NORMAL GROWTH AND DEVELOPMENT OF CHILDREN•

You are already aware that in normal circumstances, given the right environment, children growth and development takes place rapidly. You are now going to look at the definition of the concepts 'growth' and 'development'.

Growth

Growth implies a change in quantity. Human growth can be defined as a change in body structure. The changes are both in height and size. They are influenced by various factors, which will be covered later.

Development

Development is a physiological process, which occurs in children right from conception until puberty. It involves a qualitative change in this case from a lower to a more advanced stage of complexity. This process is also influenced by a number of factors.

factors that influence growth and development?

- Good nutrition or a well balanced diet is a very significant requirement for proper growth and development. A child requires food rich in proteins, minerals and vitamins for the development of body tissues and bones.
- Hormones are necessary for normal bodily functions, growth and mental development. During the puberty period common hormones involved in these activities include growth hormones, the thyroid hormone and sex hormones.
- Genetic disposition, for example, where the offspring inherits the qualities of parents of being tall or short.
- Environmental influence is important as it determines physical growth and mental development. Children who are deprived of love or subjected to emotional and physical abuse are more likely to suffer from growth failure and mental development. In some cases, if the environment is not conducive, the onset of puberty may be delayed when compared to children of the same age group.

Developmental Phases

The major development phases are the prenatal, infancy, early childhood, middle childhood and later childhood or adolescent phases.

Developmental Age Periods

Period	**Age**
Prenatal period:	Conception to birth
Infancy period:	Birth to 12 or 18 months
Neonatal:	Birth to 28 days
Infancy:	1 month to approximately 12 months
Early childhood period:	1 year to 6 years
Toddler:	1 to 3 years
Preschool:	3 to 6 years
Middle childhood:	6 to 11 years
Later childhood:	11 to 19 years
Pre Pubertal:	10 to 13 years
Adolescence:	13 to 18 years

Rate of Development

milestones that children go through and the ages at which this happens

Age (in months)	Milestone
2	Attention to objects
3	No head lag when pulled up to sitting position
5	Reaches out for objects
6	Asymmetric tonic neck reflex disappeared, sits steadily
10	Bears weight on legs when standing (unless bottom shuffler), chews lumpy foods
18	Walks independently, has stopped casting or mouthing objects
20	Says single words with meanings
28	Puts two or three words together to make phrases
36	Talks in sentences

Development Assessment.

•In order to assess whether a child is developing normally or not, it is necessary to have basic knowledge of the main milestone of normal development.

•For each milestone there is a wide range of what is considered normal.

• It is therefore useful to watch out for developmental warning signs which indicate the point beyond the uppermost limit of normal at which a milestone should have been reached.

Developmental Warning Signs	**Age**
Not smiling at mother	8 weeks
Poor head control	6 months
Unable to sit unsupported	9 months
Not crawling	12 months
Unable to stand with help	12 months
Not babbling	12 months
Unable to stand unaided	15 months
Not walking independently	18 months
Unable to understand simple commands	2 years
Not using two to three words	2.5 years

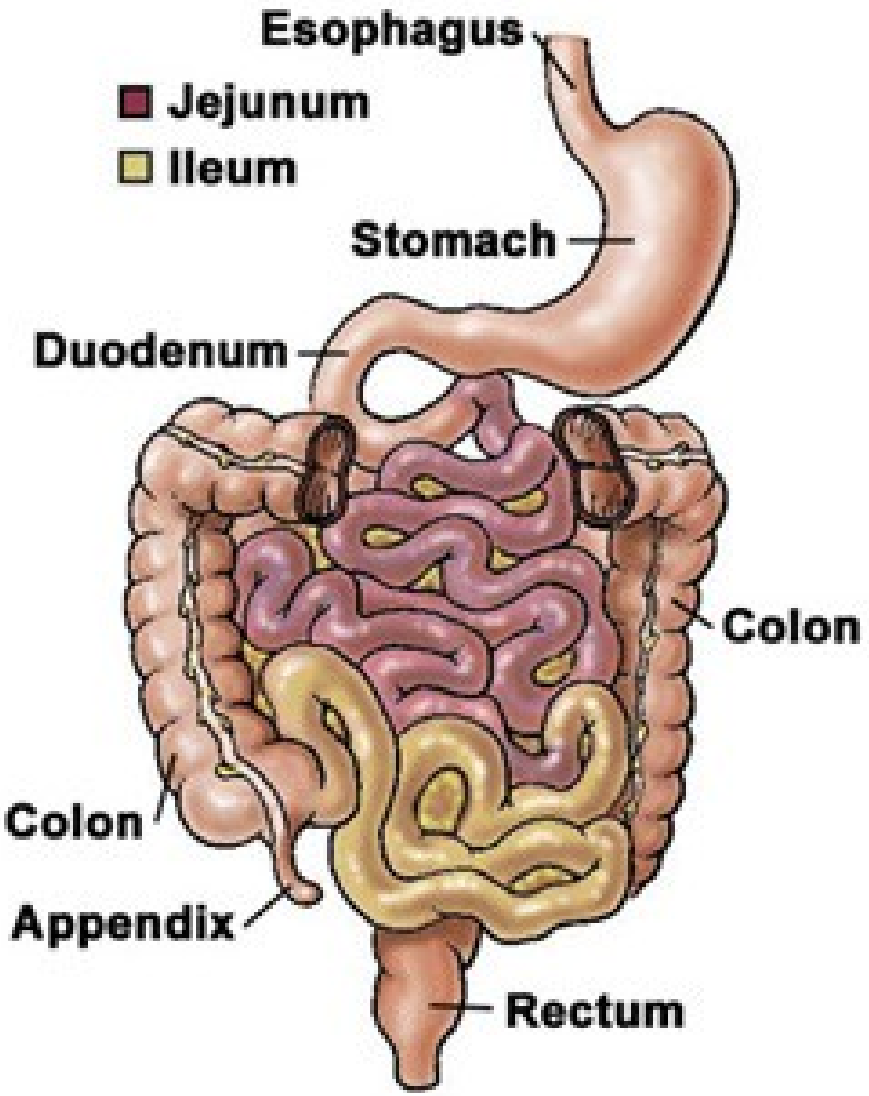
Conditions of the alimentary .

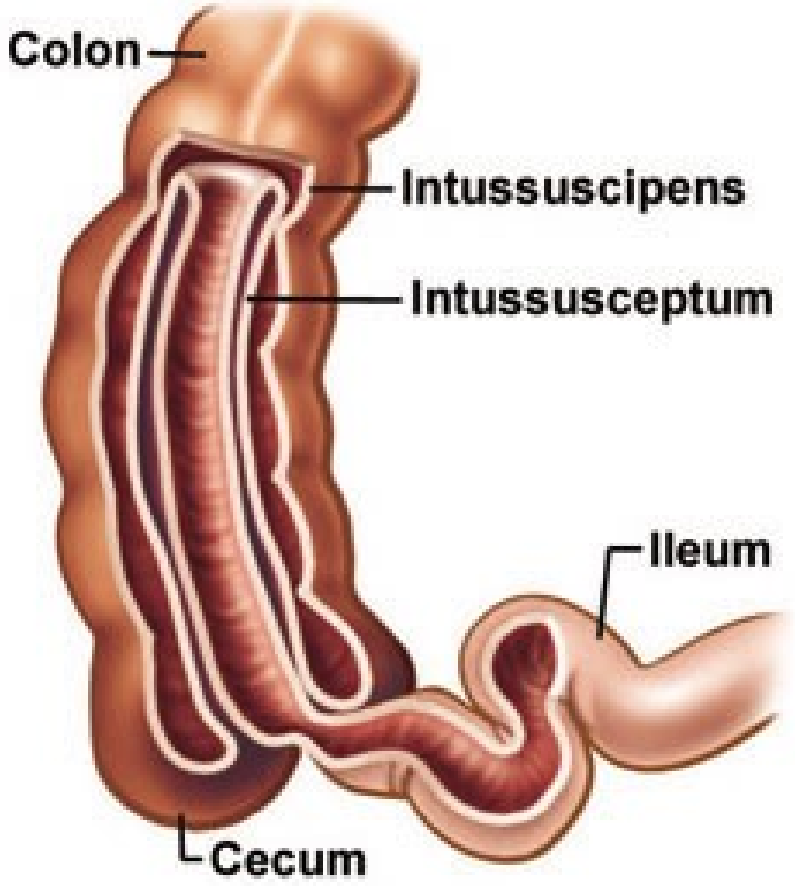
Intussusceptions: Its where **o**ne segment of bowel telescopes/ invaginates into the lumen of an adjacent segment of intestines. Most frequent cause is intestinal obstruction in infants/ young children .It peaks between 3rd – 9th month. twice as common in boys as girls.

