Gastro intestinal tract disorders

Gastroenteritis

- Inflammatory process (usually infectious) involving the gastrointestinal (GI) tract and resulting in diarrhea and vomiting.
- It is very common, especially among infants.
- The danger of dehydration from diarrhea is much greater
- Significant diarrhea and vomiting must be taken seriously in small children

Diarrheal Disease

Definition

The term diarrhea comes from Greek word "diarrhoia", meaning to flow through.

➔Loose stool > 3x/24hrs. (WHO)

➔An increase in the fluidity, volume and frequency of stools.

- A young infant normally has **~5g/kg** of stool output per day.

cont…

- There are three clinical types of diarrhea

1. ***Acute watery***

- A diarrheal episode that begins acutely and lasts for less than fourteen days with passage of watery stools without blood.

2. ***Dysentery***

- Diarrhea with blood in the stool.

3. ***Persistent diarrhea***

- Diarrheal episode that starts acutely and lasts for fourteen days or longer.

Types	Greatest Danger
1. Acute watery diarrhea (80% of cases)	Dehydration K^+loss
2. Bloody diarrhea (Dysentry) 10% of cases	Tissue damage Toxemia(sepsis)
3. Persistent diarrhea(> 2 wks) 10% of cases	Malnutrition

Diarrhea Cont...

Epidemiology

- 3-4 episodes/child /year.
- 3.2 million deaths/year 2^{ry} to acute diarrhea.
- 30% of the deaths in the hospitals especially in developing counties.

Dehydration from diarrhea is one of the five leading causes of death in children under five years.

cont…

- Acute watery diarrheal episodes are the commonest form, accounting for 80 to 82% of the cases.
- Children of 6 to 11 months of age are the most commonly affected, a time that coincides with initiation of complementary feeding.
- Highest mortality of diarrheal disease is encountered among infants.

Risk factors

Behavioral

- Inadequate breast feeding(first 4-6 months).
- Using feeding bottles
- Eating food hrs after cooking.
- Drinking contaminated water
- Not washing hands
- Not disposing of feces safely

cont…

➔Host factors

- Malnutrition - malnourished children have frequent episodes of diarrhea and each episode is more severe and long lasting
- Measles – recent measles predisposes to diarrhea
- Immunosuppression – like HIV/AIDS

Causative agents of acute diarrhea

Viral	Bacterial	parasites
Rota virus	Campaylobactor jejuni	Giardia
Enteric adenovirus	Closteridum defficil and perfringens	E. histolitica
HSV	E.coli	cryptosporidium
	Shigella and salmonella	Isospora belli
	Vibro cholera	strongloidosis
	Staph.aureus	Trichuris trichuria
	Yersina enterocolitica	

The transmission

– is usually through the fecal-oral route-by ingestion of fecally contaminated water or food or direct contact with infected feces.

Clinical manifestations

– **Fever:** may be suggestive of an inflammatory process & also occurs as a result of dehydration

cont…

- **Vomiting** suggests organisms that infect the upper intestine (enteric viruses, enterotoxin- producing bacteria, Giardia, & cryptosporidium),
- Severe abdominal pain & tenesmus

Effects of diarrhea include:

— Dehydration, metabolic acidosis, malnutrition, and sepsis, etc.

Assessment of Diarrhea

- For how long?
- Is there blood in the stool?

Assess for sign of DHN

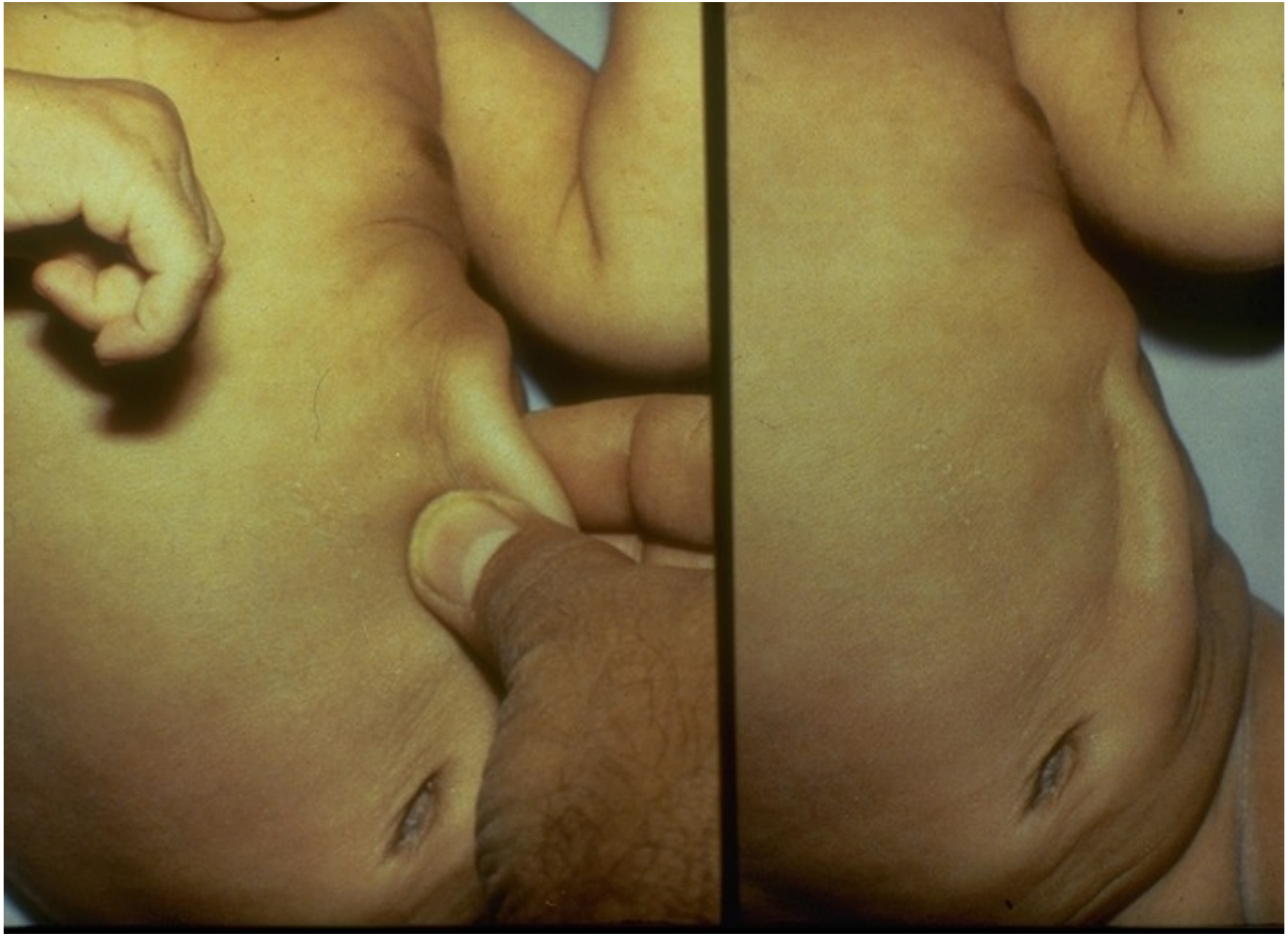
- Look at the child's general condition.
- Is the child: Lethargic or unconscious? Restless and irritable?
- Look for sunken eyes.
- Offer the child fluid. Is the child: Not able to drink or drinking poorly? Drinking eagerly, thirsty?
- Pinch the skin of the abdomen. Does it go back: Very slowly (longer than 2 seconds)? Slowly?

