer
 - Stomach
 - Pancreas
 - Colon
 - Liver
 - Kidney
 - Metastatic tumor

- Peritoneal carcinomatosis
- ▶ Functional disorders
 - Irritable bowel syndrome
 - Nonulcer dyspepsia
 - Sphincter of Oddi dysfunction
 - Functional constipation
- ▶ Pelvic disorders
 - Inflammation
 - Pelvic inflammatory disease
 - Tuboovarian disease
 - Endometris
 - Salpingitis
 - Cystitis
 - Seminal vesiculitis
 - Epididymitis
 - Mechanical disorders
 - Ovarian cyst
 - Ectopic pregnancy
 - Omental torsion
- Extra-abdominal**
- ▶ Metabolic, endocrine
 - Diabetic coma
 - Ketoacidosis
 - Hyperlipidemia
 - Hyperparathyroidism
 - Hypercalcemia
 - Tetany
 - Thyrotoxic crisis
 - Addisonian crisis
 - Uremia
 - Porphyria (!)
 - Hemochromatosis
- ▶ Hematologic
 - Hemolytic anemia
 - Henoch-Schönlein purpura
 - Sickle cell anemia
 - Leukemia
 - Lymphoma
 - Polycythemia
- ▶ Neurologic
 - Herpes zoster
 - Tabes dorsalis
 - Herniated disc
- ▶ Bones
 - Lumbago
- Vertebral body degeneration
- Intercostal neuralgia
- Diskitis
- Coxitis
- Pelvic osteomyelitis
- ▶ Cardiovascular
 - Angina pectoris
 - Myocardial infarction
 - Perimyocarditis
 - Acute right ventricular failure
 - E.g. after pulmonary embolism (capsular pain from congested liver)
 - Aortic aneurysm
 - Dissecting aneurysm
 - Pulmonary embolism
 - Infectious endocarditis with splenic infarction
- ▶ Thoracic
 - Esophagitis
 - Esophageal ruptur (Boerhaave's syndrome)
 - Pneumonia
 - Pulmonary embolism
 - Penumothorax
 - Empyema
 - Pleuritis
- ▶ Collagen vascular disease
 - Polyarteritis nodosa of the mesenteric vessels
 - LE
- ▶ Toxins
 - Snake bite
 - Insekt bite
 - Lead poisoning
- ▶ Psychiatric
 - Depression
 - Anxiety disorders
 - Schizophrenia
 - Factitious abdominal pain
- ▶ Miscellaneous
 - Acute abdomen in patients with AIDS
 - Infectious gastroenteritis (common)
 - CMV enterocolitis
 - Atypical mycobacterioses
 - *M. avium*

- *M. kansasii*
- *M. fortuitum*
- *M. xenopi*
- Salmonellosis
- Mycobacterium avium infection of the retroperitoneum and spleen
- Acalculic cholecystitis or sclerosing cholangitis due to CMV infection or cryptosporidiosis
- Perforation
- Non-Hodgkin's lymphoma of the gastrointestinal tract
- Kaposi's sarcoma of the gastrointestinal tract
- Narcotic withdrawal
- Heat stroke
- Behçet's syndrome (aphthoid-ulcerative changes of the oral and genital mucosa, iritis, erythema nodosum and arthritis)
- Unexplained intractable abdominal pain

Acanthocytes

See Erythrocyte, Morphology → 132

Achalasia

Failure of the esophagus to relax, inability of the lower esophageal sphincter (LES) to open and let food pass into the stomach. Caused by degeneration of the myenteric plexus, resulting in dysphagia (→ 110), regurgitation and dilation of the esophagus (megaesophagus).

