Acute intestinal infection

Dysentery, Salmonellosis,
Intestinal Colli Infection

Dysentery (Shigellosis)

Dysentery **is an infectious disease, accompanied by lesion of mucous membrane in the large bowel, especially its distal part**

Etiology

- ***Pathogens*** of dysentery is Shigella, Gram-negative
- Only the pathogen of species of ***Grigoriev-Shiga Sh. dysenteriae*** produces an ***exotoxin***, other pathogens produce ***endotoxins***.
- Dysentery pathogens of various species have ***different stability*** in the environment. ***Sh. dysenteriae*** have the least stability
- ***Sh. Sonnei*** are the most stable. Dysentery brought about by *Sh.Sonnei* is most spread these last years while *Sh.Flexneri* takes the second place

Epidemiology

- The ***source*** of infection is patients with acute dysentery and bacilli-carriers
- The ***mechanism of infection*** transference is fecal-oral
- The ***factors*** of transference are food and water, flies. Water ***route*** of infection spreading is most typical for Sh.Flexneri, milk - Sh.Sonnei

Epidemiology

- ***Morbidity*** in 1-year-old children is the lowest, and it is the highest among the children from 2 to 7 years of age
- ***Immunity*** in dysentery is typospecific

Pathogenesis

- The ***portal*** of entry is gastro-intestinal tract
- On getting into the stomach, the pathogens ***perish*** partially due to the influence of proteolytic enzymes and hydrochloric acid in the gastric juice
- Remaining pathogens get into the small intestine and then they get into the ***large intestine*** where they reproduce

Pathogenesis

- The *Shigellae* have a ***selective ability*** to adhesion (sticking) to colonocytes of the large bowel
- ***Endotoxin*** is the leading factor - common toxic influence on the vascular and nervous systems of the body and its vegetative centers