Cont…

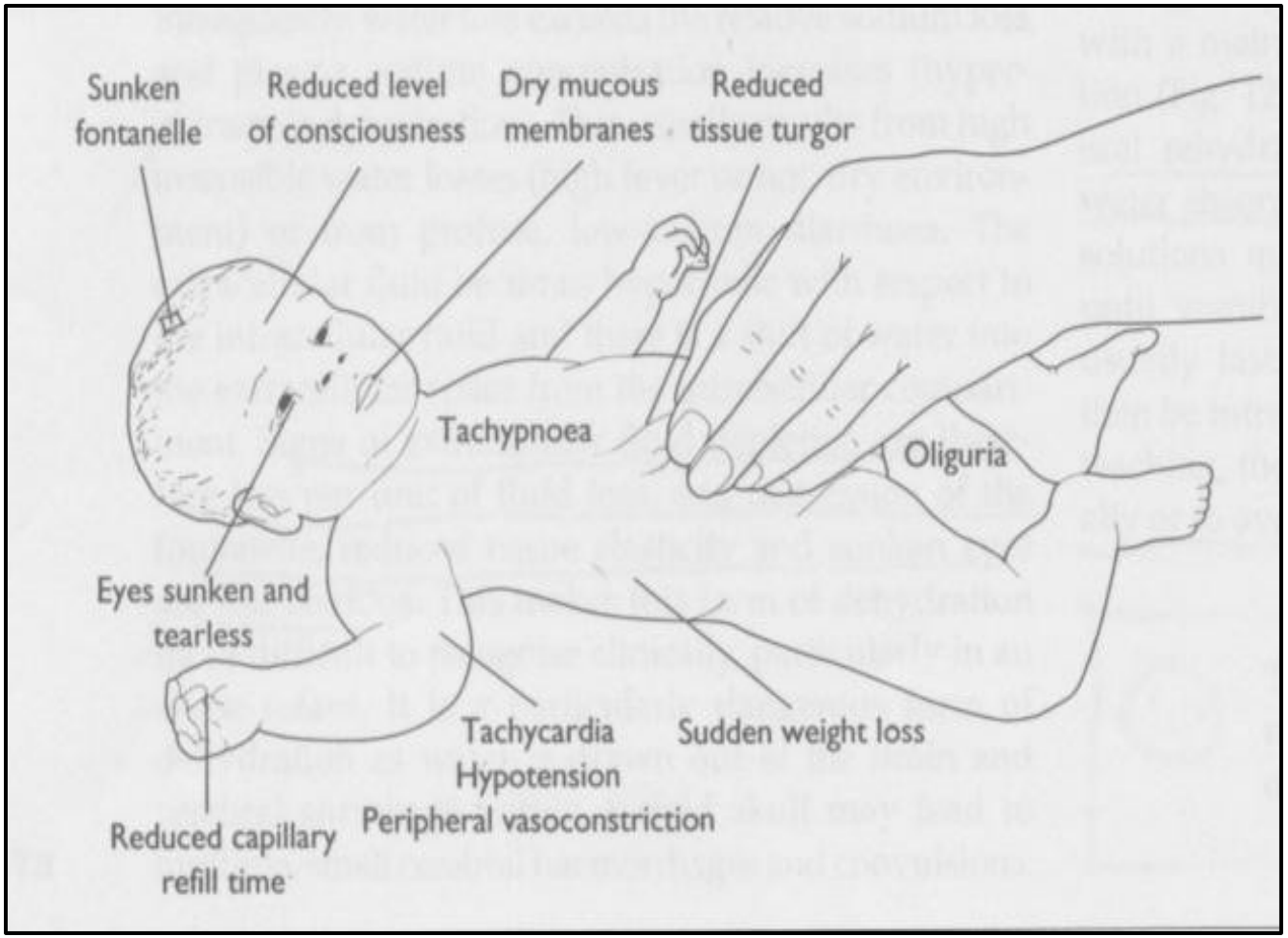
- **Mistakes in taking a skin pinch:**
  - Pinching either too close to the midline or too far laterally
  - Pinching the skin in a horizontal direction
  - Not pinching the skin long enough
  - Releasing the skin so that the finger and thumb remain in a closed position
- **Classification of skin pinches:**
  - Normal — it goes back immediately
  - Slowly — the fold is visible for less than 2 second
  - Very slowly — the fold is visible for more than 2 seconds.

Cont…

- **Severe dehydration will have two of these signs:**
  - Lethargic
  - Sunken eyes
  - Drinking poorly or not at all
  - Very slow skin pinch
- **Some dehydration will have two of these signs:**
  - restlessness or irritability
  - sunken eyes
  - drinking eagerly
  - slow skin pinch
- **No dehydration**
  - None of these signs



Cont…


Sunken fontanelle
Reduced level of consciousness
Dry mucous membranes
Reduced tissue turgor
Tachypnoea
Oliguria
Eyes sunken and tearless
Tachycardia
Hypotension
Peripheral vasoconstriction
Sudden weight loss
Reduced capillary refill time

Treatment

Main principle in management of acute diarrhea is

1. Replace lost water and salts.
2. Continue to feed to prevent malnutrition.
3. Antibiotics & antiprotozoals when needed.
4. Prevention of diarrhea

Treatment Cont…

No sign of DHN Plan A

- Fluid deficit < 5 %of total body weight
- Can be treated at home
- More than usual to prevent DHN
- Appropriate supply of food to prevent malnutrition
- Bring back the baby to the health institution, if diarrhea doesn’t get better or gets worse.

