

Jaundice, diarrhoea and other gastroenterological symptoms in childhood

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Gastrological symptoms in children

- Vomiting
- Jaundice
- Abdominal pain
- Diarrhoea
- Constipation

Vomiting

1. Vomiting is the means by which the upper gastrointestinal tract rids itself of its contents when almost any part of the upper tract becomes excessively irritated, over distended, or even over excitable. Vomiting is a symptom, presenting complaint in multitude of disorders. Range from gastrointestinal pathology to disease in distant organ (otitis media or intracranial lesion)
2. Nausea: The unpleasant sensation of the imminent need to vomit, usually referred to the throat or epigastrium; a sensation that may or may not ultimately lead to the act of vomiting
3. Regurgitation: The act by which food is brought back into the mouth without the abdominal and diaphragmatic muscular activity that characterizes vomiting.

Vomiting- causes

	Infant	Child	Adolescent
Common	<ul style="list-style-type: none">• Gastroenteritis• Gastroesophageal reflux• Overfeeding• Anatomic obstruction• Systemic infection• Pertussis syndrome• Otitis media• Pyloric stenosis	<ul style="list-style-type: none">• Gastroenteritis• Gastritis• Reflux (GERD)• Systemic infection• Pertussis syndrome• Sinusitis• Otitis media	<ul style="list-style-type: none">• Gastroenteritis• GERD• Gastritis• Inflammatory bowel disease• Appendicitis• Systemic infection• Sinusitis• Migraine• Pregnancy

Vomiting- causes

	Infant	Child	Adolescent
<ul style="list-style-type: none"> Rare 	<ul style="list-style-type: none"> •CAH •Inborn error of metabolism •Brain tumor (increased intracranial pressure) •Subdural hemorrhage •Food poisoning •Renal tubular acidosis 	<ul style="list-style-type: none"> •Reye syndrome •Hepatitis •Peptic ulcer •Pancreatitis •Brain tumor •Increased <i>ICP</i> •Middle ear disease •Achalasia •Cyclic vomiting Esophageal stricture •Duodenal hematoma •Inborn error of metabolism 	<ul style="list-style-type: none"> •Reye syndrome •Hepatitis •Peptic ulcer •Pancreatitis •Brain tumor •Increased <i>ICP</i> •Middle ear disease •Cyclic vomiting •Biliary colic •Renal colic

Interview

- ❑ **Age of the patient**
- ❑ **Duration /Frequency**
- ❑ **Onset**
- ❑ **Associated with food intake**
 - ✓ instantly : esophageal obstruction
 - ✓ After a while : stomach or duodenal obstruction
- ❑ **Nature (projectile / non projectile)**
- ❑ **Color and contents**
 - ✓ Non digested food :proximal obstruction
 - ✓ Semi digested food : distal obstruction
 - ✓ Billous content : distal to 2nd part of duodenum
 - ✓ Fecal material : obstruction at the large intestine
- ❑ **Associated symptoms**
 - ✓ Fever / Abdominal Pain /Diarrhea /constipation/ dysphagia
- ❑ **Respiratory – cough, chest discomfort**
- ❑ **Urinary – dysuria,hematuria**
- ❑ **CNS – irritability, altered sensorium,drowsy, neck stiffness, headache, visual disturbance**
- ❑ **Past medical history**
 - Any known medical illness such as metabolic inborn error, cerebral palsy, down syndrome, neurological deficit
- ❑ **Drug and allergy history**
- ❑ **Birth history**
- ❑ **Nutritional history**
 - Recently change into cow milk/ food allerrgy/ type of food
- ❑ **Other relevant history**
 - Recent eating outside, recent travelling, family member or friends in school have similar illness

Vomiting- examination

□ General condition

- Comparison of patient's weight before and after onset of illness

□ Hydration status

- Sunken frontanelle
- Eyes sunken and tearless
- Dry mucous membrane
- Prolonged capillary refill time
- Reduced skin turgor
- Tachycardia, tachypnea

□ Abdominal Examination

- Distension, Visible peristalsis, Tenderness, hepatosplenomegaly, abdominal masses, Bowel sounds

□ CNS Examination

Power, Tone, reflexes

Changes in vision

□ Respiratory Examination, Ear examination

Rehydrate accordingly- encourage oral intake

Correct electrolyte imbalances

Treat according to the underlying cause

Jaundice

Jaundice is a yellowish pigmentation of the skin, the conjunctival membranes over the sclerae (whites of the eyes), and other mucous membranes caused by **high blood bilirubin levels**.