- **Etiology:** Usually not identifiable .Sometimes polyp, foreign

Pathophysiology:

The telescoping process is known as intussusceptions. The leading proximal segment (intussuscepted) almost always telescopes into the distal segment (intussuscipens). There maybe a leading edge in form of polyp,inverted appendiceal stump or tumour.





Bowel telescoping/ invagination causes walls of bowel to press on one another compromising blood flow.Involved intestines get inflamed, edematous and bleeding occurs and appear in stool. Later complete bowel obstruction occurs with subsequent abdominal distension and vomiting .If not treatment is instituted necrosis and perforation occurs.

Clinical manifestations: Four classical manifestations include: colic, intermittent abdominal pain (sudden), vomiting – early and red currant jelly- like stools. But these are present only in 50% of those with disease. Others present with sausage- shaped mass felt right upper Quadrant. Later other symptoms set in: lethargic, weak, thready pulse, shallow respirations and increase body temperature

Diagnostic evaluation: barium enema (a barium solution that shows on x-ray is given as an enema) will show the tip of the obstructed intussuception; abdominal ultra sound and X-ray non specific but more show intra peritoneal air (perforation).

Therapeutic management: Non – surgical hydrostatic reduction using barium, a water soluble contrast agent or air enema (air insufflations – blowing air into a cavity).Air & H_2O use is safer than barium because of bowel perforation risk. Air is 90% successful while water or barium is 65-85% successful.

If there is perforation, peritonitis, shock occurs or if the above doesn't work; surgical intervention to reduce (manually) intussusceptions.

Nursing management includes: NPO status, Monitor vital signs for worsening state, - reassure caregiver who may worry due to suddenness of disease onset . Surgical care pre-operative care. Family teaching**:** Caregiver to observe signs of intestinal obstruction/ recurrence eg abdominal pain, abdominal distension, blood in stools and bile stained vomiting.

Hirschsprung's disease (HD):

Also called congenital aganglionic megacolon. Motility disorder due to absence eg parasympathetic ganglion cells in colon hence no peristalsis & feces accumulate proximal to defect – bowel obstruction. Most common cause of distal bowel obstruction in the newborn but may not be diagnosed until infancy or childhood. Common in males x 3 -4 than females.

Etiology: Has some genetical link in 7% of cases. Aganglionic segment located oftenly in recto-sigmoid area. Affected area unable to transmit coordinated peristaltic movement/ waves. Proximal to the defect, fecal matter accumulates & distension occurs. This causes hypertrophy & dilation (megacolon).

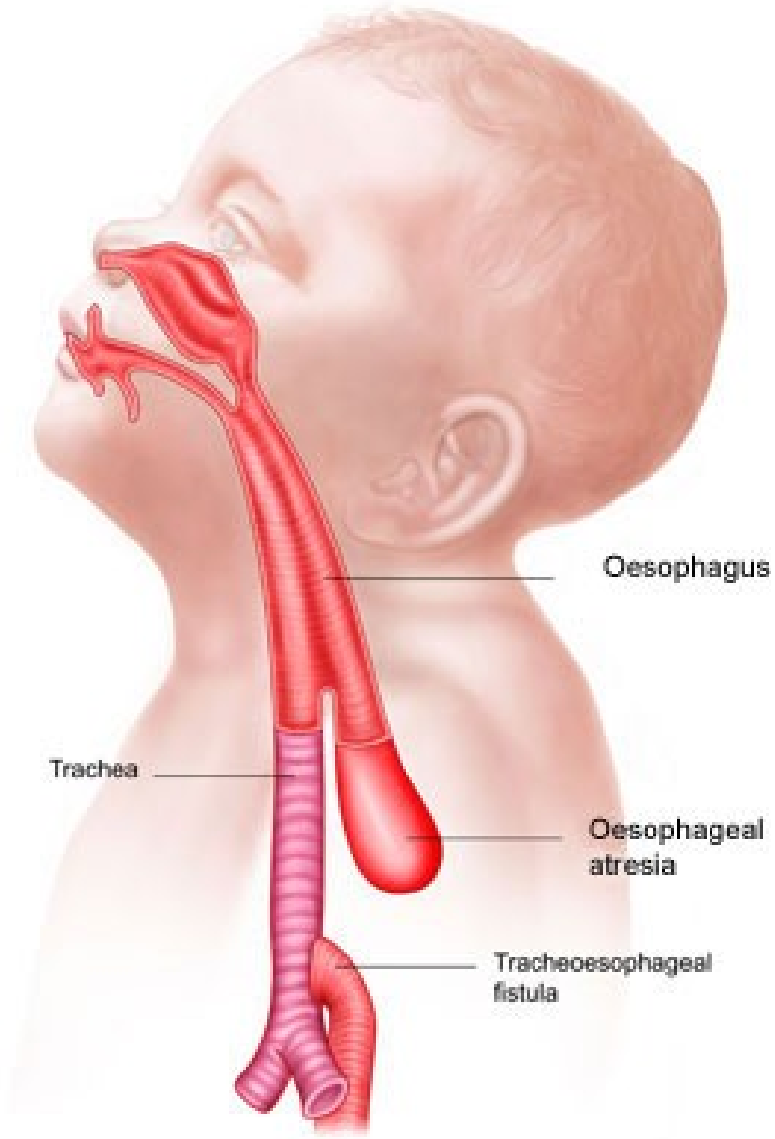
Clinical manifestations: In new born, failure to pass meconium, within 24 hrs – 48 hrs after birth, abdominal distension, bile starved vomiting, refusal to feed and intestinal obstruction. In infants & children you notice chronic constipation (initial) , abdominal distension, poor weight gain, episodes of explosive passage of stools, vomiting , ribbon – like or pellet shaped foul – smelling stools. The major danger is development of enterocolitis ie the inflammation of small and large intestines. Enterocolitis present with: onset of foul – smelling diarrhea, abdominal distension, fever, may lead to perforation and sepsis .It a major cause of death in hours – 30% of cases.

Diagnostic evaluation: History, physical examination ie rectal exam shows no stools in rectum & a tight sphincter .Rectal biopsy – absence of ganglionic cells confirms diagnosis. Barium enema can also be done.