Home Fluids for Diarrhoea Must Be:

how much fluid to give in addition to the usual fluid intake:

- Up to 2 years — 50 to 100 ml after each loose stool
- 2 years or more — 100 to 200 ml after each loose stool

- Give frequent small sips from a cup.
- If the child vomits, wait 10 minutes, continue, but slowly.
- Continue giving extra fluid until the diarrhea stops.

Home Fluids for Diarrhoea

- Ideal home fluids contain:
  - salts and nutrients (sodium, potassium, chloride, and bicarbonate)
- **Examples**: ORS solution, salted soup and salted drinks

Unsuitable fluids

- Fluids which are sweetened with sugar

Examples: soft drinks , sweetened fruit drinks and sweetened tea.

Some DHN Plan B

- Fluid deficit 5-15% of total body weight
- ORS 75ml/kg over 4-6 hrs.
- Reassess the degree of DHN
  - If no sign of DHN home Rx with replacement of on going losses(50-100ml/bowel motion).
  - If sign of some DHN repeat plan B
  - If worse IV RX

Plan B

Oral Rehydration Solution:

- Effective in all types diarrhea
- Can prevent dehydration if given early in the disease.
- Cheap, easy to administer; can be given by mother at home.
- No chance of over hydration or electrolyte overdose.



Severe DHN Plan C

- Fluid deficit 15-20%.
- IV fluid RL 30ml/kg in the 1st hr to combat circulatory collapse.
- 70ml/kg in the 5hrs.

Indication for IV rehydration

1.Severe dehydration.

2.Severe and repeated vomiting.

3.Paralytic ileus and abdominal distension.

The preferred IV solution is R/L lactate.

Also give ORS (about 5 ml/kg/hour) as soon as the

child can drink

Indications

- Dysentery - oral antibiotics for 5 days
- The first line drugs is cotrimoxazole.
- The second line drug is nalidixic acid

If cholera is suspected

- Cotrimoxazole or erithromycin for younger children.
- Tetracycline for children older than 8 years.
- Anti-protozoals if trophozoites or cyst of *giardia*, or *trophozoite* of *E. histolytica* are seen in stool microscopy.

- Whenever possible rehydration should be PO.
- IV infusions are very dangerous and not recommended unless there is severe shock or loss of consciousness from confirmed dehydration.
- Malnourished patients tend to develop electrolyte imbalance with a great excess of sodium and deficit in potassium.

Cont…

- We use a special ORS for severely malnourished called ResoMal.
- A total b/n 50-100 ml of Resomal per kg of body wt. is usually more than enough to restore normal hydration.
- For each watery stool give 30 ml of ResoMal soln.

Dysentery

- Dysentery is diarrhea presenting with loose frequent stools containing blood.

Diagnosis

- The diagnostic signs of dysentery are frequent loose stools with visible red blood.

Other findings on examination may include:

§ abdominal pain

§ fever

§ convulsions

§ lethargy

§ dehydration

Treatment

- Children with severe malnutrition and dysentery, and young infants (<2 months old) with dysentery should be admitted to hospital.
- In addition children who are toxic, lethargic, have abdominal distension and tenderness or convulsions are at high risk of sepsis and should be hospitalized.
- ciprofloxacin, pivmecillinam, and other fluoroquinolones can be given.

Prevention

Interrupting the spread of infection

- Give only breast milk for the first 6 months
- Do not use feeding bottles
- Prepare and store food safely
- Use clean water for drinking
- Wash hands when soiled
- Dispose of feces safely

Strengthening host defenses

- Start complementary feeds at age of 6 months
- Give balanced diet in adequate amount
- Immunize against measles

Appendicitis

Def: Acute inflammation of the appendix

CAUSES

- Obstruction of appendiceal lumen by fecalith, calculi, or hyperplastic lymphoid tissue

PATHOLOGY

- Acute obstruction raises intraluminal pressure, leading to ischemia.
- Bacteria invade the appendiceal wall at sites of ulceration producing inflammation.
- Necrosis of appendiceal wall results in perforation with fecal contamination of the peritoneum.

EPIDEMIOLOGY

- The most common acute surgical emergency in childhood.
- Usually occurs in children greater than 2 years of age and rarely considered in children less than 3 years of age
- Peak incidence in teens and young adults aged 15 to 25.
- Affects 1 in 500 people each year worldwide.

clinical manifestations

- Usually presents acutely with fever, right lower quadrant abdominal pain, signs of obstruction or peritoneal irritation, constipation or diarrhea, and vomiting

Diagnosis

- Increased WBC count, pyuria
- Plain abdominal film may show a fecalith
- Abdominal computed tomography (CT) scan

Differential Diagnosis

- Acute enteric infection, especially *Salmonella*
- Acute or chronic inflammatory bowel disease
- Urinary tract infection
- Other causes of acute abdomen—pelvic inflammatory disease (PID), cholecystitis, peritonitis, pancreatitis

Treatment

- Surgical removal of the inflamed appendix
- Drainage of abscess if perforation has occurred

Hernia

- Is the protrusion or projection of an organ or a part of an organ through the muscle wall of the cavity that normally contains it.

Cause

- failure of normal openings to close during fetal development
- Weakness in the supporting musculature.
- When intra abdominal pressure increase (crying and straining), the weakened area separates, causing a protrusion of underlying organs.

Umbilical Hernia

- Results from imperfect closure or weakness of the umbilical ring.

Clinical manifestations

- It appears as a soft swelling covered by skin.
- The herniated area protrudes with coughing, crying, or straining.
- It is easily reduced by pushing the bowel back through the fibrous ring.
- The contents of the hernia include omentum or portions of the small intestine.

Management

- Most defects resolve spontaneously by 3-4yrs of age.
- Surgery is indicated in cases of strangulation, increased protrusion of the hernia after the age of 2yrs or no improvement in a large defect after the age of 4 yrs.

Inguinal Hernia

- Is the protrusion of a section of the bowel into the inguinal ring.

Cause

- It usually occurs in males b/c as the testes descend from the abdominal cavity into the scrotum late in fetal life
- In females, the round ligament extends from the uterus into the inguinal canal, and weakness of the muscle surrounding the round ligament may result in an inguinal hernia.

Clinical manifestations

- ✓ The hernia appears as a lump in the groin.
- ✓ In some instances, it is apparent only when an infant cries.
- ✓ Inguinal hernias are painless.

  Pain incarceration.

Diagnosis

- ✓ hx
- ✓ Physical examination palpated in the inguinal ring.

Management – surgery at an early age.

Bowel obstruction

- This may be caused by incarcerated hernias, adhesions (scarring from previous surgery), Ascaris infection, and intussusception.