Primary

- ▶ Idiopathic achalasia (cause unknown)

Secondary

- ▶ Chagas' disease
- ▶ Neoplasms
 - Gastric carcinoma
 - Bronchial carcinoma
 - Lymphoma
 - Non-Hodgkin's lymphoma
 - Hodgkin's lymphoma

- Prostate cancer
- Mesothelioma
- ▶ Chronic idiopathic intestinal pseudo-obstruction
- ▶ Sarcoidosis
- ▶ Amyloidosis
- ▶ Ischemia
- ▶ Neurotropic viruses
 - Herpes zoster
- ▶ Drugs, toxins
- ▶ Radiation therapy
- ▶ Postvagotomy

Acid Phosphatase (AP)

Group of enzymes that liberate inorganic phosphate from phosphoric esters. The enzyme is localized in the lysosomes of all body cells, with high activity in the liver, bone marrow, prostate, erythrocytes and thrombocytes.

Reference range

0-5.5 U/l

Increased

- ▶ Prostate disease
 - Prostate cancer
 - Benign prostatic hypertrophy
 - Prostatitis
 - Prostatic manipulation
- ▶ Bone diseases
 - Osteosarcoma
 - Bone metastases
 - Paget's disease
 - Osteogenesis imperfecta
- ▶ Hematologic disease
 - Multiple myeloma
 - Polycythemia
 - Leukemia
 - Megaloblastic anemia
 - Hemolysis
 - Thrombocytosis
 - DIC
- ▶ Hyperparathyroidism
- ▶ Breast cancer
- ▶ Gaucher's disease

- ▶ Liver disease
- ▶ Chronic renal failure

Acidosis, Metabolic

A condition of low arterial pH, reduced plasma HCO_3^- concentration, and usually compensatory alveolar hyperventilation resulting in decreased PCO_2 . Increased accumulation of acid equivalents through metabolism or impairment of the regulatory ability of liver or kidneys. Compensation is made through the lungs. If the acid load overwhelms respiratory capacity, acidemia (arterial pH < 7.35) will result.

Disorder	H^+	pH	HCO_3^-	pCO_2
Met. Ac.	↑	↓	↓ ↓*	(↓)
Met. Alk.	↓	↑	↑ ↑*	(↑)
Resp. Ac.	↑	↓	(↑)	↑ ↑*
Resp. Alk.	↓	↑	(↓)	↓ ↓*

* primary change

See Alkalosis, Metabolic → 18

See Acidosis, Respiratory → 12

See Alkalosis, Respiratory → 19

Primary metabolic disorder

- ▶ pH changes in same direction as bicarbonate, pCO_2
- ▶ Metabolic acidosis
 - Serum pH decreased
 - Serum bicarbonate and pCO_2 decreased
- ▶ Metabolic alkalosis
 - Serum pH increased
 - Serum bicarbonate and pCO_2 increased

Primary respiratory disorder

- ▶ pH changes in opposite direction as bicarbonate, pCO_2
- ▶ Respiratory acidosis
 - Serum pH decreased
 - Serum bicarbonate and pCO_2

increased

- ▶ Respiratory alkalosis
 - Serum pH increased
 - Serum bicarbonate and pCO_2 decreased

Classification I

- ▶ Addition acidosis
 - Endogenous acid production:
 - Ketoacidosis
 - *Diabetic (pre)coma (typical in diabetic)*
 - *Starvation*
 - *Alcoholism*
 - *Thyrotoxicosis*
 - Lactic acidosis
 - *Vasomotor ataxia*
 - *Shock*
 - *Hypoxia*
 - *Hyperventilation*
 - *Mesenteric insufficiency*
 - *Sepsis*
 - *Pancreatitis*
 - *Severe burns*
 - *Hepatic failure*
 - *Leukemias, lymphomas*
 - *Congenital metabolic disorders*
 - *Chronic respiratory alkalosis*
 - *Drugs (biguanides, salicylates, sorbitol and xylitol infusion, ethanol intoxication, isoniazide)*
 - Fever
 - Heavy physical work
 - Fetal emergency situation during childbirth
 - Exogenous acid supply
 - Intoxication
 - *Barbiturates*
 - *Salicylates*
 - *Carbonic anhydrase inhibitors*
 - *Methyl alcohol*
 - *Glycol*
 - *Methionine*
 - Spironolactone intoxication
 - Increased chloride absorption
 - Ammonium chloride medication