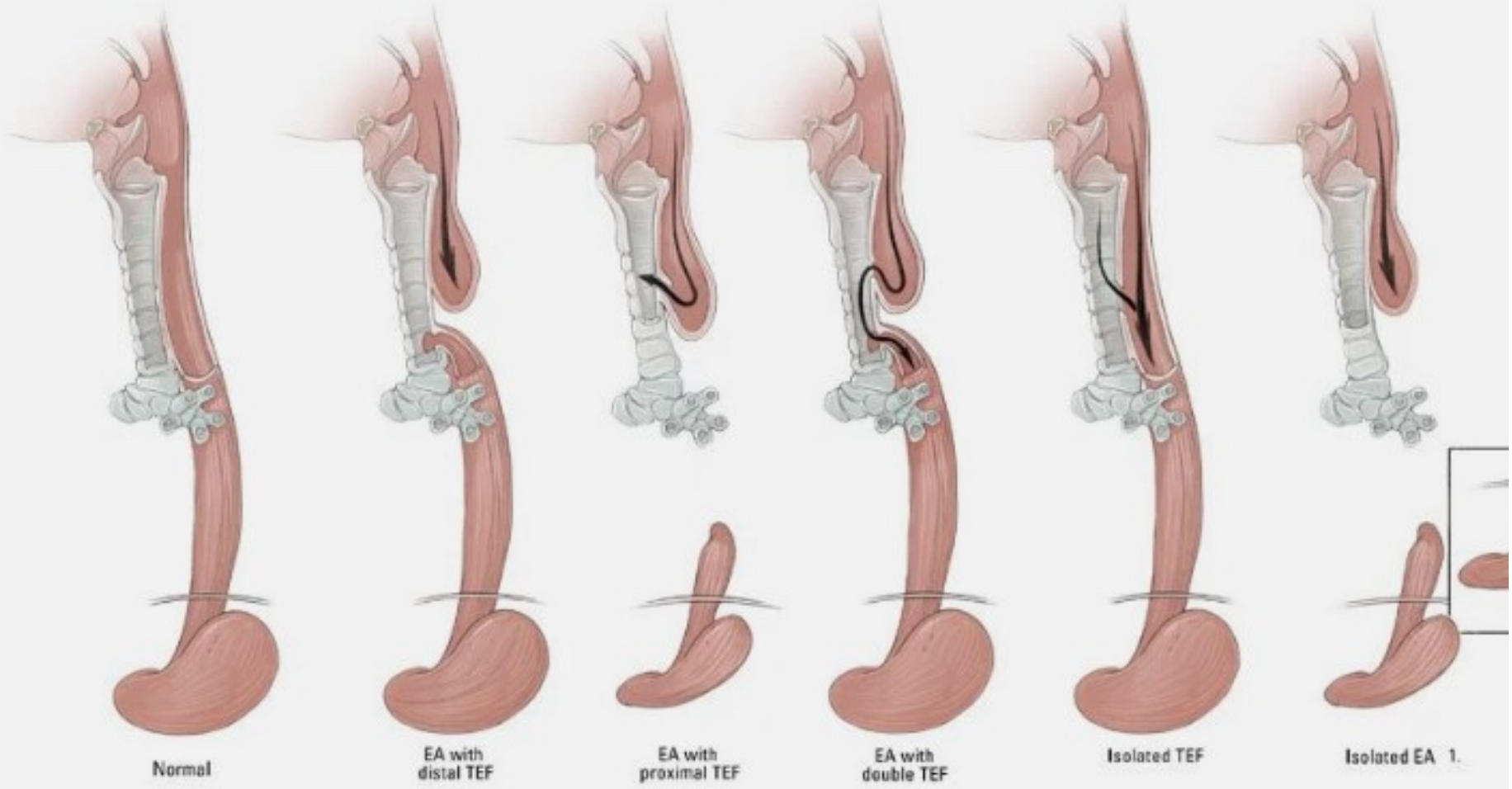
Therapeutic management: Client goes through two stages of operation. Temporary colostomy in normal bowel. In the second stage the aganglionic segment is resected & normal bowel anastomosed to the rectum. Temporarily colostomy is closed. The operation is done at 6-15 months of age .One stage correction has also been done with good results .Pre op & post operative care just like any other patient undergoing GIT surgery. Eg Pre- operative care-Clean bowel – saline enema, NPO, NG tube insertion and antibiotic to decrease flora. Post -operative care-NG tube care, Assess bowel sounds and observe abdominal distension.

OESOPHANGEAL ATRESIA AND TRACHEO-OESOPHAGEAL FISTULA

- Oesophangeal atresia ia a rare birth defect that affects a baby’s oesophagus (the tube through which food passes from the mouth to the stomach).
- The upper part of the oesophagus doesn’t connect with the lower oesophagus and the stomach. It usually ends in a pouch, which means food cannot reach the stomach.it often occurs along with another birth defect called a tracheo-oesophageal fistula, which is a connection between the lower part of the oesophagus and windpipe (trachea).
- This causes air to pass from the windpipe to the oesophagus and stomach, and stomach acid to pass to the lungs.


Oesophagus
Trachea
Oesophageal atresia
Tracheoesophageal fistula

Esophageal atresia



Oesophangeal atresia.

Clinical Features

There is a continuous flow of saliva in the infant's mouth. This is coupled with attacks of coughing and cyanosis. Feeding the infant exacerbates the infant's condition.

Diagnostic Investigation

A fine rubber catheter is passed through the mouth into the esophagus and an opaque dye, known as lipidol, is injected. This is followed by an x-ray, which will reveal the presence of the pouch.

Preoperative Care

- The saliva should be frequently aspirated.
- The infant should be put on an intravenous infusion with glucose and other nutritional fluids such as aminosol(a solution that contains amino acids used for parenteral nutrition in patient who cannot get their nutrition through eating).
- Start the infant on antibiotics such as penicillin to prevent respiratory infections.

Intraoperative phase.

- The operation is performed via the patient's neck or through thoracotomy. The blind ends are trimmed and anastomosis undertaken. In some cases a tube may be passed through the oesophagus into the stomach until the anatomized area heals. The tube may be used for feeding, but often a gastrostomy tube for feeding

Postoperative Care.

- The baby is best nursed in an incubator, which should have the facility for tipping the bottom end and to raise the head (top) during the feeding period.
- The baby should be kept as quiet as possible.
- Aspiration of saliva from the mouth and intravenous infusion should be continued.
- Feed the infant through the gastrostomy tube and ensure maintenance of fluids and electrolytes.
- Postural (involves posture) drainage should be carried out on a regular basis to prevent chest infections.
- Analgesics and antibiotics should be administered as ordered.

Oesophageal Fistula

-This is an abnormal opening of the oesophageal wall. In some cases the fistula and atresia may occur together, involving the trachea.
-Fistulae tend to occur more often in low birth weight babies.
-A history of polyhydramnious (an excessive amount of amniotic fluid) during pregnancy is often a pre determinant. In this condition, the foetus normally swallows amniotic fluid.
-The commonest abnormalities met with in medical practice are a tracheo oesophageal fistula without associated atresia of the oesophagus and a tracheo oesophageal fistula with associated oesophageal atresia.

Clinical Features

•Gastric reflux into the trachea will occur, causing inhalation of secretions and hydrochloric acid, resulting in ulceration of the mucous membrane.

•The baby will persistently cough and choke due to aspiration of gastric content. This may lead to the development of pneumonia.

• Cyanosis is present and respiration disturbed.

•Management of the condition necessitates surgical repair.

Preoperative Care

•The infant should be nursed in the incubator, kept warm and given highly humidified oxygen to relieve respiratory distress and liquefy secretion.

•The infant's head should be slightly elevated and intermittent suction carried out both to the mouth, pharynx and proximal oesophageal pouch.

•The catheter may have to be changed daily by the doctor or irrigated with normal saline.

•At intervals the infant's head may be lowered to facilitate free drainage of secretion.

•You should continue to take and record the vital signs and monitor respiration to analyse the effectiveness of these procedures.

•Antibiotics are administered prophylactically.

Surgical Management.

•As soon as the diagnosis confirms the presence of fistula, a gastrostomy should be performed to decompress the stomach and also serves as a way of feeding after surgery.

•The gastrostomy tube may be left open to permit the escape of air from the stomach. The fistulae are then repaired.

•Attempts should be made to prevent the gastric content entering the lungs. This is achieved by modifying the infant's position.

Postoperative Care

•All the preoperative nursing care given should be continued after the operation.

•Any respiratory difficulties or distress should be reported immediately to the attending physician.

•The gastrostomy tube should be allowed to drain freely by gravity until the second or third postoperative day. It can be used to feed the infant, beginning with glucose and then graduating to a milk formula.

•As the condition improves, oral feeds should be introduced at which point the gastrostomy tube may finally be removed. The nurse should ascertain that the baby can swallow without any problem. Once the gastrostomy tube has been removed and the baby is feeding well orally, their discharge may be planned.

Clinical Follow Up

In three to six weeks postoperatively an oesophagoscopy should be performed to inspect the status of the anastomosis. Oesophageal dilatation may have to be performed if a stricture is suspected.

Advise the parents to monitor the child's progress, especially where difficulties with feeding and swallowing are noted, when the child must be returned to hospital immediately without delay.

DIARRHEA IN CHILDREN

- This is one of the main paediatric emergencies you may have to deal with. In young children, passage of three or more watery stools, with or without blood, in twenty four hours is referred to as diarrhoea, which is also known as gastro enteritis. The latter technically means inflammation of the stomach and small intestine.
- There are two types of diarrhoea: acute diarrhoea mostly caused by infectious agents such as viral, bacterial and parasitic pathogens; and chronic diarrhoea caused by chronic conditions such as malabsorption syndromes, inflammatory bowel disease, immune disease, food allergy, lactose intolerance and chronic non specific diarrhoea or a result of inadequate management of acute infectious diarrhoea.