- ❑ The condition for the creation of jaundice is an increased bilirubin serum.
- ❑ Normal levels of bilirubin in the blood serum ranges from 0.3-1.0 mg/dl, with nearly 90% of conjugated bilirubin.
- ❑ Bilirubin is created in liver, spleen and bone marrow as a product of the catabolism of:
 - ❑ hemoglobin from erythrocytes 80-85%
 - ❑ other combinations of compounds containing heme / myoglobin, cytochromes, especially CP-450, other enzymes containing heme
 - ❑ hemoglobin derived from ineffective erythropoiesis / maturing erythrocytes /

Classification of jaundices

Liver plays a main role in bilirubin metabolism. There are three stages of bilirubin metabolism in liver:

1. uptake of bilirubin
2. conjugation with glucuronic and sulfuric acid
3. excretion of conjugated bilirubin into bile

Classification of the jaundice

Pre-hepatic/ hemolytic- Intrinsic defects in red blood cells or extrinsic causes external to red blood cells

Hepatic/ hepatocellular – liver disease

Post-Hepatic/ cholestatic- obstruction of biliary passage

Hemolytic jaundice

- Structural erythrocytes anomalies- defects in membrane / sickle cell anemia /, enzymopathie, hemoglobinopathies, thalassemia
- extrinsic causes haemolysis
 - immunological /auto-, isoantibodies/
 - chemical /intoxication Pb, Cu, drugs/
 - mechanical /valvular prosthesis/
 - infection/bacterial sepsis/
 - Hipersplenizm,metabolical disorders/ uricemia/

Diagnosis

- Family history, drugs,
- weakness, worse exercise tolerance
- normal urine, dark stools, straw yellow discoloration of the skin
- tachycardia, hypersplenism
- predominance of indirect bilirubin / unbound /
- anemia, reticulocytosis
- a marked increase in LDH, a slight increase in transaminases
- lack of serological markers of viral infections

Unconjugated bilirubin predominance

- Increased production
 - Intra- and extravascular hemolysis
 - Ineffective erythropoiesis
- Impaired uptake bilirubin by hepatocytes
 - Sepsis, drugs, long-term hunger, hyperthyroidism
- Impaired conjugation of bilirubin
 - Gilbert's syndrome, Crigler-Najjar syndrome, neonatal jaundice

Jaundice caused by congenital enzymatic defects of hepatocytes

➤ Gilbert Syndrome

- abnormal binding of bilirubin with glucuronide acid – deficiency of UDPG
- Family character, the predominance of indirect bilirubin, normal levels of liver enzymes, no evidence of hemolysis, bilirubin rarely exceeds 5 mg/dl

➤ Crigler-Najjar Syndrome

- bilirubin metabolism defect associated with deficiency of UDPG
- Type I- children die in the first 2 years of life
- Type II-normal levels of enzymes, <20 mg / dl bilirubin
- predominance of indirect bilirubin

➤ Dubin-Johnson Syndrome

- secretion disorder associated bilirubin pole gall hepatocytes
- family character, the predominance of conjugated bilirubin,
- bilinubinuria, the presence of the dye in hepatocytes melanin-like

➤ Rotor Syndrome

- Variety of Dubin-Johnson syndrome, the absence of the dye deposits in hepatocytes

➤ Newborns jaundice

- immaturity of enzymatic hepatocytes - deficiency UDPG transferase

Hepatic jaundice- causes

➤ Infection

- viral: HAV, HBV, HCV, HDV, HEV, EBV, TORCH, Echo, Parvo,
- listeriosis

➤ Toxic

- drugs- cytostatics, paracetamol, TPN
- Chemical compounds- carbon tetrachloride
- mushrooms- Amannita phalloides
- Alcohol