- Infusion of 0.9% Na⁺Cl Solution
 - Potassium substitution with neutral salts
- ▶ Retention acidosis (reduced renal acid elimination)
 - Renal failure
 - Glomerular/tubular retention acidosis
 - Chronic interstitial nephritis
 - Distal tubular acidosis (type I)
 - Acute renal failure
- ▶ Base loss
 - Biliary fistula
 - Small intestine fistula
 - Diarrhea
 - Inflammatory intestinal diseases
 - Ileus (→ 206)
 - Following chronic hyperventilation
- ▶ Renal bicarbonate loss
 - Proximal tubular acidosis (type II)
 - Distal renal tubular acidosis
 - Hyperkalemic renal tubular acidosis
 - Therapy with carbonic anhydrase inhibitor
 - Acetazolamide

Classification II

- ▶ Lactic acidosis without hypoxia
 - Drugs, toxins
 - Alcohol
 - Methyl alcohol
 - Salicylates
 - Acetaminophen
 - Sodium nitroprusside
 - Catecholamines
 - Biguanides
 - Isoniazide
 - Infusions
 - Fructose
 - Sorbitol
 - Xylitol
 - Severe hepatopathy
 - Diabetic regulatory dysfunction
 - Diabetic ketoacidosis
 - End-stage renal failure
 - Tumor

- Leukemia
 - ▶ Lactic acidosis with hypoxia
 - Circulatory insufficiency
 - Shock
 - Myocardial infarction
 - Hypovolemia
 - Sepsis
 - Pulmonary embolism
 - Cardiac pump failure
 - respiratory failure
 - COPD
 - Status asthmaticus
 - CO₂ intoxication
 - ▶ Physical activity
- ### Classification III
- ▶ Increased anion gap (→ 34)
 - ▶ Normal anion gap (→ 34)

Acidosis, Respiratory

A condition of low arterial pH, hypoventilation resulting in an elevated PCO₂, and usually compensatory increase in plasma HCO₃⁻ concentration. Decrease in blood pH is often caused by retention of carbon dioxide due to inadequate pulmonary ventilation or hypoventilation (→ 319), unless compensated by renal retention of bicarbonate.

Disorder	H ⁺	pH	HCO ₃ ⁻	pCO ₂
Met. Ac.	↑	↓	↓↓*	(↓)
Met. Alk.	↓	↑	↑↑*	(↑)
Resp. Ac.	↑	↓	(↑)	↑↑*
Resp. Alk.	↓	↑	(↓)	↓↓*

* primary change

See Respiratory Failure → 319

See Dyspnea → 112

See Acidosis, Metabolic → 11

See Alkalosis, Metabolic → 18

See Alkalosis, Respiratory → 19

Causes

- ▶ Airway obstruction
 - Laryngeal spasm or edema
 - Tracheal stenosis or edema
 - Sleep apnea
 - Mechanical
 - Foreign body
 - Neoplasm
 - Aspirated fluid
 - Bronchospasm
- ▶ Cardiopulmonary, thoracic
 - Cardiac failure
 - Pneumonia
 - Pulmonary edema
 - Respiratory distress syndrome
 - Restrictive lung disease
 - Pulmonary embolism
 - Pneumothorax
 - Chest trauma
 - Smoke inhalation
 - Inadequate mechanical ventilation
 - Kyphoscoliosis
- ▶ Neuromuscular
 - Drugs, toxins
 - Sedatives
 - Tranquilizers
 - Anticholinesterases
 - Anesthetics
 - Injury or infarction
 - Cerebral
 - Brainstem
 - High spinal cord injury
 - Neuromuscular
 - Myasthenia gravis
 - Guillain-Barré syndrome/
Polyradiculitis
 - Amyotrophic lateral sclerosis
 - Poliomyelitis
 - Tetanus
 - Botulism
 - Myopathy involving respiratory muscles
 - Hypokalemic myopathy
 - Familial periodic paralysis
 - Muscular dystrophy

- Primary hypoventilation
- Sleep apnoea syndrome
- Diaphragmatic paralysis

Acrocyanosis

Persistent, painless, symmetric cyanosis of the hands and less commonly the feet caused by vasospasm of the small vessels of the skin.