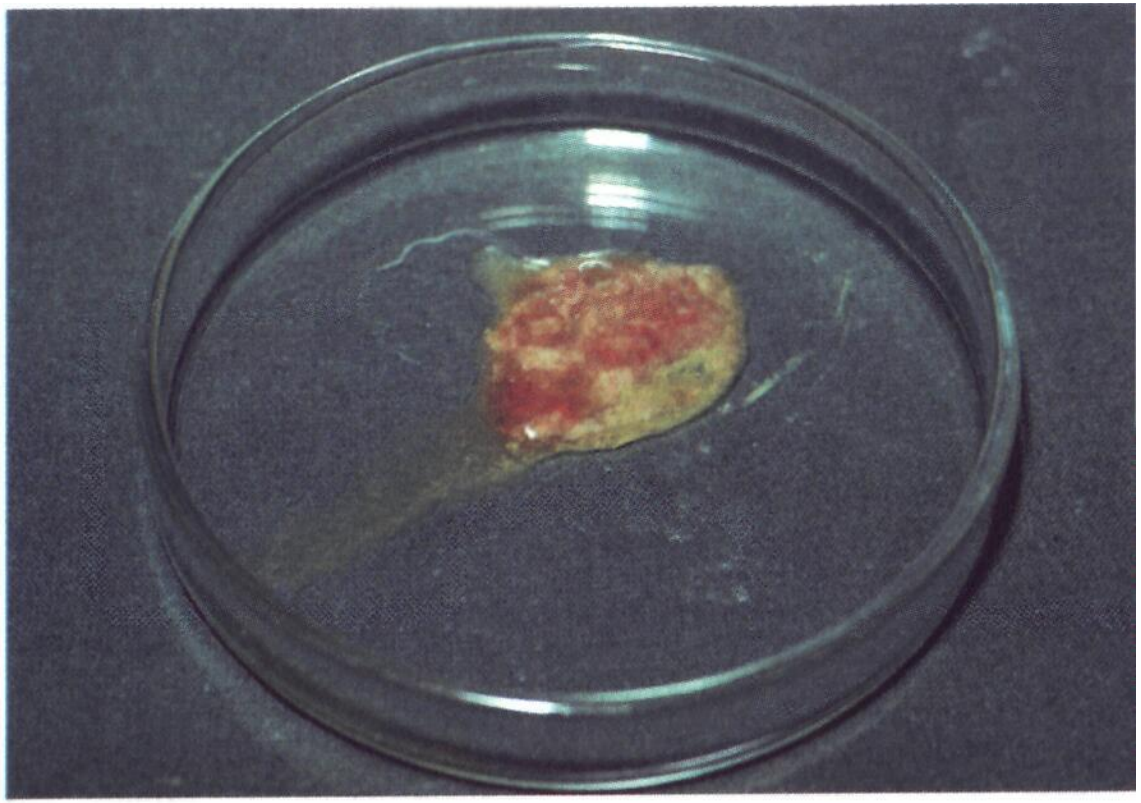
Clinical manifestations

- The ***incubation period*** varies from several hours to 7 days

- The child becomes restless, loses appetite, complains of headache and abdominal pain

- In this period the children ***complain*** of abdominal painful cramps in defecation, drawing ***pain on the side of the sigmoid colon*** and anus

- In the first hours after the onset of disease stool has ***stercoral character***, but by the end of the day or the second day of the disease stercoral masses disappear completely, stools become ***poor and contain turbid mucus and blood*** only



Clinical manifestations

- ***Tenesmus*** is a typical sign of dysentery. Tenesmus appears due to the simultaneous spasms of the sigmoid colon and anal sphincters. In frequent tenesmus the rectum mucous membrane ***prolapse*** may result
- Symptoms of ***toxemia***, ***pallor and dryness of the skin*** are found
- On ***abdominal palpation,*** tenderness and hardening are found over the sigmoid colon
- Moderate leukocytosis, neutrophilia with the change to the left, insignificant increase of ESR shows in ***the blood***

Clinical type classification

Clinical type classification of dysentery is based on the signs, which have been proposed by

A. A. Koltupin (type, severity, course)

- ***Typical and atypical forms*** are distinguished.
- In ***typical*** forms colitic syndrome is present constantly
- Obliterated, dyspeptic, subclinical, hypertoxic forms are referred to the ***atypical*** forms

Typical forms

of dysentery are divided into

- ***mild***
- ***moderate***
- ***severe***

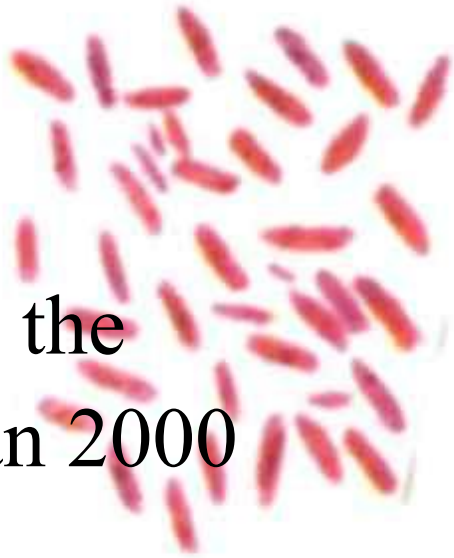
of ***toxemia symptoms:*** fever, convulsion syndrome, mental confusion, headache, weakness

and ***local alterations from*** gastrointestinal tract

1-year-old babies has peculiarities

- ***Colitic syndrome*** is not well expressed. Stools have enterocolitic or dyspeptic character
- ***Toxemia*** at the early age is accompanied by high fever, recurrent vomiting
- If frequent enterocolitic stools are present, ***dehydration*** with hemodynamic disorders may occur
- ***Complications*** can bring about rectum mucous membrane prolapse
- As a ***secondary infection***, otitis, pneumonia, stomatitis, infection of the urinary tract may occur

Salmonellosis Etiology



- ***Pathogens*** of salmonellosis belong to the *Salmonella* genus. There are more than 2000 serologic types *of Salmonellae*
- The ***Salmonellae groups*** are discerned due to the structure of O-antigen (A, B, C, D, *E* and others)
- The disease in 80-90 % of the cases is connected: ***S.typhimurium, S.Heidelberg, S. anatum. S. derby, S.panama, S.enteritidis***
- Pathogens have high ***stability*** in the environment