➤ Metabolical

- Wilson disease- disorders of Cu metabolism
- hemochromatosis- disorders of Fe metabolism
- alfa-1 antytrypsin deficiency
- Galactozemia, fructozemia, glycogenosis IV, tyrosinemia, cystic fibrosis

➤ Autoimmunological /AIH/

- AIH typ I, IIa, IIb, III
- Primary billiary cirrhosis /PBC/
- Primary sclerosing cholangitis/PSC/
- other- Alagille'a syndrome, Aegenes syndrome

Diagnosis

- interview - surgery, blood transfusion, alcohol, drugs, chemicals
- dark urine, stool discoloration
- Cutaneous / vascular spiders, palmar erythema, purpura flava /
- enlarged liver and spleen
- predominance of direct bilirubin / conjugated /
- a significant increase in the level of ALT, AST in serum less pronounced ALP, GGT
- leukopenia and thrombocytopenia / hypersplenism /
- decrease in albumin, gamma globulin increase
- serological markers of infection HAV, HBV, HCV, HDV, CMV, EBV
- autoantibodies ANA, AMA, ANCA, LKM, SLA
- reduction in the level of ceruloplasmin,
- high copper concentrations in serum and daily urine collection
- elevated levels of Fe
- Elevated urobilinogen in urine, bilirubinuria

Jaundice extracellular- cholestasis

Congenital obstruction of extrahepatic roads żółciowych- biliary atresia

Cyst of common bile duct

Narrowing of the bile ducts

Urolithiasis and / or spontaneous perforation of the common bile duct

Diagnosis

- interview - symptoms of biliary cholelithiasis, itching, weight loss
- dark urine, stool discoloration
- enlargement of the gallbladder, Courvoisier's sign, liver enlarged, hard, with uneven surface
- predominance of direct bilirubin / related
- a significant increase in GGT, ALP, small ALT, AST
- leukocytosis, increased ESR, anemia
- lack of serological markers of hepatitis infection
- Abdominal ultrasound - the lack of gallbladder
- Liver biopsy - to 3 weeks of life -> GOLD STANDARD DIAGNOSIS biliary atresia
- ERCP
- CT, MR
- PTC - percutaneous cholangiography

Abdominal pain

Abdominal pain in children can be a symptom of psychosocial stress, as in adults tension headache in the occipital region.

Children usually localized pain around the navel.

Division

- acute
- chronic
- recurrent

Acute abdominal pain

- ❑ may have a mild start, then gradually the pain increases
- ❑ the moment of his appearance can be applied to a specific date
- ❑ pain wakes the child or prevents sleep, interrupts play
- ❑ it is non-recurring
- ❑ rarely subsides without treatment
- ❑ often accompanied by other symptoms: nausea, vomiting, diarrhea, fever, lack of appetite
- ❑ the patient is anxious, unwillingness to investigate
- ❑ position with curled legs - protects the stomach, decreasing muscle tension of the stomach

Acute abdominal pain- causes

SURGICAL

appendicitis

intusseption

cyst or ovarian torsion

NON-SURGICAL

constipation

gastroenteritis

ovulatory pain

simulation

urinary tract infection

haemolytic uraemic syndrome

hepatitis

Chronic abdominal pain

- ❑ prevalence 20-30% of children 5-14
- ❑ restricts the normal activity of the child - only 1/10 patients regularly go to school
- ❑ to 9 years of age occurs with equal frequency in boys and in girls, older children more often in girls
- ❑ may be also relapsing
- ❑ there may last for several days or weeks
- ❑ individual episodes last up to 3 hours, more than half of children about 1 hour
- ❑ seizures usually occur in droves
- ❑ pain interferes with falling asleep, but does not raise a child
- ❑ in most children distinct periods without abdominal pain, but occasionally the pain can be continuous
- ❑ It can be associated with other symptoms: nausea, vomiting, diarrhea, headache, dizziness, fatigue

The causes of chronic abdominal pain

- ❑ The most common cause- functional abdominal pain
- ❑ Infection- yersiniosis, giardiasis, H. pylori infection, UTI
- ❑ constipation
- ❑ Food allergy
- ❑ Food intolerance- disaccharidoses- fructose, lactose, sucrose
- ❑ celiac disease
- ❑ Anatomical changes- ovarian cyst, pancreas divided, gastrointestinal ileus / subileus
- ❑ Inflammatory bowel disease- ulcerative colitis, Crohn's disease
- ❑ Epilepsy, migraine
- ❑ Drugs: NSAIDs, steroids, iron preparations