DDx

- ▶ Localized peripheral cyanosis
 - Raynaud's syndrome
 - Vegetative vasomotor hyperexcitability
 - Venous thrombosis
 - Peripheral arterial occlusive disease
 - Constitutional acrocyanosis
 - Cold agglutinin disease
 - Paroxysmal cold hemoglobinuria
 - Perniosis
 - Acrodynea (Feer's disease)
 - Waldenström's syndrome
- ▶ Congenital cardiac defect with right-to-left shunt
 - Tetralogy of Fallot
 - Patent ductus arteriosus
 - Acquired cardiac defects
 - Cor pulmonale
 - Left ventricular failure
 - Mitral stenosis
 - Congestive cardiomyopathy
 - Mitral valve insufficiency
- ▶ Pulmonary
 - Chronic bronchitis
 - COPD
 - Pulmonary emphysema
 - Pulmonary fibrosis
 - Bronchiectases

Acromegaly, See Growth Hormone → 159

ACTH

Adrenocorticotrophic hormone

Polypeptide hormone of the anterior lobe of the hypophysis stimulating growth of the adrenal cortex or secretion of its hormones. Indicator in differential diagnosis of hypercortisolism (Cushing's syndrome (→ 91), and adrenocortical insufficiency.

Increased

- ▶ Central Cushing
 - Pituitary ACTH secreting adenoma (usually microadenomas)
 - Hypothalamic hyperfunction (increased corticotropin-releasing hormone)
- ▶ Ectopic ACTH syndrome
 - Practically any tumor can cause ectopic ACTH syndrome. In over 50% of cases it is caused by lung cancer, followed by islet cell malignancies and thymomas.
- ▶ ACTH therapy
- ▶ Primary adrenal cortical insufficiency (Addison's disease). See Addison's Disease → 14.
 - Autoimmune/idiopathic (~80%)
 - Congenital
 - Hemorrhage/infarction
 - Waterhouse-Friderichsen
 - Iatrogenic
 - Infections
 - Tuberculosis
 - Drugs
 - Infiltrative, neoplasm

Decreased

- ▶ Adrenal Cushing
 - Adrenal adenoma
 - Adrenal hyperplasia
 - Adrenal carcinoma
- ▶ Iatrogenic hypercortisolism
 - Long-term glucocorticoid therapy (most common cause)

Addison's Disease

Adrenal cortical insufficiency

Chronic insufficiency of the adrenal cortex due to insults to the adrenal including physical trauma, hemorrhage and tuberculosis of the adrenal. Characterized by bronzing of the skin, anemia, weakness, and low blood pressure.

Primary adrenocortical insufficiency (Addison's disease)

- ▶ Autoimmune/idiopathic (~80%)
- ▶ Congenital
 - Adrenal aplasia/hypoplasia
 - Familial glucocorticoid deficiency
 - Adrenal leukodystrophy
 - Congenital adrenal hyperplasia
- ▶ Hemorrhage, infarction
 - Anticoagulation
 - Arteritis
 - Coagulopathy
 - Embolus
 - Hypotension
 - Neonatal
 - Pregnancy
 - Sepsis
 - Waterhouse-Friderichsen syndrome
 - Surgery
 - Thrombosis
 - Trauma
- ▶ Iatrogenic
 - Bilateral adrenalectomy
 - Radiation (therapy)
- ▶ Infections
 - AIDS
 - CMV
 - Cryptococcosis
 - Kaposi's sarcoma
 - Mycobacterium avium
 - Toxoplasmosis
 - Fungal
 - Blastomycosis
 - Coccidiomycosis
 - Cryptococcosis