Epidemiology

- Salmonellosis **is *anthropsoonosis***
- The ***general source*** of infection is various animals
- Besides, recently the sick people and bacilli carriers ***present the main epidemiological danger***
- The ***general route*** of infection transference is alimentary; food
- In babies, ***the contact route*** is the main one
- Within the last years, ***morbidity*** of 1-year-old babies has considerably increased, particularly due to ***nosocomial*** (hospital) infection

Pathogenesis

- In ***per oral infection*** is destructed intensively in the stomach and small intestine
- At this time a lot of ***endotoxin*** is released
- Due to the influence of endotoxins the ***toxic signs*** of the disease appear
- ***Penetrates*** into the mesenteric lymph nodes and enterocytes into blood, and causing ***bacteriemia (typhus-like form***, ***septic form***)
- Salmonellae and their toxins ***influence the nervous system***
- Vomiting and diarrhea cause ***dehydration***

Clinical manifestations

- The ***incubative period*** has duration from 2-3 hours (in the ***alimentary***) to 5-7 days (in the ***contact***)

Classification

- **Localization form**
  - gastrointestinal,
  - flu-like,
  - effaced
  - asymptomatic

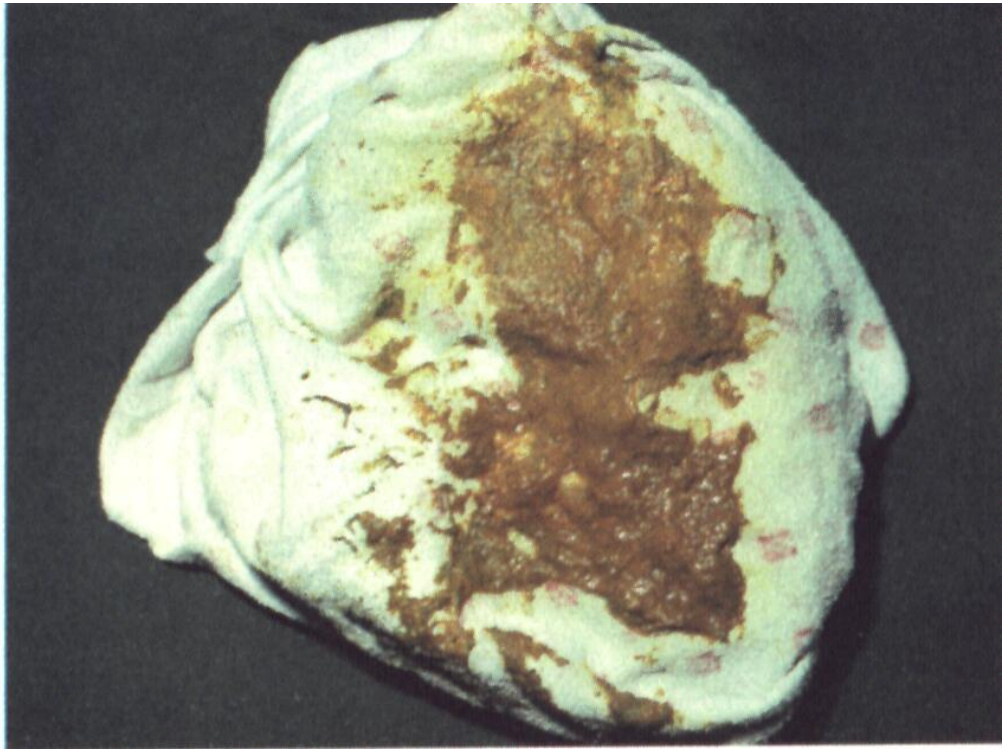
- **Generalization form:**
  - typhus-like,
  - septic

- ***Acute*** (up to 1 month), ***protracted*** (1-3 months)
- ***Mild, moderate and severe*** forms

Gastrointestinal form

- ***Has the course*** of gastritis, enteritis, colitis, gastroenteritis, enterocolitis, gastro-enterocolitis
- The disease has an ***acute onset*** with fever and chills.
- Nausea and recurrent ***vomiting*** appear.
- ***Abdominal pain*** and diarrhea appear rapidly ***stools*** become more frequent up to 3-5 times daily.
- The ***tongue*** is dry and coated. Besides, headache, general malaise and weakness appear.
- ***Duration*** of the disease is 5-7 days.