Diagnosis

- ✓ Clinical presentation is determined by the level of obstruction.
  - Proximal obstruction—presents with vomiting with minimal distension.
  - Distal obstruction—presents with distension with vomiting occurring later.

- ✓ Typically there is cramping abdominal pain, distension and no flatus.
- ✓ Sometimes peristalsis waves can be seen through abdominal wall.
- ✓ Abdominal X-rays show distended loops of bowel with air fluid levels.

Treatment

Δ Give the child nothing orally

Δ Give fluid resuscitation

Δ Pass a nasogastric tube

urgent review by a surgeon experienced in pediatric surgery.

Intussusception

- A form of bowel obstruction in which one segment of the intestine telescopes into the next.

Diagnosis

- ✓ Usually occurs in children <2 years of age, but can occur in older children.

Clinical presentation:

- **Early:** colicky abdominal pain with vomiting. The child cries with pain, doubles over, and pulls the legs up.
- **Late:** pallor, abdominal distension, tenderness, bloody diarrhea and dehydration.
- Palpable abdominal mass (begins in right lower quadrant and may extend along line of colon.

Treatment

Δ Give an air or barium enema (this can both diagnose and reduce the intussusceptions).

Δ Pass a nasogastric tube and give fluid resuscitation.

- Give antibiotics if there are signs of infection (fever, peritonitis)—give ampicillin (25–50 mg/kg IM or IV four times a day), gentamicin (7.5 mg/kg IM or IV once a day) and metronidazole (7.5 mg/kg three times a day).
- Arrange **URGENT REVIEW** by a surgeon experienced in

Hirschsprung Disease

Definition: Congenital abnormality caused by reduced motility in colon.

- Lack of ganglion cells in colon prevents

bowel from transmitting peristaltic waves needed to move fecal material.

- **Clinical Manifestations**
- No meconium in the first 24 hours.
- Vomiting, Reluctance to feed, Ribbon Like stools, Foul odor of breath, History of constipation or fecal mass and Distended abdomen.

Diagnosis and Treatment

- Rectal biopsy
- Removal of the aganglionic portion of the colon.
- 1st stage surgery is often a colostomy
- 2nd stage is pull-through surgery to connect the working colon to a point near the anus.
- History & Physical
- Barium enema (X-ray)

Long Term Complications

- Anal stricture, Incontinence of stool and Short bowel syndrome

NURSING CARE

Pre-op-Cleanse bowel ,Patient/parent teaching

Post-op

- NPO
- Vital Signs – never take a rectal temperature
- Assessment
- Patient/parent teaching- Colostomy care, Skin care and Nutrition

Neurology

Meningitis and Epilepsy

Meningitis

- Is inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges.
- The inflammation may be caused by infection with viruses, bacteria, or other microorganisms, and less commonly by certain drugs.

Etiologies

The first 2 months of life

- group B streptococcus, gram negative enteric bacilli and listeria monocytogenes.
- Occasionally, Hemophilus influenzae (both type b and non-typable strains) and other pathogens found in older patients.

Cont…

2 months to12 years of age

- Hemophilus influenzae type b, Streptococcus pneumoniae and Neisseria meningitides

In children more than 12 years old

- neisseria meningitides and streptococcus pneumoniae

Cont…

- Alterations in host defenses due to anatomic defects or immune deficits increase the risk of meningitis from less common pathogens such as pseudomonas aeruginosa, Paediatrics and staphylococcus aureus, Staphylococcus epidermidis, salmonella and listeria monocytogenes.

Epidemiology

- The risk is greatest among infants 1-12 mos of age. 95% of cases occur b/n 1 month and 5 yrs of age.
- Additional risk factors –

  - recent colonization with pathogenic bacteria,
  - close contact with patient having invasive disease by N. Meningitidis & HIB,
  - crowding and poverty.

Cont...

Mode of transmission

- person to person contact through respiratory tract secretions or droplets.

Pathogenesis

- Bacterial meningitis is usually the result of bacteremia from an upper respiratory infection.
- Invasion by direct extension is less common but may occur from purulent infections of the paranasal sinuses, mastoids, or rarely from abscesses contiguous to the meninges.
- Bacteria may also gain entry to the CNS through penetrating wounds, lumbar puncture, neurosurgical procedures or midline dermal sinus tracts.

Clinical manifestations

- dramatic, sudden onset, rapidly progressive with shock, and coma- resulting in death within 24 hrs
- Several days of fever, poor feeding, myalgia, arthralgia, skin rash
- Meningial irritation signs- neck stiffness, kerning, brudzinski (<12-18 mo. inconsistent).

Cont…

- **Brudzinski's sign:** reflex **flexion of hips** and **knees** upon active flexion of the neck.
- **Kerning's sign:** reflex **contraction** and **pain** up on **extension of leg** that is flexed at the hip.
- **Opisthotonus: spasm** in which head and heels are bent back ward.

Cont…

- Signs of increased ICP- emesis, bulging fontanel, hypertension , bradycardia, apnea or hyperventilation, stupor, coma,
- Seizure- due to cerebritis, infarctions, (20-30% of patients).

Diagnosis

- Lumbar Puncture (LP) for CSF examination.
- **CSF analysis:**
  - Color – **Cloudy,**
  - WBC (>200cell/ml)
  - High protein(>100mg/dl)
  - Low glucose(<40 mg/dl)
  - Gram stain(70-90% positivity)

Bacterial meningitis

- The child should be isolated and intravenous (IV) antibiotics therapy immediately after diagnosis
- Ampicilline and CAF or penicilline initially
- If E.coli is suspected, an gentamyacine with ampicilline is choice
- Antipyretics and anti seizure drugs
- A corticosteroid, or steroid, such as dexamethasone,

Suggested Antibiotics And Duration Of Therapy

- H. influenzae type b: chloramphenicol 100 mg/kg/d for 7 - 10 days.
- S. pneumoniae: aqueous penicillin G 300,000 IU/kg/d for 10 - 14 days.
- N. meningitidis: aqueous penicillin G 300,000 IU/kg/d for 5 - 7 days.
- If no etiologic agent is identified the initial antibiotic therapy should be continued for 10 to 14 days

Supportive care

- NPO
- IV fluid: 800-1000ml/24hr.
- Septic shock- dopamine
- Signs of ↑ ICP

-Endo Tracheal intubation& hyperventilation

- mannitol (0.5-1g/kg)
- Seizures- first Rx-diazepam iv,or lorazepam

Nursing management

- bed rest
- isolate the pt
- obtain baseline V/S and monitor frequently
- insure that prescribed antibiotics are administered
- observe for any side effects to antibiotics
- keep the env’t as quit as possible