- Histoplasmosis
- Syphilis
- Tuberculosis (~20% of all Addison's)
- ▶ Drugs
 - Aminoglutethimide
 - Barbiturate
 - Etomidate
 - Ketoconazole
 - Metirapone
 - Mitotane
 - Phenytoin
 - Rifampin
 - Spironolactone
 - Suramin
 - Trilostane
- ▶ Infiltrative
 - Amyloidosis
 - Hemochromatosis
 - Sarcoidosis
- ▶ Neoplasm
 - Leukemia
 - Lymphoma
 - Metastases
- ▶ Coma
- ▶ Uremia
- ▶ Volume/electrolyte disorders

Secondary (pituitary) or tertiary (hypothalamic) adrenocortical insufficiency

- ▶ After surgery of cortisol-secreting tumor
- ▶ Drug withdrawal
 - ACTH
 - Glucocorticoids
 - Megestrol acetate

Adnexitis

See Pelvic Inflammatory Disease → 279

Adrenal cortical insufficiency

See Addison's Disease → 14

Adrenal Tumor

Unilateral

- ▶ Functional
 - Adrenal adenoma
 - Adrenal carcinoma
 - Pheochromocytoma
 - Primary aldosteronism
- ▶ Nonfunctional
 - Adrenal adenoma
 - Adrenal carcinoma
 - Ganglioneuroma
 - Myelolipoma
 - Hematoma
 - Adrenolipoma
 - Metastasis

Bilateral

- ▶ Functional
 - ACTH-dependent Cushing's syndrome
 - Congenital adrenal hyperplasia
 - Pheochromocytoma
 - Conn's syndrome (hyperplastic)
 - Micronodular adrenal disease
 - Idiopathic bilateral adrenal hypertrophy
- ▶ Nonfunctional
 - Infection
 - Tuberculosis
 - Fungi
 - Infiltration
 - Leukemia
 - Lymphoma
 - Amyloidosis
 - Hemorrhage
 - Bilateral metastases

Adrenocorticotrophic hormone

See ACTH → 14

Adult respiratory distress syndrome

See Pulmonary Edema → 303

Adynamia, See Fatigue → 140

AFP

Alpha-Fetoprotein

AFP is formed by the fetus in the gastrointestinal tract and the liver, as well as embryonic yolk sac. It is thought to protect the fetus from maternal estrogens and immunologic rejection, as well as substituting for the albumin that predominates later. Concentrations $> 50 \mu\text{g/l}$ in adults are pathognomonic for an AFP-producing tumor.

Normal values

Newborns	$< 140,000 \mu\text{g/l}$
Non-Pregnant:	$< 25 \text{ ng/ml}$
Fetal serum	Peak: 3 mg/ml (13th week)
Amniotic fluid	Peak: $30 \mu\text{g/ml}$ (13th week)
Maternal serum (MSAFP)	Peak: 100 ng/ml (30th week)

Increased AFP

- ▶ Hepatocellular carcinoma
- ▶ Ovarian tumors
- ▶ Germ cell tumors
- ▶ Testicular tumor (non-seminoma)

Slightly increased AFP

- ▶ Pancreatic cancer
- ▶ Gastric carcinoma
- ▶ Bronchial carcinoma

Increased maternal AFP

AFP $> 100 \mu\text{g/l}$ in the 16th–20th week of gestation (abnormal maternal serum AFP =MSAFP)

- ▶ Fetal malformation
 - Anencephaly
 - Spina bifida
 - Abdominal wall defects
- ▶ Multigravida
- ▶ Intrauterine malnutrition
- ▶ Exomphalos
- ▶ Astroschisis
- ▶ Placental abnormalities
- ▶ Threatened abortion