- ***Stools*** are watery, contain small admixture of mucus.



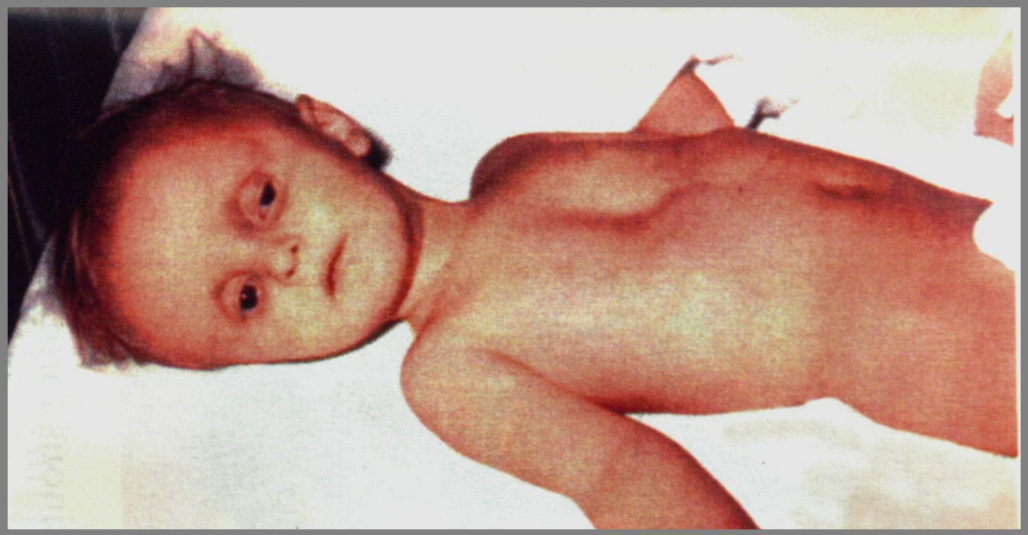
Typhus-like form of salmonellosis

Clinically it may resemble abdominal **typhoid or paratyphoid**:

- duration of fever is 1-2 weeks,
- ***toxemia*** (headache, myalgia, arthralgia, anorexia),
- ***enlarged spleen***, roseolous or erythematous ***rash***,
- ***cardiovascular system disorders*** (bradycardia or tachycardia),
- ***gastrointestinal disorders*** (vomiting, diarrhea, abdominal distention).

Septic forms of salmonellosis

- frequent in ***neonates and infants*** younger than 6 months of age.
- Septic forms are frequently accompanied by ***local lesions*** (meningitis, osteomyelitis, subcutaneous abscesses, arthritis, pyelonephritis).
- The diseases can have a very ***severe course*** with metabolic disorders of all forms, especially electrolyte dysbalance



Diagnosis

- ***Is based*** on its clinical manifestations, the epidemiological history and bacteriological test results
- Clinical diagnosis of ***dysentery*** - typical signs of distal colitis are present.
- Stools is the ***material for bacteriological tests***
- Blood, stools, urine, vomiting mass, gastric water, pus from the inflammatory foci is the material -bacteriological tests in ***salmonellosis***
- Material for bacteriological tests should be taken ***before the antimicrobial therapy*** is started

Treatment

- ***Diet*** - recommended to reduce the volume of food in acute period of the disease. Breast milk is optimal nutrition
- The ***volume*** must correspond to the age norm by the 5th-7th day after the onset of the disease
- ***Enzymatic therapy*** is administered in the reparation stage in a course from 2 to 4 weeks