Cont…

- avoid bright light
- put on side lying position
- monitor the fontanel and maintain record of head circumference
- increased fluid intake (this may involve encouraging fluids at home or receiving intravenous fluids in the hospital)
- medications (to reduce fever and headache)
- supplemental oxygen or mechanical ventilation (respirator) may be required if the child becomes very ill and has difficulty breathing

Prevention

- Vaccination & antibiotic prophylaxis

  - N.meningitidis- rifampin 10mg/kg/dose q12 hr for 2 days – for all close contacts of patients with meningococcal meningitis,

- HIB- rifampin 20mg/kg/day,once, 4 days for all household contacts

Epilepsy

- Unit objectives
- At the end of the unit the students will be able to:

1. Define epilepsy
2. Identify types of epilepsy?
3. Define meningitis?
4. List manifestations of meningitis?

Epilepsy

- A medical disorder involving episodes of irregular electrical discharge in the brain and characterized by the periodic sudden loss or impairment of consciousness, often accompanied by convulsions

- **Epilepsy** is a paroxysmal neurologic disorder characterized by a sudden onset of sensory perception or motor activity with or without loss of consciousness due to abnormal, excessive, hyper synchronous electrical discharges from the cortex.
- Its etiology is often unknown.
- Secondary causes include congenital, perinatal injuries, intra cranial tumors, vascular, metabolic and others.
- 30% of epileptic cases have neurologic deficit

Epilepsy

Epidemiology

- An incidence of 4-8/1000 children per year
- 3-5% of children develop febrile seizure in the first five years of life
- More seizure in poor society and males
- High incidence in the extremes of age
- Seizure can be exacerbated by menses, fever, sleep (nocturnal seizure), flashing (watching TV)

Seizure disorder

- **Convulsion** : abnormal, uncontrolled muscle twitching with or without loss of consciousness due to abnormal neuronal excitation.
- **Seizure**: an abnormal motor, sensory or behavioral change with or with out consciousness.
- **Epilepsy**: *Epilepsy* describes a condition in which a person has *recurrent* seizures due to a chronic, underlying process.

Seizure disorder

Provoked seizure… symptomatic seizure

- Meningitis, fever, electrolyte imbalance, asphyxia, head trauma, congenital brain malformation, etc

Unprovoked seizure (EPILEPS)… Idiopathic

- No clear mechanism
- May be familial due to genetic disorder

1. **Partial seizures**
   a. Simple partial seizures (with motor, sensory, autonomic, or psychic signs)
   b. Complex partial seizures
   c. Partial seizures with secondary generalization
2. **Primarily generalized seizures**
   d. Absence (petit mal)
   e. Tonic-clonic (grand mal)
   f. Tonic
   g. Atonic
   h. Myoclonic

3. Unclassified seizures

a. Neonatal seizures
b. Infantile spasms

- **Clonic:-** rhythmic jerking movement, migrate to other part
- **Tonic:-** extension of all four limbs, upper limb stiffly fixed position
- **Myoclonic:-** single or multiple flexion jerks of limbs (often indicate metabolic derangement)
- **Subtle:-** common in children, clonic horizontal eye deviation, repetitive blinking/fluttering

– Twitching, drooling, sucking movements, arm movement that resemble swimming/boxing, leg movement described as pedaling or crying, apnea (common)

Partial Seizures

- Partial seizures occur within **discrete** regions of the brain.
- If consciousness is fully preserved during the seizure, the clinical manifestations are considered relatively simple and the seizure is termed a ***simple partial seizure***.
- If consciousness is impaired, the symptomatology is more complex and the seizure is termed a ***complex partial seizure***.
- seizures that begin as partial seizures and then spread diffusely throughout the cortex, called ***partial seizures with secondary generalization***

Clinical presentation

Simple partial seizure

- The presence of twitching, clonic or myoclonic activities with out loss of consciousness

Complex partial seizure

- Behavioral abnormalities like lip smacking, chewing, running, crying, aggressive behavior with **no self awareness**

Quiz(10%)

1. Rhythmic jerky movements of extremities that can migrate to other body part is_____(2%)
2. Child developed primarily stiffed body, and after 15sec,abnormal body movement. What is possible dx of this child.____
3. Which occur first? Tonic/clonic
4. Seizure with clonic or myoclonic and child is conscious at end is_____(2%)
5. List partial seizure which have post ictal confusion at the end of seizure?
6. What is primary causes of epilepsy?
7. List aggravating factors of epilepsy
8. What are secondary causes of epilepsy?

Absence Seizures (Petit Mal)

- Are characterized by sudden, brief lapses of consciousness without loss **of postural control**.
- The seizure typically **lasts for only seconds**, **consciousness returns as suddenly** as it was lost, and there is **no postictal confusion**.
- usually accompanied by subtle, bilateral motor signs such as rapid **blinking of the eyelids, chewing movements, or small-amplitude, clonic movements of the hands**.

Cont. …

- Usually begin in childhood (ages 4–8) or early adolescence and are the main seizure type in 15–20% of children with epilepsy.
- The seizures can occur **hundreds** of times per day, but the child may be unaware of or unable to convey their existence

Generalized tonic clonic seizure

- Resulting from **metabolic derangements**
- Sudden onset of loss of consciousness,
- generalized tonic, breath holding, tonic deviation of the eyes followed by generalized clonic movement with salivation, incontinence and sweating.
- Patient lapse in to drowsiness and sleep after seizure disorder.
- Some patients do have **aura prior to seizure** disorder.

Cont…

- The initial phase is usually **tonic contraction** the muscles of expiration and the larynx at the onset will produce a loud **moan or "ictal cry**.“
- Respirations are impaired, secretions pool in the oropharynx, and cyanosis develops.
- Contraction of the jaw muscles may cause biting of the tongue.

Cont. …

- A marked enhancement of sympathetic tone leads to increases in heart rate, blood pressure, and pupillary size.
- After 10–20 s, the tonic phase of the seizure typically evolves into the clonic phase, produced by the superimposition of periods of muscle relaxation on the tonic muscle contraction.