Chronic abdominal pain

FUNCTIONAL ABDOMINAL PAIN

proper growth

lack of localized symptoms

pain spilled

pain around the navel

ORGANIC ABDOMINAL PAIN

pain radiating to the back, chest, hips, associated with the intake of food or flushing

pain awakens the child from sleep

pain located, limited

inhibition of body weight gain

Other symptoms- fever, vomiting, joint pain, gastrointestinal bleeding, pain around lumbar area, changes on the skin around the anus or anal fissure, anal incontinence, abdominal tumors, hepatosplenomegaly

Abdominal pain- diagnostics

Laboratory tests: blood count, ESR, CRP, ALT, AST, amylase, creatinine

Urine test

Stool test: culture, viruses, occult blood, parasites, H. pylori antigen in stool test ELISA- Giardia intestinalis

abdominal ultrasound

Diarrhoea- diagnosis

The higher than normal number of stools per day (often more than twice), or change in the nature of stool (they are watery or semi-liquid), or the child's stools contain mucus, blood or sputum

WHO - a condition in which a child <2 years of age, artificially fed or mixed has three or more liquid or semi-liquid stools per 24 hours

or

1 abnormal stool having blood or mucus or pus within 24 hours

Diarrhoea- classification

Division due to duration:

- Acute diarrhea <14 days (usually 3-5 days)
- Prolonged diarrhoea 14-30 days
- Chronic diarrhea > 30 days (> 14 days)

The division because of the etiology

- Noninfectious diarrhea
- Infectious diarrhea, fever, blood in the stool, nausea and / or vomiting,
- antibiotics

The division due to the mechanism

- Osmotic diarrhea caused by intestinal inability to absorb excessive amounts of substances that retain water, thereby increasing stool volume (eg. lactose intolerance)
- Secretory diarrhea caused by active secretion into the intestine of large amounts of salt, water and other substances (infection agents, laxatives)

Acute diarrhoea- causes

Infections enteral-> viruses, bacteria, exotoxins, protozoa

Infections outside the gastrological tract-> UTI, otitis media, pneumonia

Surgical diseases -> appendicitis, intussusception, obstruction

Drugs:-> Antibiotics

Viral diarrhoea

HRV (Rhinoviruses) of group A, B and C

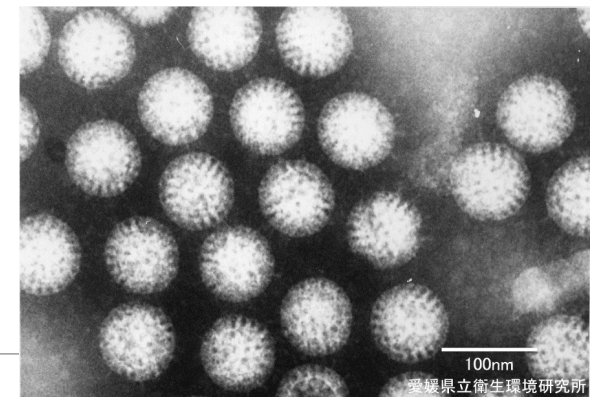
- infection through oral-faecal
- infection is comprised of small intestine
- short incubation period (1-3 days)
- often excessive vomiting (1-2 days)
- Acute watery diarrhea (usually 2-7 days)
- often fever
- 20-40% - rhinitis symptoms of upper respiratory tract
- Diagnosis: ELISA or a latex agglutination assay

Adenoviruses

- tendency to prolong the diarrhea
- Often accompanied by symptoms of upper respiratory tract infections
- clinical course is usually mild
- severe dehydration, acidosis - in the case of severe vomiting and / or diarrhea without proper treatment

Rotavirus

- The main cause of severe diarrhea in young children
- Europe: - autumn-winter season
- Children aged 6-24 months
- Oral and droplet
- Often as nosocomial infections and epidemics
- vaccination



Bacterial diarrhoea

The course is self-limiting!