Etiotropic therapy

- Antibiotics (ampicillin - 100 mg/kg, ceftriaxon – 50-75 mg/kg) should be administered ***in severe forms of dysentery and salmonellosis***, and the children younger than 2 years of age.
- ***Furasolidone*** in dosage of 8-10 mg/kg, ***nevigramon*** in dosage of 60 mg/kg, ***bactrim*** in dosage of 60 mg/kg may be given
- ***In 1-year-old babies*** and in generalized' forms of salmonellosis - ***cephalosporin*** (ceftazidime, ceftriaxone in the dosage of 100 mg/kg)..
- Dysenteric and salmonellic bacteriophages may be used to

Prophylaxis

- ***Bacteriological examination*** is made in all the patients alter 2 days when the antibacterial therapy is finished
- If epidemic ***outbreaks appear***, all contact persons should be examined bacteriologically singly

Intestinal Coli Infection (Escherichiosis)

Escherichiosis is an acute intestinal infection caused by *E. coli,* which mainly affect 1-year-old babies

Etiology

- ***E. coli*** are Gram-negative pathogens
- ***Classification includes*** enterohemorrhagic *E. coli* (EHEC), enterotoxigenic *E. coli* (ETEC), enteroinvasive *E. coli* (EIEC), enteropathogenic *E. coli* (EPEC).
- The ***EPEC group*** *of E. coli* contains about 30 serotypes: O-l11; O-55; O-25; O-44; O-l19. They cause the ***disease*** in 1-year-old babies and have antigens similar to ***Salmonellae***

Etiology

- The ***EIEC group*** of *E. coli* contains 13 serotypes: O-124; O-151; O-144 and others. Their antigenic structure is similar to that *of Shigellae.* EIEC group cause the diseases in children and adults. The disease is similar to ***dysentery clinically***
- The ***ETEC group*** of *E. coli* contains the pathogens which produce enterotoxin similar to ***cholerogen*** by its effect. Enterotoxin causes considerable production of liquid into the lumen of the small bowel. These diseases have likeness with the mild form of ***cholera***

Epidemiology

- Eschirichiosis of the ***first group*** is found all year round. ***1-year-old babies*** get ill most frequently. The ***source*** of infection is sick human, sometimes the source of infection is a bacillus carrier
- Infection is caused by ***contact and alimentary route***
- In ***EIEC escherichiosis*** infection is transmitted by alimentary route. The disease frequently occurs in ***summer and autumn***
- ***ETEC eschcrichiosis*** is found among older children and adults. The main ***routes*** of infection are food and water

Pathogenesis

- E. *coli* ***enter*** the child's body through the mouth and then ***get into*** the lumen of the gastrointestinal tract.
- The pathogens reproduce in the ***small bowel***.
- They produce ***enterotoxins***, remaining on the surface of the mucous membrane.
- Epithelium of the small intestine ***is affected***, and inflammatory changes appear.
- Besides ***enterotoxins, endotoxins*** are liberated due to the pathogen destruction

Clinical manifestations

EPEC eschcrichiosis occurs in 1-year-old babies.

- The ***incubative period*** is from 3 to 8 days.
- The disease has an abrupt ***onset*** - temperature increases, weakness and anorexia
- ***Stools*** occur frequently, they are watery, yellow or orange. If such stools occur five to seven times daily, dehydration may occur.
- ***Toxemia*** is manifested by restlessness, recurrent regurgitation and vomiting.
- The signs of ***escherichiosis in 1-year-old babies*** are neurotoxicosis and toxicosis with dehydration

Neurotoxicosis

- occurs rarely in the first days of the disease due to toxemia
- is characterized hyperthermia, recurrent vomiting, acute restlessness, mental confusion, tonic convulsions, occipital muscular stiffness, tachycardia, toxic breathing, protrusion of cranial fontanel