Clinical presentation

- **Generalized tonic: Sudden marked body stiffness and loss of consciousness.**
- **Generalized clonic**: Sudden multiple tremor like movement with loss of consciousness.
- **Myoclonic seizure**: sudden generalized brief twitching with or without loss of awareness.
- **Atonic seizure**; characterized by sudden **loss of postural muscle tone** lasting 1–2 s. Consciousness is briefly impaired, but there is usually **no postictal confusion.**
- **Infantile spasms**: Sudden flexion, extension or mixed pattern associated with crying

Provoked seizures

Febrile seizure: the most common cause of seizure in children (3-5% in the first 5 years)

- Mainly between 5months to 5 years
- Often during URTI or Diarrhea
- It is a generalized tonic clonic seizure
- 30% risk or recurrence
- 5% risk or epilepsy
- Rule out the presence of meningitis -- LP

Diagnosis

Provoked seizures have clear causes like fever, meningitis, head trauma, hydrocephalus, brain tumor, electrolyte disorder etc.

- Order CT or MRI to see any brain pathology
- CBC, electrolyte, LP, VDRL, etc. to confirm clear causes of seizure

Unprovoked seizure (Epilepsy)

- Confirm brain electrical discharge and the pattern of seizure

Treatment of Epilepsy

Objectives

- Stop seizure
- Reduce frequency of attacks
- Treat underlying cause (if any)

Non pharmacologic

- Advice on a healthy lifestyle with good sleep habits and avoidance of excessive alcohol and caffeine.
- The patient should know the name and the dose of his/her medication and should be warned of the consequences of poor compliance

Drug Treatment

- **First line**
  - Phenobarbital, I.M/I.V/P.O. 4-6 mg kg/day loading dose, followed by 5 mg/kg in two divided doses.
- **Alternative**
  - Phenytoin, I.M/I.V/P.O. 4-6 mg kg/day loading dose, followed by 5 mg/kg in two divided doses

- If seizures are associated with,

1. **Hypocalcaemia (Hypocalcaemia tetany)**
   - Calcium gluconate solution10% 1-2 ml/kg/; repeat PRN after 6 hours.
2. **Hypoglycemia**
   - Glucose 10%
3. **Vitamin B 6 deficiency**
   - Vitamin B 6 (pyridoxine),50mg IM as single dose

- N. B.
  - Antiepileptic drugs should not be discontinued even if the seizure is well controlled unless decided by specialist after complete control of seizures for years

Side effects of anticonvulsants

- **Phenobarbitone**: behavioural disorder
- **Phenytoin**: Ataxia, gum hyperplasia, hirtusim
- **Carbamazepine**: bone marrow suppression
- **Valproic** acid: Liver toxicity
- **Skin rash**: most of anticonvulsants
- **Drug** interaction with antiTB, OCP and ARV

Nursing management

- Assess A, B, C’s
- Prevent trauma
- Evaluate and maintain airway
- Provide 100% oxygen
- Establish vascular access
- Obtain rapid glucose
- Administer Medications

Disorder Of GUT

GUT

- Course objectives : At the end of the unit the students will be able to:
  - Define UTI
  - Identify risk factors of UTI in children
  - List classification of UTI
  - Define Nephrotic Syndrome with its manifestation
  - Identify Wilm’s tumor stage

GUT…

definition of terms

- **Frequency:-** Frequent voiding—more than every 3 hr
- **Urgency:-** Strong desire to void
- **Dysuria:-** Painful or difficult voiding
- **Hesitancy:-** Delay, difficulty in initiating voiding
- **Nocturia:-** Excessive urination at night
- **Incontinence:-** Involuntary loss of urine
- **Enuresis:-** Involuntary voiding during sleep
- **Polyuria:-** Increased volume of urine voided

Cont. ….

- **Oliguria:-** Urine output less than 500 mL/day
- **Anuria:-** Urine output less than 50 mL/day
- **Hematuria:-** Red blood cells in the urine
- **Proteinuria:-**Abnormal amounts of protein in the urine

Urinary tract infections (UTI)

Definition

- UTI refers to a group of conditions in which there is growth of bacteria within the urinary tract.
- Most common serious bacterial infection in infants and children
- Highest frequency in infancy
- Uncircumcised males have a ten-fold incidence

Epidemiology

- 3-5% of girls and 1% of boys develop UTI
- UTI in girls began by3- 5 years of age
- Males develop UTI often before one year
- During the first year of life, the male: female ratio is 2.8-5.4: 1.
- During child hood Females exceed males with a ratio of 10:1

Risk factors of UTI

- Female gender
- Uncircumcised male
- Vesicoureteral reflux
- Obstructive uropathy
- Urethral instrumentation
- Tight clothing (underwear)
- Pinworm infestation
- Constipation
- Neuropathic bladder
- Wiping from back to front

Urinary tract infection

Etiology

- E. coli (70-80% of cases), Proteus, Klebsiella etc.
- S. saprophyticus (skin normal flora)
- Adenovirus (hemorrhagic cystitis)

Pathogenesis

- Nearly all UTIs (except in neonates) are ascending infections, the origin being the colon.
- The bacteria arise from the fecal flora, colonize the perineum and enter the bladder via the urethra.
- In uncircumcised boys, the bacteria arise from the flora beneath the prepuce and grow in bladder.
- Entry in to short female urethra
- Bacteria reach to the kidney via reflux

Cont. …

- In some cases, the bacteria ascend to the kidney to cause pyelonephritis.
- In rare cases, renal infection may occur by hematogenous spread.
- UTI in neonates, however, is mostly hematogenous in origin.

Classification of UTI

Upper tract: involves renal parenchyma, pelvis, and ureters

- Typically causes fever, chills, flank pain

Lower tract: involves lower urinary tract

- Usually no systemic manifestations

Can be Complicated and uncomplicated UTI

Cont. …

Lower tract

- Cystitis
- Urethritis

Upper tract

- Pyelonephritis
- VUR
- Glomerulo-nephritis

Classification of UTI…..

Asymptomatic bacteriuria:

- This is a benign condition characterized by presence of positive urine culture without any manifestations of infection and occurs almost exclusively in females.

Cystitis

- It indicates involvement of the urinary bladder
- Cystitis does not result in renal injury.

Pyelonephritis

- Refers to involvement of **renal parenchyma** and it may result in renal injury called **pyelonephritic renal scarring**.
- When there is **no parenchymal** involvement, the condition is termed **pyelitis**.