Watery stools with mucus, pus or blood

The tendency to threading (Salmonella, Shigella, Yersinia, Campylobacter, EPEC)

Can call septicemia and systemic infections (Salmonella, Yersinia)

Traveler's diarrhea (ETEC, Shigella, Salmonella, Campylobacter jejuni, Vibrio cholerae, Cryptosporidium parvum, Giardia intestinalis, Entamoeba histolytica)

ETEC

Enterocytotoxic E. coli; ETEC, Shiga-like toxin producing E. coli; verotoxin-producing E. coli

- Production verocytotoxins (VT 1, VT-2)
- Clinically: bloody diarrhea, usually without fever
- E. coli O157: H7 - a frequent cause of bloody diarrhea in developed countries
- undercooked or undercooked beef, hamburgers, drinking water, unpasteurized milk, yogurt, vegetables
- Lack of sensitivity to chemotherapy
- Complication: Hemolytic uremic syndrome (up to 10% infected with E. coli O157: H7)

Salmonella

- ❑ Infection of a typhoid can cause bacteremia and focus of infection in the GI tract (bones, joints, CNS) - *S. typhi*, *S. paratyphi* A, B, C
- ❑ gastroenteritis (salmonellosis) - *S. enteritidis*, *S. typhimurium*, *S. agona*
- ❑ asymptomatic carriers
- ❑ onset usually <6 years of age
- ❑ oral infection -> contaminated water, food (ice cream, mayonnaise)
- ❑ fever, nausea
- ❑ many, plentiful smelly stools (mucus, pus, blood)
- ❑ They were usually self-limited
- ❑ shedding in feces is usually approx. 3 weeks.
- ❑ antibiotics promotes prolonged carriage

Clostridium difficile

- ❑ Toxin A - enterotoxin similar to the toxins of *V. cholerae*
- ❑ Toxin B - cytotoxin
- ❑ Approx. 50-70% of newborns; 20-50% <1 r.ž .; approx. 3% of adults - contaminated with *C. difficile*
- ❑ Symptoms after antibiotics therapy: clindamycin, ampicillin, amoxicillin, cephalosporins
- ❑ The broad spectrum of clinical symptoms:
 - mild diarrhea with watery-brown stools
 - severe hemorrhagic diarrhea
 - pseudomembranous colitis
- ❑ positive bacteriological examination can not be the basis for the diagnosis!
- ❑ gold standard - cell culture, demonstrate the cytotoxicity of *C. difficile* toxin A and B

Giardia intestinalis



- ❑ the most common cause of parasitic diarrhea
- ❑ developed countries approx. 2-5% of the population, developing countries approx. 20%
- ❑ It is in the form trophozoite and cysts
- ❑ oral infection -> intake of water or products containing cysts
- ❑ course varies (asymptomatic carriers, acute self-limited diarrhea, chronic diarrhea with malabsorption)
- ❑ feces or duodenal contents to the presence of cysts or trophozoites
- ❑ ELISA test for Giardia intestinalis antigen

Laboratory test

Specific diagnostic tests immunosorbent assay (ELISA) or latex agglutination- detected in a sample of stool antigens: HRV group A, adenovirus, rotavirus

In most children without immunodeficiency microbiological diagnosis it is not necessary - does not change the basic principles of treatment

Indications for microbiological examination:

- Bloody diarrhea (Salmonella, Shigella, Campylobacter, E. coli O157: H7, Yersinia enterocolitica, Clostridium difficile - toxin A and B)
- Diarrhea with very severe dehydration $\geq 10\%$ or serious condition
- Prolonged diarrhea (> 10-14 days)
- A large number of leukocytes in the stool (> 5 hpf)
- Immunosuppression in child
- epidemiological considerations
- Suspected cholera

Diarrhoea treatment

The result of diarrhoea- dehydration

Loss of water and electrolytes in the faeces (Na, K, Cl, HCO₃)

The degree of dehydration is defined as a percentage of weight loss

Comparison of current weight and before the diarrhoea onset

Primary treatment of acute diarrhea is oral irrigation (DPN) or intravenous (depending on the extent of dehydration) and feeding (early realimentation)