Diarrhoea is a very common disease, but cases can be quite easily reduced in simple ways, such as improving nutrition in young children and general standards of hygiene within the community. Additionally, providing adequate hydration early in diseases associated with the symptom is necessary. Lack of hydration is the main cause of death in young children if no urgent action
is undertaken.

Pathophysiology. Abnormal loss of fluids and electrolytes from the intestines may occur as a result of gastrointestinal disturbance and this leads to diarrhoea. There are three main factors

First Factor

The first factor is increased fluid secretion from the intestine. Some micro-organisms such as Vibrio cholerae and Escherichia coli produce toxins, which stimulate salt and water secretion from the absorptive villi cells of the intestine. The bacteria stick to the surface of villi cells without penetrating or destroying the cells. This secretory diarrhoea is very strong and accounts for the severe rise in watery stools and rapid dehydration that is seen in cholera and coli form diarrhoea in infants and children. The intestinal walls are still able to absorb foods and water when the child is given these orally

Second Factor

The second factor is poor absorption (malabsorption). Depending on the child's age, about two to eight litres of fluid enter the intestine in twenty-four hours. One quarter of this fluid is ingested from the foodstuff and drinks. The digestive juice produces the rest. Only 50-200 mls of this fluid is absorbed or reabsorbed into the blood stream. The remainder is passed in the faeces.

The stimulation or irritation of the intestine results in rapid passage of the bowel contents. This rapidity results in lack of intestinal enzymes to split sugar, which in turn passes to the large intestine. Here it draws water from the surrounding tissues, causing diarrhoea

Third Factor

The third factor is exudation from the intestine. Some pathogenic micro-organisms such as Salmonella typhi normally cause diarrhoea by penetrating the intestinal mucosa, destroying the cells and sometimes gaining access to the bloodstream. Here the mucosa becomes inflamed and exudation (leakage) of fluids containing serum, pus cells, and blood occurs. In some very serious cases, the ulcers bleed heavily and may perforate causing peritonitis as in typhoid fever

Causes of Diarrhoeal Diseases

There are several causes of acute diarrhoea in children. You will now cover some of these causes in greater detail.

Enteral Infections

This group encompasses several micro-organisms and parasites gaining access to the intestinal tract. Some of these are non pathogenic and are usually present within the tract but may change with circumstances to cause diarrhoea. Some of the organisms and intestinal parasites in this category include escherichia coli (e.coli), schistosoma, crystosporidium associated with HIV, entamoeba histolytica, salmonella, vibrio cholerae, shigella. rotavirus and other types
of viruses.

Parenteral Infections

Any fever in children, and infections which are unconnected to the gastro intestinal tract, can cause diarrhoea or diarrhoea and vomiting. The diseases which fall under the category of parenteral infections include urinary tract infection, pneumonia, otitis media, tonsillitis, malaria and measles.Diarrhoea may be associated with upper respiratory tract infections, urinary tract infections and otitis media.

Dietary

These include overfeeding, introduction of new foods, reinstituting milk too soon after diarrhoeal episode, osmotic sugar from excess sugar in formula, excessive ingestion of sorbitol(complex) or fructose.

Medications
Medications such as antibiotics and laxatives may also result in diarrhoea.

Toxics
Resulting from ingestion of heavy metals such as lead and mercury and organic phosphates.

Functional
Especially Irritable bowel syndrome

Other Factors

•Here the cause may be known or unknown. Causes may include psychological factors, for example, a child who is fearful, anxious and lives under a tense environment may develop diarrhoea due to increased gastro intestinal activities.

• Acute abdominal problems such as intussusception may result in diarrhoea and/or bloodstained stools.

•The ingestion of poisonous substances, which include traditional herbal medicine administered in the community, may also be contributing factors.

• Some children have diarrhoea of unknown origin. Physical and laboratory investigations do not reveal the cause, though if treatment attempts are made to control it just like any other form. Gastro enteritis is associated with feeding defects and vitamin A deficiency.

When a child has developed diarrhoea, investigations should be carried out to exclude parenteral and enteral infections. Dehydration tends to develop very rapidly in children and the degree of this should be carefully assessed. Any dehydration must be corrected.

clinical manifestation

I. History of diarrhoea and vomiting with recent weight loss.
II. Dry mouth, lips, tongue, eyes and skin .
III. Thirst
IV. Sunken eyes and depression of fontanelle.
V. Loss of skin elasticity (turgor). Lift up a skinfold over the abdomen or neck and see whether it sinks back slowly. (Note that loss of skin elasticity also occurs in marasmus.)
VI. Restlessness, apathy (loss of interest in surroundings), coma
VII. Low urine output
VIII. Rapid acidotic respiration
IX. Rapid weak pulse

Management of Diarrhoeal Diseases

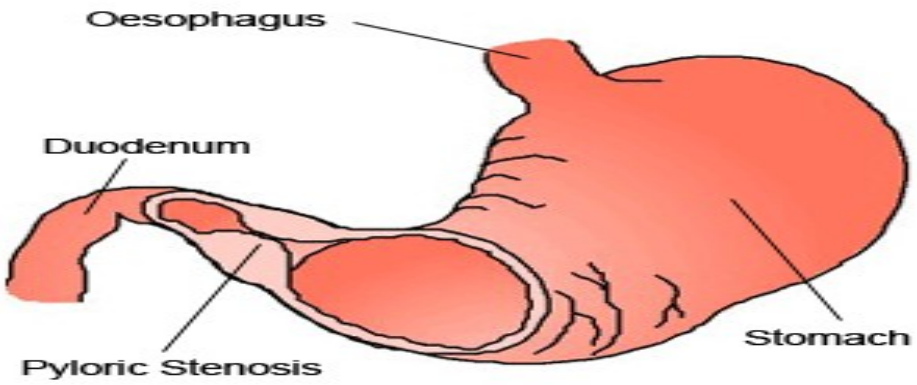
- The major goals in the management of acute diarrhoea include assessment of the fluid and electrolyte imbalance, rehydration, maintenance fluid therapy and reintroduction of adequate diet.
- As the basis of treatment, the child's condition should be assessed and fluid replacement commenced according to the degree of dehydration.
- Their nutritional requirements are maintained as soon as is practical.
- Any parenteral and enteral infections are effectively treated with appropriate antibiotics or drug preparation, whether these infections are either suspected or confirmed.

•The child should be kept warm, while their vital signs of temperature, pulse and respiration are monitored for positive improvement or deterioration of the child’s condition.
• The parents should be constantly reassured.
•An accurate fluid balance chart should be maintained.
• Pay particular attention to the child’s urinary output.
•The child’s personal hygiene must be maintained.
• Ensure the child has a daily bed bath, regular care of pressure areas and change of beddings when they are soiled.

- The nurse in dispensaries and health centres should be on the look out for certain signs, which may dictate the need for referral to the main hospital for further management.
These should include suspected surgical problems such as appendicitis or intussusception or acute dehydration that cannot be managed in a small health facility within 48 hours.
- If a child has had continuous diarrhoea for more than three days where the actual cause cannot be identified, this child requires referral.
- Likewise, any child with chronic diarrhoea or suspected HIV infection or lactose intolerance ought to be transferred to a well equipped health facility.

PYLORIC STENOSIS.

This is an obstruction at the pyloric sphincter caused by hypertrophy of the circular muscle fibres in the pylorus, resulting in gastric stasis and dilatation. The condition occurs soon after birth for unknown reasons.
Pyloric stenosis is a common surgical condition of the gastro intestinal tract occurring in approximately 1 in 150 male infants and 1 in 750 female infants (this denotes a ratio of 1 male to 5 female infants).
It also tends to occur more frequently in the first born children and in some families more than the others. The child is usually normal until three to four weeks old.



pathophysiology.

- In pyloric stenosis, there is a diffuse hypertrophy and hyperplasia of the smooth muscle of the gastric antrum and sphincter, which becomes twice its normal size and is almost cartilaginous in its consistence.
- This pathological change increases the size of the pyloric circulation muscle, which in turn, results in the narrowing of its orifice. This narrowing can be partial or absolute which leads to obstruction.
  The gastric contents cannot, therefore, flow freely through the constricted or blocked pylorus.
- Vigorous peristalsis results in hypertrophy and dilatation of the stomach muscle.

Clinical features.