Toxicosis with dehydration

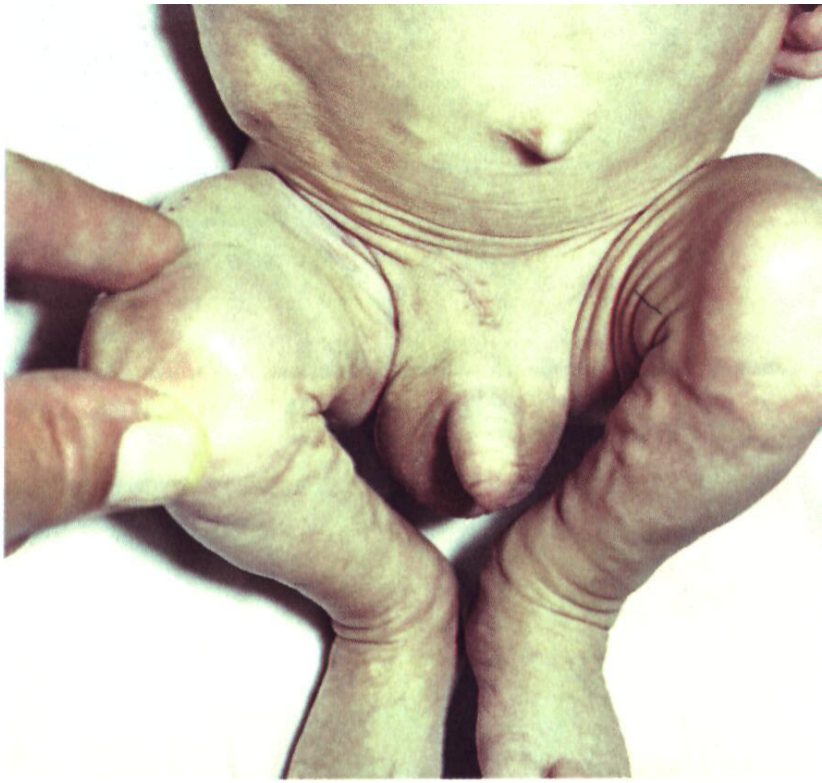
- ***manifested*** by the signs of lesions, cardiovascular, electrolyte disorders.

There are ***isotonic, salt deficient, water deficient*** types of dehydration.

- ***Water deficit*** manifests itself by thirst, restlessness and excitement. The skin and mucous membranes are dry. Muscle tone is decreased, hurried breathing, low diuresis.

Dehydration

- The patient eyes fall in ("***sun glasses***" symptom)
- The ***skin*** of the hands may have a characteristic appearance resembling wrinkled "***washer woman hands***"



Dehydration

- ***Fever***, if present, is low grade, or the patient may develop hypothermia
- The ***mucous membranes*** are dry.
- The ***voice*** becomes hoarse, weak and even soundless.
- The ***pulse*** is weak, blood pressure is low.
- ***Diuresis*** decreases down to anuria.

Treatment

- Syndrome consists of a ***complex of measures***: dietary regimen, etiotropic and pathogenetic therapy.
- The patient ***should be given to drink*** by small portions in 2-3 teaspoons every 10-15 minutes peroral regidratation (Regidron, Oralit, ORS-200)
- ***Vomiting is not a contraindication*** for giving liquid orally, the quantity of liquid should be reduced but it should be administered

Version of calculating the daily fluid intake (according to Velitishchev):

- The existing water deficiency in the patient (***loss of body weight***).
- ***Replacement of the daily loss of fluids*** through skin and breathing by 30 ml per kg per day and by 10 ml per kg per day if there is an increase of the body temperature per 1 °C.
- If there is a ***continuous loss due to vomiting and diarrhea*** fluids should be rated at 20-30 ml per kg per day.

Correlation of glucose and saline solution

determined by the ***dehydration type***

- in ***isotonic*** type of dehydration a 5-10 % glucose solution and saline solutions are administered in ***correlation 1:1,***
- in ***water-deficient dehydration*** (1:2-l :3) of 5-10 % glucose solution may be given
- in ***salt-deficient dehydration*** the correlation between saline and glucose solution is 2:1 -3:1.