GRADE (weight loss)	GENERAL CONDITION	EYE BALLS	TEARS	MOUTH AND TONGUE	THIRST	SKIN FOLD
No or small (<5%)	Calm, conscious	Proper tension	+	Wet	Normal	Straightens up fast
Intermediate (5-10%)	restless	Sunken , dark circles	-	Dry	drinks greedily thirsty	Straightens up slowly
Severe (>10%)	Drowsy or unconscious , limp	More sunken	-	Very dry	Drinks poorly or unable to drink independently	Straightens up very slowl

Acute diarrhoea treatment

Oral fluids- preparations with a lower content of sodium (60 mmol / l) and a lower osmolarity (245 mmol / l)

Smectite (Smecta) - reduces the duration of diarrhea Wed. 17 - 24 hrs., no effect on faecal output

Probiotics - Lactobacillus rhamnosus GG, Saccharomyces boulardii shortens the duration of acute diarrhea in infants and young children approx. for 24 hours. Efficiency is strain specific. More efficient in viral diarrhea (diarrhea in the etiology HRV) and in early use.

Not recommended:

- drugs absorbing bacterial toxins (activated charcoal).
- drugs inhibiting peristalsis p.p. (Eg. Loperamide)
- antisecretion drugs (bismuth subsalicylate)
- To rehydrate not use a commercially available clear fruit juices, or drinks like "cola"

Antibiotics in diarrhoea

In most cases, acute infectious diarrhoea (viral and bacterial) resolves spontaneously and does not require antimicrobial agents

Indicated antibiotic therapy and modification of treatment after collecting stool culture when:

fever ($> 38^{\circ}\text{C}$) and at least one of the following symptoms:

-> Bloody diarrhea

-> Large number of leukocytes and / or lactoferrin in the stool

Chronic diarrhoea- causes

Frequent causes of chronic diarrhoea

- post-infectious diarrhoea, toddler's diarrhoea, food allergy, coeliac disease, cystic fibrosis, disaccharide intolerance

Rare causes of chronic diarrhea

- diarrhoea chloride, diarrhoea sodium, congenital atrophy of microvilli, epithelial dysplasia, autoimmune diarrhoea

Food allergy

The most common allergens

Childhood- 90% of food allergies are caused by proteins of cow's milk, eggs, peanuts, wheat

Teens, young adults and later age - 85% peanuts, fish, shellfish

Allergy to cow's milk proteins

Formula feeding: 1,9-4,4%

Breast-feeding: 0.5%

Food allergy- causes

Digestive tract

- Vomiting (approx. 25-75%)
- Acute diarrhea
- Chronic diarrhea (approx. 25-75%)
- Loss of body mass
- Enteropathy - malabsorption
- Iron deficiency anemia
- Abdominal pain, abdominal colic (babies)
- Colitis, proctocolitis
- gastroenteropathy eosinophilic
- constipation

Skin

Respiratory system

Food allergy

DIAGNOSIS

- Interview
- Oral food challenge
 - open
 - blind
 - double-blind
- skin tests
- Total IgE and specific

TREATMENT

- Elimination diet
- Protein hydrolysates (Bebilon pepti, Nutramigen)
- Diets elementary (Bebilon amino, Neocate)
- Soy formula

Lactose intolerance

Primary lactose deficiency– very rare!

Secondary lactase deficiency

- acute and chronic gastrointestinal infections
- food allergy
- celiac disease
- antibiotic or chemotherapy
- immune disorders
- malnutrition

Hypolactasia adult type

- In Poland approx. 35%

Coeliac disease

Celiac disease is immune-mediated, caused by gluten, and the gluten- like prolamins.