- Persistent vomiting which gradually increases in severity until it
becomes projectile
- The infant becomes dehydrated and develops hypochlorhydric alkalosis (blood becomes more alkaline than usual because of diminished level of hydrochloric acid)
- Gastritis with some bleeding from the gastric mucosa may also occur
- Loss of weight and constipation may follow
- On physical examination, visible peristaltic movement of the stomach is noticeable over the abdominal wall
- On abdominal palpation a lump can be felt indicating thickened pylorus

Investigations.

- Any investigations should begin with history taking with reference to immediate projectile vomiting which follows feeds. Undertake a physical examination of the child. A radiological study, which may include barium meal, may also be required.
- Blood tests should be carried out to determine serum chloride concentration as well as the pH ,sodium and potassium level.

Nb/// hydrochloric is used as a supplement for low stomach acid that is said to impact a variety of diseases; acne, anaemia, bronchial asthma, diabetes e.t.c...

Mangement.

- Before surgery;
- Due to persistent vomiting, the feeds should be reduced radically. Gastric lavage should be performed at regular intervals using normal saline. An intravenous infusion of 5% dextrose normal saline should be put up and monitored.
- You should also maintain a fluid balance chart.
- The child’s electrolyte balance should be monitored and any deficiencies identified should be replaced accordingly.
- Muscle relaxant (antispasmodic) drugs, for example, atropine methonitrate (eumydrin) 0.6% alcohol solution, administered by a dropper or pipette direct on the tongue at the back of the mouth, may be prescribed to be given fifteen to twenty minutes prior to each feed.

cont

- **Surgical Management**
- The only curative treatment is surgical intervention, known as pyloromotomy (Rammstedt's operation), which should be undertaken as soon as possible, in order to relieve the obstruction.
- The procedure is performed under general anaesthesia or local anaesthesia and involves making an incision through the hypertrophied circular muscle without severing the mucous membrane.

Preoperative Nursing Care

The infant is usually admitted to hospital and because of their lowered resistance to infections, they must be isolated in a cubical, kept warm and the reserve barrier nursing method employed. All the child's carers, including the parents, should be instructed to wear gowns and masks.In preparation for surgery, you must perform the following functions diligently:

- Regularly take and record vital signs. The temperature should be taken rectally.
- Monitor the amount and characteristics of the vomitus and stool.
- Observe for signs of hunger such as the infant sucking the fingers or fist as well as for signs of hyperperistalsis.
- Collect specimens for laboratory analysis as requested by the surgeon.
- Assist with other diagnostic procedures as required.
- Withhold oral feeds, administer and monitor parentaral fluids as prescribed.
- · Perform gastric lavage with normal saline if ordered. In cases where naso-gastric tube is passed and left in situ, the nurse must ensure it is intact and aspiration is performed regularly, recording the content on the fluid balance chart.

cont

- If feeding is ordered preoperatively, the infant's head should be lifted up a bit to prevent regurgitation. Intravenous infusion of 5% dextrose alternating with normal saline, if ordered, must be given and monitored with a lot of care to prevent overloading the child's circulation.
- · Maintain a strict intake/output chart. The solution given replaces the deficit electrolytes such as sodium chloride and potassium. The amount to be given is determined by the metabolic alterations of the individual child.
- · The addictive electrolytes such as oral potassium should be administered correctly according to the dosages prescribed.

cont

- **Postoperative Nursing Care**
- On return from the operating theatre, the care given before the child went in for surgery must be continued.
- More attention should be paid to the provision of adequate fluid and nutritional intake. Intravenous fluids are sustained until the infant is able to take oral glucose, electrolyte solution or breast milk or formula milk. This is usually approximately six hours postoperatively, especially when no further vomiting occurs.
- The infant's head should be slightly elevated after feeding and then should be placed on right lateral position.
- Response to feeds must be recorded.
- You should observe for signs of complications, paying special attention to pulse, skin colour and abdominal distension.

cont

- Before the baby is discharged to go home, the parents should be taught, and encouraged to get involved in, positioning, feeding, observing for vomiting and inflammation around the operation site.
- When the time comes for discharge, the parents should be informed about where to go for follow up and review procedure.
- Feeding the baby after surgery varies from one hospital to another and from one surgeon to another. The principles, however, remain the same. Below is the guideline, which may be applied in most health institutions.

Cont..

Postoperative hours	Type and amount of feeds
4 to 8	5 mls dextrose hourly
8 to 10	10mls dextrose hourly
10 to 12	10mls half strength milk feeds hourly
12 to 18 hourly	15mls half strength milk feeds 2
18 to 24 hourly	30mls half strength milk feeds 2
24 to 30 hourly	30mls full strength milk feeds 2
30 to 36 hourly	45mls full strength milk feeds 2
36 to 42	60mls full strength milk feeds 3 hourly
42 to 48	75mls full strength milk feeds 3 hourly

Cont....

- Thereafter, the baby can be given normal feeds according to accepted weight. If the child is breast fed, attempts should be made to assist the mother to keep the milk supply going. The same feeding schedule should be maintained during the first 48 hours, with a substitute of half strength breast milk. It is also recommended, in consultation with the surgeon, that the baby be put on the breast within 48 hours of the operation.
-

RESPIRATORY TRACT INFECTIONS.

- **Bronchial Asthma**
- This is a very common respiratory disease, which affects the tracheo bronchial tree due to hyper reactivity to various stimuli. It is reversible, episodic and results in obstruction of the airway.
- Although it affects all age groups, it is known to cause chronic respiratory disability in childhood. The onset of childhood asthma normally occurs during the first five years of life. It is more common in boys than girls, but later on, in adolescence, the ratio of boys to girls becomes almost equal.
- The exact cause of bronchial asthma is unknown but many factors are suspected which can be grouped as intrinsic factors and extrinsic factors. One or more of these factors may trigger the onset of asthmatic attack in any individual.
- **Intrinsic and Extrinsic Factors**

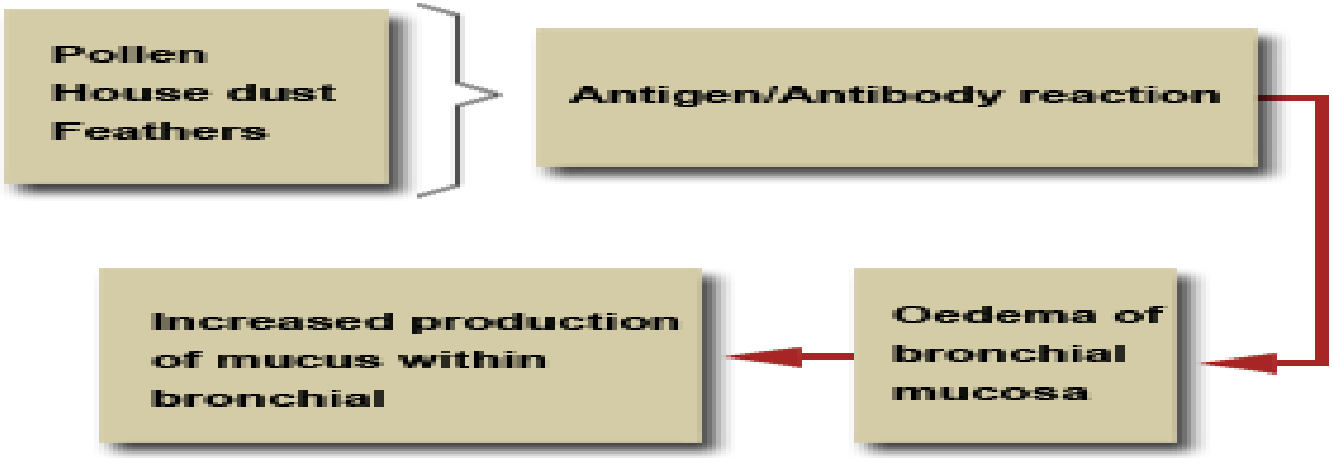
Intrinsic Factors

These refer to some clinical manifestations within the patient, especially those of the airway obstruction. The onset of a bronchial asthmatic attack is triggered by non specific factors. There is no allergic response although a family history of asthma may be present. The triggers to broncho spasm and wheezing may include one or more of the following:

- Viral respiratory infections
- Emotional stress or excitement
- Exercise
- Drugs such as aspirin
- Inhalation of irritating substances such as cigarette smoke, strong perfumes or air pollutants

Extrinsic Factors

The patient may be allergic to certain substances found within the environment. These include inhalation of specific allergens, like house dust, feathers, animal hairs and pollen amongst others. Extrinsic allergies can be detected by performing skin tests using various reagents, which can help to identify the offending substance. A good personal history account may also enable the clinician to associate family allergy to the child's disease. Dia



Pathophysiology

- The underlying pathology in asthma is reversible and diffuse airway inflammation. The inflammation leads to obstruction from the following: swelling of the membranes that line the airways (mucosal edema), reducing the airway diameter; contraction of the bronchial smooth muscle that encircles the airways (bronchospasm), causing further narrowing; and increased mucus production, which diminishes airway size and may entirely plug the bronchi.
- The bronchial muscles and mucus glands enlarge; thick, tenacious sputum is produced; and the alveoli hyperinflate

•Cells that play a key role in the inflammation of asthma are mast cells, neutrophils, eosinophils, and lymphocytes. Mast cells, when activated, release several chemicals called mediators. These chemicals, which include histamine, bradykinin, prostaglandins, and leukotrienes, perpetuate the inflammatory response, causing increased blood flow, vasoconstriction, fluid leak from the vasculature, attraction of white blood cells to the area, and bronchoconstriction
(NHLBI, 1998).