- ▶ Fetal death in utero
- ▶ Multiple pregnancy (twin gestation)

Decreased maternal AFP

- ▶ Chromosomal abnormalities
 - Down's syndrome

Agranulocytosis, See Leukopenia → 223

Alanine aminotransferase

See Aminotransferases → 23

Albumin

Main protein in human blood. Only reduced levels are clinically relevant. About 70% of total body albumin is found in the interstitial space. Also occurs in liquor and muscle. Function: regulation of the oncotic pressure of blood, transport protein for water, salts (calcium), pigments (bilirubin), free fatty acids and drugs. Since many drugs are bound by albumin, a hypoalbuminemia can lead to an increase in pharmacologically available drug with the same dosage.

Reference range

In serum:	$3.5\text{--}5.2 \text{ g/dl}$
In urine:	$< 10 \text{ mg/g}$ (morning urine) $< 30 \text{ mg/24 h urine}$

Hypoalbuminemia

- ▶ Liver diseases (decreased synthesis)
 - Cirrhosis
 - Hepatitis
- ▶ Nephrotic syndrome
- ▶ Gastrointestinal
 - Severe malnutrition
 - Malabsorption
 - Protein-losing enteropathy
- ▶ Infection/inflammation
 - Inflammatory bowel disease
 - Acute and chronic infectious and inflammatory diseases
- ▶ Malignancies
- ▶ Iatrogenic

- After hemodialysis
- Oral contraceptives
- Rapid intravenous hydration
- ▶ Severe burns
- ▶ Pregnancy
- ▶ Pre-eclampsia
- ▶ Cystic fibrosis
- ▶ Lymphangiectasia
- ▶ Prolonged immobility
- ▶ Miscellaneous
 - Rheumatoid arthritis
 - Lupus erythematosus
 - Rheumatic fever
 - Waldenström's syndrome
 - Idiopathic hyperlipidemia
- ▶ Rare causes
 - Sarcoidosis
 - Leishmaniasis
 - Leprosy
 - Ménétrier's disease

Hyperalbuminemia

- ▶ Iatrogenic albumin substitution
- ▶ Dehydration (pseudohyperalbuminemia)

Albuminuria, See Proteinuria → 298

Aldosterone

Mineralocorticoid hormone produced by the zona glomerulosa of the adrenal cortex. Facilitates potassium exchange for sodium in the distal renal tubule, causing sodium reabsorption and potassium and hydrogen loss. Regulating the balance of salt and water in the body and regulating blood pressure.

Reference range

Plasma	At rest	< 8 ng/dl
	After stimulation	2-6 x increase
24 h urine		5-19 µg

See Hyperaldosteronism → 186

See Hypoaldosteronism → 198

Aldosteronism. See Conn's syndrome, aldosteronism → 186

Alkaline Phosphatase (AP)

Group of enzymes that hydrolyze many orthophosphoric monoesters and are present ubiquitously (liver, kidney, bones, intestine and placenta)

Reference range

55-170 U/l

Increased serum AP

- ▶ Physiologic
 - During growth (bone AP, up to 700 IU/l)
 - In last trimester of pregnancy (placental AP)
- ▶ Pathologic
 - osteogenic (increased osteoblast activity)
 - Rickets
 - Osteomalacia
 - Fracture healing
 - Osteonecroses
 - Osteomyelitis
 - Hyperparathyroidism
 - Paget's disease
 - Bone tumors
 - Osteosarcoma
 - Metastatic bone tumors
 - Multiple myeloma
 - Osteoblastic metastases
 - Prostate carcinoma
 - Breast cancer
 - Osteomyelosclerosis
 - Gastrointestinal
 - Bowel disease
 - *Ulcerative colitis*
 - *Bowel perforation*
 - Hepatic cholestasis
 - *Fatty liver*
 - *Alcoholic hepatitis*
 - *Benign or malignant liver tumor*
 - *Primary biliary cirrhosis*