Clinical manifestation

Cystitis (lower UTI)

Present with dysuria, urgency & frequency

- Abdominal pain and vomiting
- Foul smelling urine
- Hematuria
- Perineal discomfort
- New onset urinary incontinence
- Suprapubic tenderness on examination

Cont. …..CM

Pyelonephritis (upper UTI)

- Non localizing fever in infants
- Vomiting, irritability and poor feeding
- Chills and flank pain is reported in older children
- Dysuria & urgency due to cystitis
- Flank tenderness can be elicited on exam

Diagnosis

- Urine **culture** is the definitive diagnosis
- More than 10^5 bacterial colony is definitive
- Urine **analysis** for nitrite, bacteria, esterase and WBC
- Increased BUN
- **U/S-** enlarged kidney or renal abscess
- Voiding cysto-urethrogram (CUG) reveals urinary reflux
- Renal scan to visualize scar formation

Management

Management of cystitis

- Cystitis progress to pyelonephritis
- Co-trimoxazole 6-8mg/kg/d in 2 doses OR
- Nitrofurantion 5-7mg/kg/day in 3-4 doses OR
- Amoxicillin 50mg/kg/day in3divided doses
- 3-5 days of therapy will sufficient for cystitis

Cont. ….

Management of pyelonephritis

- Admit severe cases for parentral therapy
- Intravenous ceftriaxone 50-75mg/kg/day OR
- Intravenous Ampicillin 100mg/kg/day plus
- Gentamycin 3mg/kg/day are alternatives
- Treatment should continue for 10-14 days

Surgical Management

- Drainage of perinephric or renal abscess
- Correction of severe vesico-ureteric reflux

Nursing management

- Monitoring body temperature
- Promoting normal elimination
- Providing family teaching
- Administering prescribed medication

Complications

- Bacterial sepsis, Renal abscess
- Renal scaring and hypertension
- Chronic renal failure

Nephrotic Syndrome

- Chronic renal disorder in which the basement membrane surfaces of the glomeruli are affected, causing loss of protein in the urine.
- The glomeruli membrane has increased permeability permitting albumin and protein to pass through the membrane and excreted in the urine.

Clinical Manifestations

Four most common characteristics:

1. ***Edema*** - May have periorbital edema upon rising in morning and shifts during the day.
2. Massive ***proteinuria*** and ***Hypoproteinemia***
3. ***Hypoalbuminemia***
4. ***Hyperlipidemia***



Other signs and symptoms

- Fatigue
- Anorexia
- weight gain
- Abdominal pain – from large amount of fluid in abdominal

Comparison Nephrotic Syndrome & Glomerulonephritis

Nephrotic Syndrome

- 3-4+ Proteinuria
- Microscopic Hematuria
- Low Serum Albumin
- Neg ASO & streptozyme
- Normotensive
- Electrolytes normal

Glomerulonephritis

- 0-2+ Proteinuria
- Hematuria
- Normal Serum Albumin
- Positive ASO & strepto
- Frequently hypertensive
- Na (low), K

Diagnostic Tests

1. **Urinalysis** – protein-to-creatitine (PR/CR) ratio of first morning void to assess for proteinuria. Urine appears dark and frothy.
2. **Blood tests** – hypoalbuminemia, elevated cholesterol and triglycerides, elevated Hgb, Hct, platelets

Therapeutic Interventions

1. **Administer medications** – Prednisolone, Albumin, Diuretics, assess for side effects
2. **Prevention of infection** – avoid people with infections.
3. May be placed on protective isolation.
4. **Keep accurate record of I&O**. Measure abdominal girth, weigh daily.

Cont. …

4. Test urine for protein and specific gravity to see if treatment is effective
5. Diet: Normal diet for child's age

- A "**no added salt**" diet is recommended during steroid treatment.

6. Promote rest
8. Discharge teaching

Complications

- Children with Nephrotic Syndrome are prone to **infection** related to:
  - Loss of immunoglobins in the urine
  - Corticosteroid Therapy

Endocrine Disorder

Diabetes Mellitus (DM)

- Is a common, chronic, metabolic syndrome characterized by hyperglycemia as a cardinal biochemical feature.
- The major forms of diabetes are classified according to those caused by *deficiency of insulin secretion* due to pancreatic β-cell damage (type 1 DM, or T1DM) and those that are a consequence of *insulin resistance* occurring at the level of *skeletal muscle, liver, and adipose tissue,* with various degrees of β-cell impairment (type 2 DM, or T2DM).

T1Diabetes mellitus

- T1DM is the most common endocrine-metabolic disorder of childhood and adolescence, with important consequences for physical and emotional development.
- Individuals with T1DM confront serious lifestyle alterations that include
  - -An absolute daily requirement for exogenous insulin
  - - The need to monitor their own glucose level
  - - And the need to pay attention to dietary intake.

Type1DM

- The onset occurs predominantly in childhood, with median age of 7 to 15 yr, but it may present at any age.
- T1DM is characterized by autoimmune destruction of pancreatic islet β cells.

Type 2 Diabetes mellitus

- The children and adolescents with type 2 diabetes are usually obese but are not insulin dependent and infrequently develop ketosis(during severe infections or other stresses)
- It is characterized by insulin resistance and often a progressive defect in insulin secretion.
- This type of diabetes was formerly known as adult-onset diabetes mellitus, non-insulin-dependent diabetes mellitus (NIDDM), or maturity-onset diabetes of the young (MODY).

- A history of polyuria and polydipsia is relatively uncommon in these patients.
- Acanthosis nigricans (**dark pigmentation of skin creases/flexural areas**) is present in the majority of patients with T2DM and is accompanied by a relative hyperinsulinemia at the time of the diagnosis

Environmental Factors

- **Viral infections** like coxsackie B3, coxsackie B4, cytomegalovirus, rubella, and mumps can infect human β cell.
- Diet especially exposure to **cow's milk** at an early age. The likely mechanism is the molecular mimicry between a 17-amino-acid peptide of the bovine serum albumin and the islet antigen 69.
- **Drugs** like pentamidine and Vacor are directly cytotoxic to β cells and cause diabetes

Family history of DM

- **10% (only)** of the children with diabetes have diabetes type 1 among relatives
- If both parents are affected by type 1 diabetes, they will have a child with diabetes in about 20-25 %
- 1 parent: about 5 %