Clinical Features of an Asthmatic Attack

An asthmatic attack can present in several ways:

- The typical asthmatic attack starts gradually and the patient will notice wheezing and shortness of breath on exertion.
- As the condition progresses, the patient's respiration worsens with the slightest effort, leading to difficulties in expelling the air from the lungs on expiration.
- Dry unproductive cough develops, as mucous secretions cannot drain properly, leading to blockage of the smaller bronchioles. When there is chest infection, there may be mucoid sputum.
- The patient becomes increasingly dyspnoeic and exhausted as he uses accessory muscles of respiration.
- There will be cyanosis and sweating.
- The patient becomes anxious, frightened and tense making the condition worse.
- Pulse and respiratory rates are increased.

Diagnostic Investigations

•There is no specific laboratory test for bronchial asthma. However, the following investigations may suffice to confirm the diagnosis. You should be able to accurately take the child's and family history, especially when **wheezing is noted** in the first instance. **History of allergy** in the family predisposes asthma in the child. Other information to record should include frequency; duration, severity, and rapidity of past symptomatic onset of attacks.

•Undertake a thorough physical examination. More often than not, you will find that growth delay is associated with severity of asthma or uncontrolled broncho spasm. You should, therefore, take and record the child's weight and height routinely. During attacks of acute episode, **cyanosis and use of accessory muscles** of respiration must be noted. Blood from a vein should be taken to the laboratory for a white blood cell count, with specific reference to **eosinophil**. This tends to be elevated in allergic conditions.

Nursing Care

- In order to provide nursing care of children with bronchial asthma, you should have a comprehensive knowledge of the ideal process, medical treatment and expected outcome.
- During the acute stage of an asthmatic attack, you should aim at assisting the child towards optimum respiratory functioning, growth and social development. You should provide emotional support and education. You need to ensure that the child is on complete bed rest and is correctly positioned, more significantly, sitting upright and well supported at the back with pillows. This is essential in easing the child’s breathing.

- One nurse or the parent/guardian should always stay by the bedside to provide psychological support. Oxygen should be administered continuously at low rate to counter cyanosis. The child may have to be put on intravenous infusion, with or without added medication, and you should monitor their progress as the care continues.

- Maintain a fluid balance chart to ensure that the child does not become dehydrated from excessive perspiration. A light, nourishing diet with high protein and vitamin content, and oral fluids should be introduced as soon as the condition improves.
- The parents should be reassured and given the necessary support during the period of hospitalisation as they, too, become frightened for the welfare of their child. The child's personal hygiene should be considered at all times, as they will have been sweating during early stages. This should be done by provision of a bed bath once they are settled.

Medical Management

- There are various medications, which may be prescribed for the child with asthma. The most common ones are broncho dilators.
- This category includes adrenaline (epinephrine) given as 1:1000 strength, in a dose of 0.01ml/kg body weight, up to 0.3ml subcutaneously, for three doses at 20 minute intervals during an acute attack. Aminophyllin (theophyllin) with caution may also be given 1-5mg/kg body weight by intravenous route, but can alternatively be added into normal saline infusion and the child observed strictly ¼ hourly.

- Steroid Group

These may be prescribed and given to prevent broncho spasms taking place. They include prednisolone or methyprednisolone in a dose of 2mg/kg body weight intravenously, then 1mg/kg six hours later for status asthmaticus.

- Antibiotics

Broad spectrum antibiotics may be given when there is evidence of respiratory tract infections. A choice can be made from common varieties such as ampicillin syrup. The dose is prescribed according to the age of the child. Your responsibility in drug administration is to ensure they are given on time, in the correct dosage, and to observe for possible side effects.

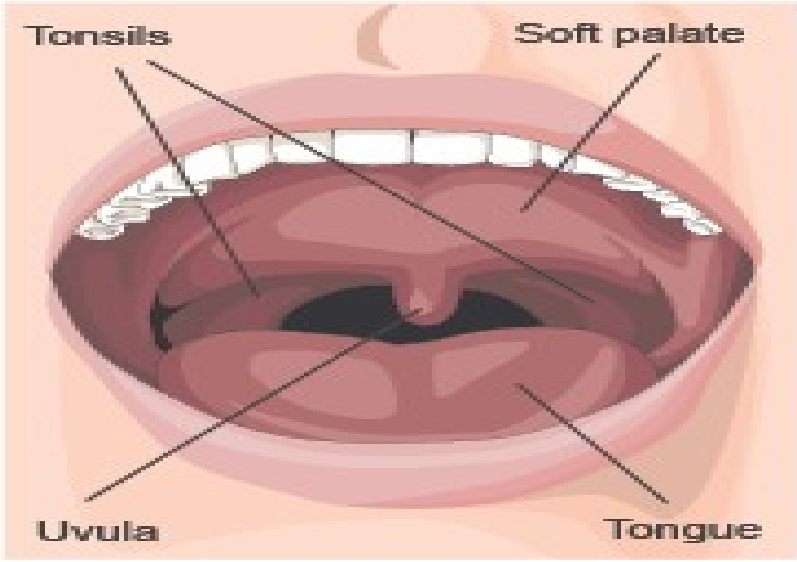
TONSILLITIS

Tonsillitis is normally classified as either acute or chronic.

Acute Tonsillitis

Inflammation of the tonsils is usually an acute infection, which is very common in children, occurring as a result of pharyngitis. It is most frequently caused by haemolytic streptococcus.

Although it is a bacterial infection, the bacteria can also cause enlarged tonsils, which may meet in the midline and obstruct the food and air passages. If the adenoids are also involved, they block the posterior nares resulting in mouth breathing. In addition to this, the eustachian tubes may be blocked resulting in otitis media.



Nursing Care

- The patient should be barrier nursed on bed rest in any comfortable position they choose for the first 24 to 48 hours. A throat swab should be taken to the laboratory to confirm the causative organism before drugs are prescribed.
- During the febrile stage, their vital signs should be monitored and recorded two hourly. Bed clothing and personal wear should be reduced and a cradle used to keep the weight off the patient. An electric fan and tepid sponge may be used to lower the fever.
- Oral care should be carried out four hourly using appropriate approved lotions, such as glycothymoline in saline.

•Oral fluid intake is encouraged and should be given slowly in small amounts at a time. Meals should be warm and in liquid form, so that the patient can swallow without discomfort as all attempts should be made to prevent convulsions. Parents should continually be reassured.

•Crystalline penicillin is given intramuscularly in the early stage and then changed to other oral antibiotics.

•Soluble aspirin syrup is given three times a day. The dose of medication should be calculated in relation to the weight of the child.
NB/You should note that a tonsillectomy is never performed for acute tonsillitis. The child should be isolated from those suffering from the following conditions: congenital heart disease; nephritis and acute rheumatism. This is because streptococcal infections can cause very serious infections to patients with these conditions.

chronic tonsillitis.

As one becomes older, the rate of tonsillitis recurrence decreases. Repeated tonsillitis treated medically may require surgical removal due to the fear that peritonsillar abscesses may form
(Boat et al, 1983).

Tonsillectomy and Adenoidectomy

It is a common practice that when a decision to remove tonsils has been taken, adenoids must also be removed at the same time. The operation is rarely performed on children under the age of three years unless they have developed airway obstruction.