- Drug induced liver disease
- Hepatic granuloma
- Hepatic cyst
- o Biliary cholestasis
 - Cholecystitis
 - Cholelithiasis
 - Primary biliary cirrhosis
- o Hepatitis (liver AP)
- o Cholestasis (bile duct AP)
- o Cirrhosis
- o Cholangitis
- o Liver abscesses
- o Hodgkin's lymphoma with and without liver involvement
- o Liver metastases
- o Hepatotoxic
 - Drugs
 - Intoxications
- Miscellaneous
 - o Endocrine
 - Hyperparathyroidism
 - Hyperthyroidism
 - Acromegaly
 - o Sarcoidosis
 - o Polyarteritis nodosa
 - o Diabetes mellitus
 - o Acute pancreatitis
 - o Renal failure (renal osteopathy)
 - o Right ventricular failure (Æ congested liver)
 - o Fanconi's syndrome (hereditary impairment of amino acid metabolism with cystine storage in miscellaneous organs, rachitic microplasia and nephropathy)
 - o Paraneoplastic
 - Hodgkin's lymphoma
 - Hypernephroma
 - Bronchial carcinoma
 - o Pregnancy
 - o Hereditary hyper-phosphatasemia

Decreased serum AP

- ▶ Vitamin D intoxication
- ▶ Pernicious anemia
- ▶ Hypothyroidism

- ▶ Celiac sprue
- ▶ Malnutrition
- ▶ Fibrate therapy

Alkalosis, Metabolic

Loss of acids or retention of bicarbonate (HCO_3). Respiratory compensation. Through transmineralization: Hypokalemic alkalosis. ($\text{pH} > 7.45$, $\text{HCO}_3 > 29$ mmol/l)

Disorder	H^+	pH	HCO_3^-	pCO_2
Met. Ac.	↑	↓	↓ ↓*	(↓)
Met. Alk.	↓	↑	↑ ↑*	(↑)
Resp. Ac.	↑	↓	(↑)	↑ ↑*
Resp. Alk.	↓	↑	(↓)	↓ ↓*

* primary change

See Acidosis, Metabolic → 11

See Acidosis, Respiratory → 12

See Alkalosis, Respiratory → 19

Base excess

- ▶ Overcorrection of acidosis with bicarbonates
- ▶ Hepatic coma
- ▶ Administration of citrates (banked blood)
- ▶ Milk alkali syndrome
- ▶ Alkali therapy for stomach problems

Acid loss

- ▶ Loss of stomach acid
 - Vomiting
 - Hyperemesis gravidarum
 - Gastric juice drainage
- ▶ Hypokalemia
 - Saluretic therapy for hypokalemia
 - Renal potassium loss
 - Conn's syndrome
 - Bartter's syndrome
 - Gastrointestinal potassium loss
 - o Diarrhea
- ▶ Mineralocorticoid therapy
- ▶ Cushing's syndrome
- ▶ Cystic fibrosis

- ▶ After respiratory acidosis

Alkalosis, Respiratory

Hyperventilation

Disorder	H ⁺	pH	HCO ₃ ⁻	pCO ₂
Met. Ac.	↑	↓	↓ ↓*	(↓)
Met. Alk.	↓	↑	↑ ↑*	(↑)
Resp. Ac.	↑	↓	(↑)	↑ ↑*
Resp. Alk.	↓	↑	(↓)	↓ ↓*

* primary change

See Hyperventilation → 197 (!!!)

See Acidosis, Metabolic → 11

See Alkalosis, Metabolic → 18

See Acidosis, Respiratory → 12

Alopecia

Increased loss of hair. Pathologic if > 100 hairs/day. Hypotrichosis is reduced hair growth, particularly of secondary hair.