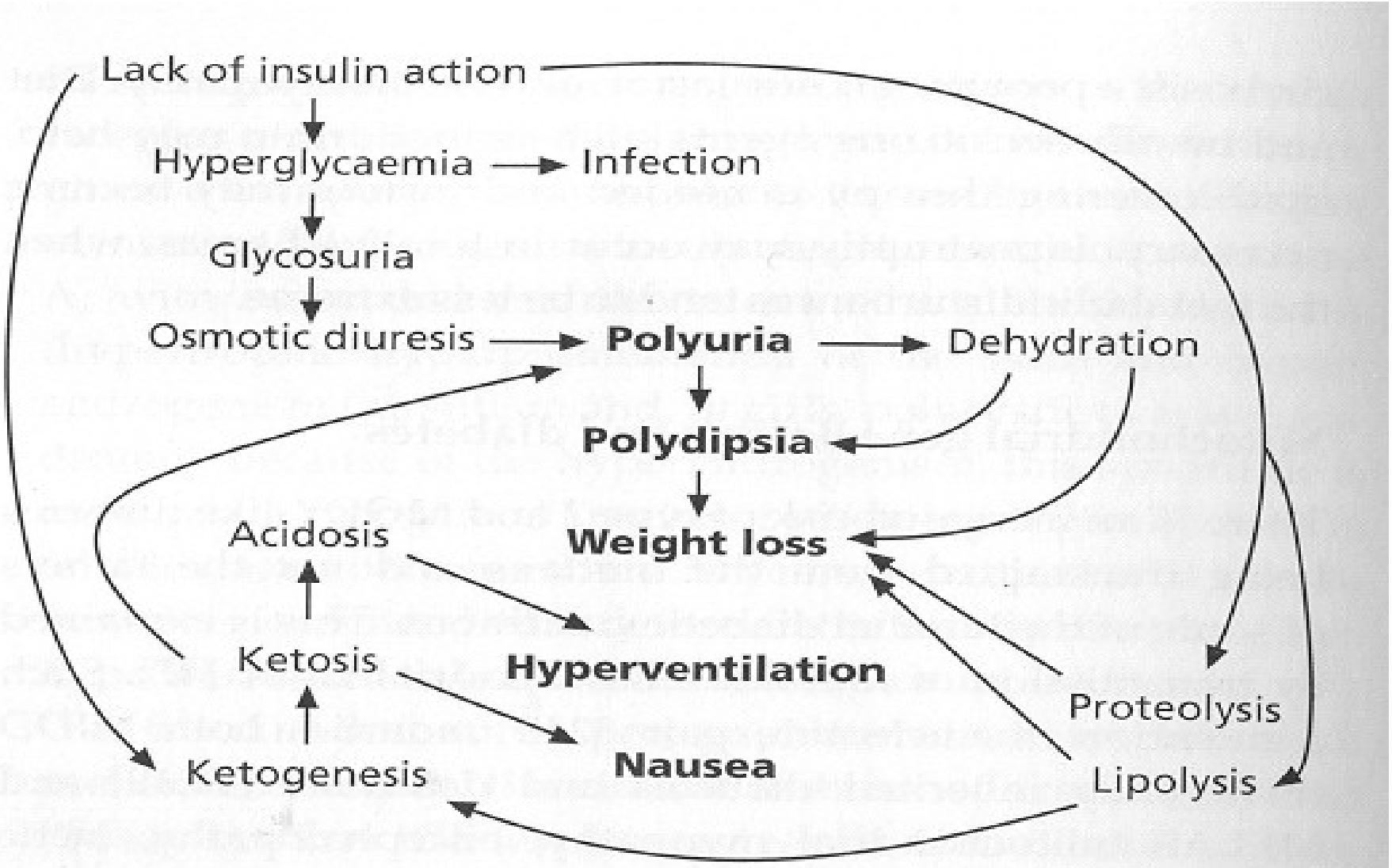


Fig. 24.1. The symptoms of uncontrolled diabetes mellitus.

CLINICAL PRESENTATION

Childhood type 1 diabetes can present in several different ways.

- **Classic new onset** - Hyperglycemia without acidosis is the most common presentation of childhood type 1 diabetes. Symptoms are caused by hyperglycemia and include polyuria, polydipsia, weight loss despite increased appetite initially (polyphagia), and lethargy.

Diabetic ketoacidosis

- Children with type 1 diabetes often present with DKA (hyperglycemia and ketoacidosis). Symptoms are similar but usually more severe than those of patients without acidosis.
- In our set up more than 80 % of patients will present with DKA at the initial presentation.

Diabetic ketoacidosis

- As an initial presentation or in a known case of DM when they omit their insulin or when there is infection or stress.
- Can be classified as mild,moderate

	Normal	Mild	Moderate	Severe
CO 2 meq/l	**20-28**	16-20	10-15	<10
PH	7.35-7.45	7.25-7.35	7.15-7.25	<7.15
Clinical	No change	Alert but fatigued	Kussmal breathing , sleepy	comatose

Diabetic ketoacidosis

- When extremely low insulin levels are reached, keto acids accumulate. Keto acids produce abdominal discomfort, nausea, and emesis.
- Dehydration accelerates, causing weakness and polyuria persists.
- Ketoacidosis exacerbates prior symptoms and leads to Kussmaul respirations (deep, heavy, rapid breathing), fruity breath odor (acetone) and possible coma.

Criteria for the diagnosis of diabetes mellitus

1. Symptoms of diabetes plus casual plasma glucose concentration ≥11.1 mmol/L (≥ 200 mg/dl).

∗ Casual is defined as any time of day without regard to time since last meal.

2. Fasting plasma glucose ≥7.0 mmol/l (≥126 mg/dl).

∗Fasting is defined as no caloric intake for at least 8 h.

3. 2-hour postload glucose ≥11.1 mmol/l (≥200 mg/dl). The test should be performed as described by WHO, using a glucose load containing the equivalent of 75 g glucose dissolved in water.

DKA Management

1. Volume expansion

   10-20 ml/kg R/L or N/S over 1 hour

2. Insulin therapy and K+ replacement

   - 0.1u /kg/hr continuous insulin mxt

   -0.5 u/kg/ every 4-6 hourly intermittent insulin mxt

   -K + 20-40 meq/L of fluid

Treatment for diabetic mellitus

- Insulin Therapy.

  Children with long-standing diabetes and no insulin reserve require about 0.7 U/kg/d if prepubertal, 1.0 U/kg/d at midpuberty, and 1.2 U/kg/d by the end of puberty
- Basic education – about the insulin injection , meal planning ,exercise, about symptoms of hypo/hyperglycemia

Nutritional management

- 55% CHO, 30 %fat and 15 % protein
- The total daily caloric intake is divided to provide 20% at breakfast, 20% at lunch, and 30% at dinner, leaving 10% for each of the midmorning, mid afternoon, and evening snacks, if they are desired.

Exercise

- No form of exercise, including competitive sports, should be forbidden to the diabetic child.
- But the risk of hypoglycemia is there during or within hours after exercise so BG measurement is important .
- They have to take candy or carbonated juice to take immediately if there are symptoms of hypoglycemia

T2DM management

- Weight loss and physical exercise are said to be the main strategies in controlling glucose level in T2DM patients
- Oral hypoglycemic agents like metiformin can be tried
- Insulin if they have ketonuria