Preoperative Care

•The child and a parent are admitted a day before surgery so that they may get used to the ward environment and to the nurses and so that the child may be fully examined.

• The operation should be clearly explained to the parents.

•The baseline observations of temperature, pulse and respiration are recorded four hourly.

•Any abnormalities noted should be reported to the attending physician.

•A consent form should then be signed by the parents/guardians. A routine urinalysis should be carried out. Mouthwashes should continue to be given up until the morning of the operation.

Postoperative Care

- The child should be placed in a semi prone position, with the head slightly low to facilitate drainage of respiratory secretions until fully conscious. You should observe and report any bleeding from the tonsillar bed, which may be suspected should you see the child repeatedly swallowing. Any vomiting must also be reported to the surgeon.
- Vital signs should be recorded one hourly initially, but later every two to four hours, as the patient's condition improves.

Cont…

- You should pay attention to the patient's breathing.
- Oral fluids should be given as soon as they are able to swallow, but this should only be in small amounts at a time. Fluids may consist of cold drinks such as fruit juice.
- Ice cream is also recommended for its soothing and cooling properties. A mild analgesic, such as aspirin or paracetamol for pain relief, may be given, especially before feeds. Antibiotics are also prescribed. The child may get out of bed the following day, and return home on the second day after operation.

ACUTE OTITIS MEDIA.

Defination and etiology.

Acute otitis media is an infection of the middle ear , usually lasting less than 6 weeks. The pathogens that cause acute otitis media is streptococcus pneumonia, haemophilus influenza and moraxella catarrhalis, which enter the middle ear after the Eustachian tube dysfunction caused by obstruction related to upper respiratory infections, inflammation of surrounding structures eg (rhinosinustis, adenoid atrophy), or allergic reactions eg(allergic rhinitis). Bacteria can enter Eustachian tube from contaminated secretions in the nasopharynx and the middle ear from a tympanic membrane perforation. A purulent exudates is usually present in the ear ,resulting in conductive hearing loss.

Pathophysiology

- Child below 3 years is more vulnerable to OM because have eustachian tube that are wider, shorter, straighter than those of older child & adults.
- Also eustachian tubes are horizontally positioned. Hence; these anatomical features allow micro organisms & nasopharngeal secretions easy access to the middle ear. This lead to inflammation with/without infection.
- Exudates/ fluids is produced and impede middle ear's ability to transmit sound. Enlarged lymphoid tissue may obstruct flow of drainage from middle ear ; pressure in the middle ear increase and rapture of tympanic membrane may occur.

Clinical manifestations: Children who are verbal will express pain. Non-verbal/ preverbal children will express pain by tugging/pulling ear. Others include: fever, diarrhea, irritable, vomiting, URTI may be present. If conductive hearing impairment is present, child is attentive to voices/ noises.

Diagnostic evaluation: Otoscopic exam in the ear AOM shows tympanic membrane as red and bulging. Serous/ purulent fluid visible behind tympanic membrane. .May be absent with chronic OM. Culture with sensitivity testing is conducted ,if drainage in the external canal is present so that to institute appropriate antibiotic therapy identified.

Therapeutic management:

- For Acute OM – antibiotics eg amoxil, cefaclor, co-trimoxazole (Bactrim) for 5-10days. If poor compliance expected, give single dose of IM ceftriaxone (Rocephin).
- Response within 2-3 days but effusion (serous fluid) takes months/weeks to clear.
- There are possible complications: conductive hearing loss & related speech problem; abscess formation in the tissues adjacent to the middle ear, meningitis and septicemia.
- Follow-up for 2 to 4 weeks or earlier depending on the state is important.
- Recurrent OM i. e episodes occurring within 6months need prophylactic antibiotic treatment treat URTI early and influenza/ pneumoccal immunizations.

•Tympanostomy (surgical incision in the tympanic membrane to drain fluid) is indicated if an episode of OM with effusion last longer than 3-4m & associated with loss of at least 20 decibel. Ear plugs used when swimming to prevent water entry. Family education include avoiding second hand smoke it irritates eustachian tube; avoid horizontal position during bottle feeding and adequate breast feeding .

LARYNGO-TRACHEO BRONCHITIS/ CROUP

- This is a combined disease process, which affects the larynx, trachea and bronchi simultaneously. Infections of the respiratory tract are generally not limited to one anatomical area in small children, but affect other areas as well because of the close proximity.

etiology

- Acute infections of the larynx and trachea are more frequent in toddlers than in older children and are considered more serious because young children have a relatively smaller airways, which becomes easily obstructed when the inflammation occurs.
- The inflammation of the larynx and trachea are collectively called croup syndrome, which involves acute epiglottis, acute laryngitis and acute laryngo-tracheobronchitis.

pathophysiology

- In acute-tracheo bronchitis, the onset is gradual. It occurs more frequently in the course of a viral upper respiratory tract illness.
- Sevral virus can cause croup but mostly the parainfluenza virus.
- When it occurs, it may increase in severity within 24-hour period. Maximum airway obstruction occurs below the vocal cords. As mentioned above, young children have smaller and shorter airway.

Cont…

- It is also worth noting that the smooth muscle in the lower respiratory tract still lacks cartilaginous support because this does not develop until adolecence.
- It follows, therefore. That, when infected, there is constriction of the lower airway prompting an increased volume of respiratory secrections. These are the sources of obstruction, which eventually interfere with exchange of gases.

Clinical features

- He/she may have harsh voice, barking or brassy cougu
- Inspiratory rate gradually increases but expiratory rate may sometimes increase as an alternative. This is refered to as a stridor;
- The child is pyrexial with a temprature of 39 degrees to 40 degrees celsus;
- Tachycardia is present as the infection spreads downwards to the bronchi and brochioles moderate. There is persistent airway obsruction with dysnoea where the patient uses accessory muscles of respirations.

Cont..

- Cyanosis, restlessness and anxiety are always present. The patient gradually looks pale.

Nursing care

- The child with laryngo-tracheo bronchitis should be hospitalised and placedin the intensive care in a separate room or cubivle. He/ she should be barrier nursed on bed rest unti his/her condition improves.
- Once the child has been admitted, care must be taken to ensure the cubicle or room is well ventileted, quiet and clean. Only a few visitors or carers should be allowed in the room. They should use all the facilities available for barrier nursing.

Cont..

- You, as the nurse, should constantly be vigilant of the patient’s condition by taking and recording his vital signs, particular emphasis being laid on his respiratory pattern. This is necessary because, should the condition worsen, he/she may be unable to breathe properly and mechanical methods to sustain life will have to be used. These may either be tracheotomy or endotracheal intubation.

cont

- You should, therefore, urgently report any complications to the doctor as soon as they occur. These complications may may include actual or suspected epiglottitis, respiratory disress characterised by progressive stridor, restlessness, rapid pulse rate , hypoxia, cyanosis or pallor or hyperpyrexia in a child who appers toxic.

cont

- While the child remains ill, a nasogastric tube is passed for feeding purposes while intravenous infusion remains in progress. The fluid balance chart should be maintained, paying attention to urinary output. The child’s vital sign of temprature, pulse and respiration are recorded two to four hourly. Humidified oxygen therapy is given, while respiratory sunction is carried out, both whenever necessary.

Cont..

- The position is changed two hourly but try top allow the child the child to assume the position he/she is most comfortable with provided the is clear. Treat pressure araeas four hourly. General hygiene, including frequent oral toileting, should be maintained on daily basis. As the condition improves, most gadgets are removed and patients are mobilised first in bed and gradually out of bed.

Cont..

- If croup is bacterial the child may be prescribed antibiotics, which may have to be administered by injection initially. These may include ampicillin or chloramphenicol. Other broad-spectrum antibiotics may also be considered singly or in combination.
- Corticosteroid e.g dexamethasone or prednisolone can be administered to reduce swelling n the throat.

STREPTOCOCCAL SORE THROAT.

- This is a condition caused by a strain of beta haemolytic streptococci. It is classified as a communicable disease of the respiratory tract.
- The infection can spread from one child to another either by droplets and direct or indirect contact. It has an incubation period of two to five days.
- After the Beta-Haemolytic streptococci have invaded the throat, their toxin from from the site of infection are absorbed into the bloodstream.