Common causes

- ▶ Nonscarring alopecia
 - Androgenetic alopecia
 - Telogen effluvium
 - Anagen effluvium
 - Trichotillomania
 - Traction alopecia
 - Alopecia areata
 - Ssecondary syphilis
- ▶ Scarring alopecia
 - Inflammatory dermatoses
 - Systemic lupus erythematosus
 - Infection
 - Physical or chemical agents
 - Neoplasm
 - Congenital defects

Causes

- ▶ Genetic causes (90%)
 - Androgenetic alopecia (men and women)
- ▶ Endocrine

- Thyroiditis
- Hypothyroidism
- Hyperthyroidism
- Hypogonadism
- Cushing's syndrome
- Sheehan's syndrome
- Hypoparathyroidism
- Pituitary insufficiency
- Adrenocortical insufficiency
 - Primary
 - Secondary

▶ Stress

- Psychic trauma
- Operation
- Labor

▶ Folliculitis

▶ Dermatitis

- Seborrhea
- Scleroderma
- Chronic disciform LE
- Mycosis fungoides
- Lichen ruber atrophicans
- Psoriasis
- Neurodermatitis
- Dermatitis exfoliativa generalisata
- Chronic lupus

▶ Scarring

- Chemical or physical trauma
- Lichen planopilaris
- Extensive bacterial or mycotic infections
 - Trichophytosis
 - Favus
 - Microsporosis
 - Secondary syphilis
 - Leptospirosis
 - Typhoid fever
- Herpes zoster infection
- Scleroderma

▶ Drugs

- ACE inhibitors
- Allopurinol
- Androgens
- Anticoagulants
- Anticonvulsants

- Antimycotic agents
- Arsenic
- Azathioprine
- Beta blockers
- Borates
- Cadmium
- Chemotherapeutics
- Chlorambucil
- Cisplatin
- Clofibrate
- Cyclophosphamide
- Cytarabine
- Estrogens
- Ethyl urethane
- Fluoruracil
- Gentamycin
- Gold compounds
- Heparins
- Indomethacin
- Levodopa
- Linolic acid
- Mercury and derivates
- Methotrexate
- Monoiodoacetic acid
- Niacin
- Oral contraceptives
- Propranolol
- Retinoids
- Salicylates
- Selenium
- Spironolactone
- Squalene
- Steroids
- Thallium
- Thallium
- Thyroid depressants
- Undecylenic acid
- Vitamin A overdose
- Warfarin
- ▶ Miscellaneous
 - Testicular feminization
 - Turner's syndrome
 - Cirrhosis
 - Autoimmune disease
 - Hashimoto's thyroiditis
 - Addison's disease
 - Diabetes mellitus
 - Schmidt's syndrome
 - Cachexia
 - Malignant tumors
 - Anemia
 - Postinfectious
 - Pneumonia
 - Scarlet fever
 - Abdominal typhoid fever
- ▶ Temporary hair loss
 - Pregnancy
 - Malnutrition
 - Malabsorption
 - Malresorption
 - Protein deficiency
 - Tryptophan deficiency
 - Nontropical sprue
 - Vitamin A deficiency
 - Vitamin B deficiency
 - Vitamin D deficiency rickets
- ▶ Mechanical effects
 - Traction alopecia
 - Pressure alopecia
 - Alopecia after extended bed rest
 - Trichotillomania (compulsion to pull out one's own hair)

Alpha-1 Antitrypsin

Alpha-1 antitrypsin inhibits or prevents the activity of proteolytic enzymes (trypsin). Alpha-1 antitrypsin deficiency is an inherited disorder leading to damage of various organs, principally the lungs with dyspnea or the liver with jaundice, ascites, and gastrointestinal bleeding.

Reference range

85–200 mg/dl

Alpha-1 antitrypsin deficiency

- ▶ In children
 - Nonphysiologic neonatal jaundice
 - Hepatitis of unclear origin in children
 - Hereditary, autosomal recessive alpha-1 antitrypsin deficiency