This disease affects people with a genetic predisposition, and is characterized by clinical symptoms glutenodependant, enteropathy and antibodies specific for coeliac disease :

- tissue transglutaminase antibodies – tTGA
- endomysial antibodies – EMA
- deamidated gliadin peptide – DGP
- histocompatibility antigens HLA-DQ2 or DQ8

Coeliac disease- classification

1. The classic form of the disease
2. Hidden
 - refractory anemia and recurrent short stature
 - delayed puberty and infertility
 - enamel hypoplasia
 - recurrent aphthous in mouth
3. Latent
4. The potential (only HLA)

Coeliac disease – classical form

A rich, smelling, fatty stools

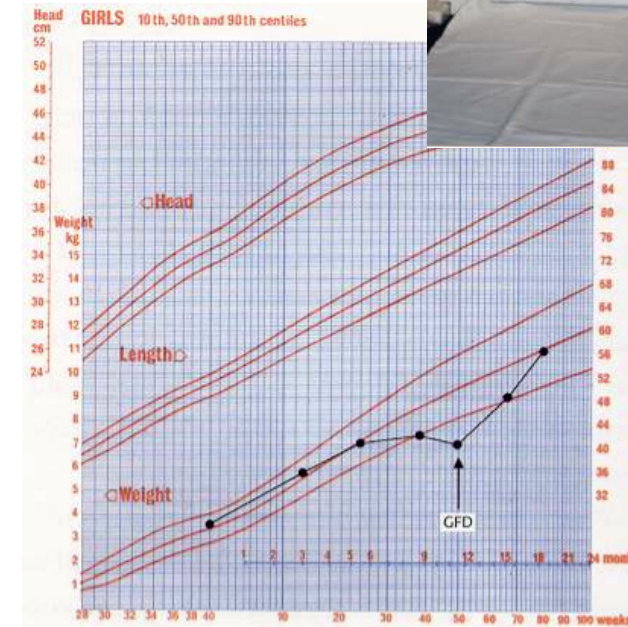
Inhibition of weight gain or decrease

Growth retardation

Child sad, apathetic, irritable

Lipoatrophy

A large protruding belly, thin legs



Toddler's diarrhoea

The most common cause of chronic diarrhoea!

Painless passing three or more unformed stools for at least 4 weeks

Onset between 6 a 36 m.ž.

Stools only during the daytime

No disturbances of weight gain (if sufficient caloric intake)

Children

- treatment is not necessary
- increasing the dose of fat and reduced amounts of juices

Parents

- explain the nature of the disease
- persuading parents about the benign nature of the disease

Constipation

Defecation occurs less 1 per 3 days and/ or the big efforts is neccesery because hard, though stool consistency in children after infancy.

Functional constipation according to Rome III Criteria:

- * ≤ 2 stools/ week

- * ≥ 1 episode of fecal inconinenec/ week

- * fecal masses in rectal ampulla

- * in interview: retention behaviours, hard, tough stools, large diameter of the stools

- *Diagnosis- 2 or more symptoms occurs at least for 2 months

Organic causes of the constipation

❑ Surgical:

- Hirschsprung disease
- Anus and rectal diseases
- Acute abdomen

❑ Metabological

- dehydration
- Cystic fibrosis (meconium obstruction)
- Hypothyroidism, adrenal insufficiency
- Hipercalcemia

❑ neuromuscular

- hypotension abdominal muscles (Down syndrome, MPD)
- muscular dystrophy
- spinal injury (tumors, spina bifida)
- Congenital muscular limpness

❑ After drugs intake

- narcotics
- antidepressants
- psychotrop medicines
- vincristine

❑ Psychiatric: anorexia nervosa, depression

❑ In older infants exclusively breastfed

Constipation

INTERVIEW

- Child age
- Duration time of illness
- Frequency of bowel movement, stools consistency, effort during defecation, blood in stools, fecal incontinence
- Time after birth when meconium appears
- drugs
- Vit D3 supplementation
- diet
- Other diseases

Physical examination

- assessment of nutritional status
- abdominal distension
- palpation assessment of faecal impaction in the left and sometimes right iliac fossa time
- rectal examination - evaluation tone of sphincter, the presence of fecal masses in a rectum

Additional tests

- Ultrasound of abdominal cavity and thyroid
- electrolytes
- Thyroid hormones
- Sweat chloride test
- Vitamin 25 OH D3
- Anorectal manometry
- enema
- rectoscopy
- transit time
- Rectal biopsy: histological examination and histochemical

Treatment

- ❑ Colon cleansing from defaulting fecal masses
- ❑ Drugs: laxatives, drugs affecting gastrointestinal motility
- ❑ High- fiber diet
- ❑ Increased physical activity
- ❑ Psychological examination
- ❑ Surgical treatment

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