Cont…

- Unless the treatment is effectively admnistered early enough, the said toxins cause complications, which may affect other body organs and structures.

Clinical manifestations.

- Fever. Rapid pulse rate and cough, following throat infection;
- There is cellulitis of the throat, which may include the pharynx;
- Headache and dysphagia, delirius and restless.
- Vommiting and thirst ,lymphadenitis,
- The tongue is reddish strawberry-like color and has a white coating on the surface.

Nursing care.

- Nurse in an isolated room, quiet and with fresh air.
- Administer humidified oxygen.
- Plenty of fluid should be encouraged but if there is dysphagia one should give an intravenous infusion of 5% dextrose alternating with normal saline.
- A fluid chart should be maintained.
- Vital signs should be recorded 2 hourly. vommitting should be similarly observed and recorded.

cont

- Cold and heat application to the painful cervical nodes is recommended.
- The patients personal hygiene should be taken care of especially oral care.
- Most importantly antibiotics given promptly to avoid complications of the illness.

Complications of streptococcal sore throat.

- Otitis media
- Mastoiditis
- Meningitis
- Anaemia due to hemolysis.
- Rheumatic heart disease.(is autoimmune.)
- Renal problems (acute nephritis).(is autoimmune)
- Electrolyte imbalance
- Pneumonia, peripheral circulatory collape.
- Abscess formation

BRONCHITIS

- Is an acute inflammation of one or more bronchi in children, which affects those below the age of four years.
- The infection is more prevalent in the younger children than the older ones because the former group have low resistance.
- Although referred to as bronchitis, the trachea, which is anatomically and physiologically related to the bronchi, cannot escape infection when the latter is involved.
- In some cases, it is associated with certain communicable or infectious diseases such as whooping cough, measles and typhoid fever, just to name a few.

Etiology.

- Acute bronchitis may present itself as a mild or severe manifestation.
- It frequently attacks malnourished and debilitated children from overcrowded homes.
- Environmental air pollution, allergic conditions and climatic changes, especially cold months and housing may precipitate the condition.
- the disease is always associated with the upper respiratory tract infections, caused by various types of micro-organisms such as the influenza virus, streptococci, and pneumococci, parainfluenza, adenovirus, rhinovirus, moraxella catarrhalis . Exposure to irritants such as pollution, chemicals,and tobacco smoke.
- Some young children with congenital heart defects or fibrocystic disease of the pancreas also tend to develop acute bronchitis due to their low immunity.

Clinical manifestation.

- generally week unwell.
- Their cheeks and skin may be flushed and their mouth may be dry
- Have dyspnoea leading to restlessness and irritability
- On checking the vital signs, the child will be pyrexial with temperature running between 39 and 40 degrees Celsius, in some cases even above these figures
- The respiration, though increased, is usually shallow due to pleural pain .
- Older children normally complain of anterior chest pain, which may increase with frequent coughing at first
- Later on, the cough may become productive and the patient will be exhausted as a result of the above symptoms.
- Nausea, vomiting and diarrhoea.

Pathophysiology.

- During an episode of bronchitis, the cells of the bronchial-lining tissue are irritated and the mucous membranes becomes hyperemic and edemaatous, diminishing bronchial mucociliary function.
- Consequently, the air passages becomes clogged by debris and irritation increases. In response, copious secretions of mucus developes, which causes the characteristic cough of bronchitis.

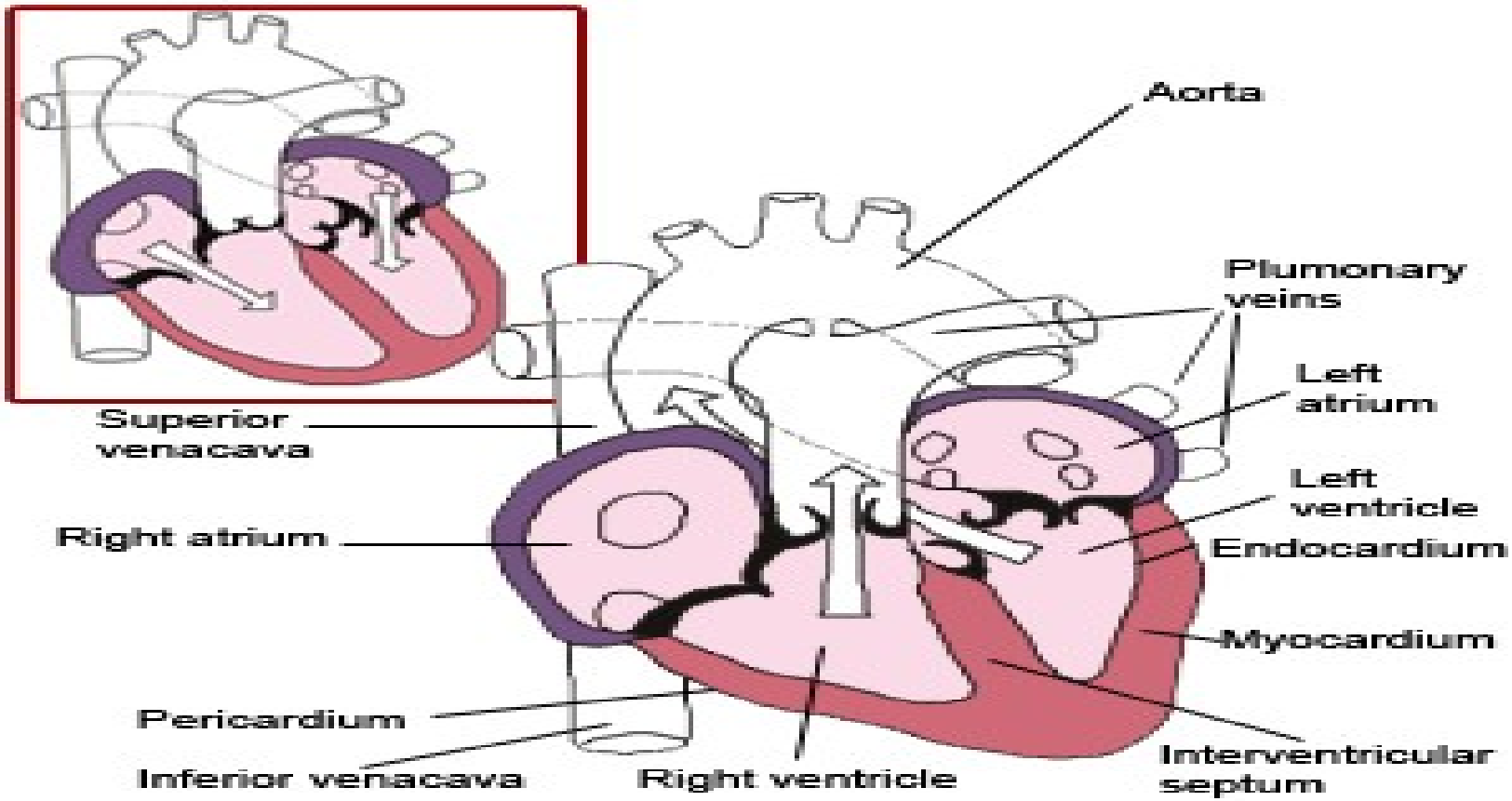
Cont..

- Chronic bronchitis is associated with excessive tracheobrochial mucus production sufficient to cause cough with expectoration for 3 or more months a year for atleast 2 consecutive years. The alveolar epithelim is both the target and the initiator of inflammation in chronic bronchitis.
- **NB/ chronic bronchitis with obstruction must be distinguished from chronic infective asthma. The differentiation is based mainly on the history of the clinical illness: patients who have chronic bronchitis with obstruction present with a long history of productive and a late onset of wheezing, whereas patients with who have asthma with chronic obstruction have a long history of wheezing with late onset of productive cough**.

Management.

- Central cough suppresants (e.g, codeine and dextromethorphan)
- Bronchodilators (eg ipratropium bromide and theophylline)- control of bronchospasm, dysnea, and chronic cough in stable patients with chronic bronchitis; a long acting beta-agonist plus an inhaled corticosteroid can also be offered to control chronic cough.
- NSAIDs for pain.
- Mucolytics- management of moderate to severe COPD especially in winter.
- Give antibiotics if required especially in acute exacerbations of chronic bronchitis.

CARDIOVASCULAR DISORDERS.



CONT....

CONGENITAL HEART:

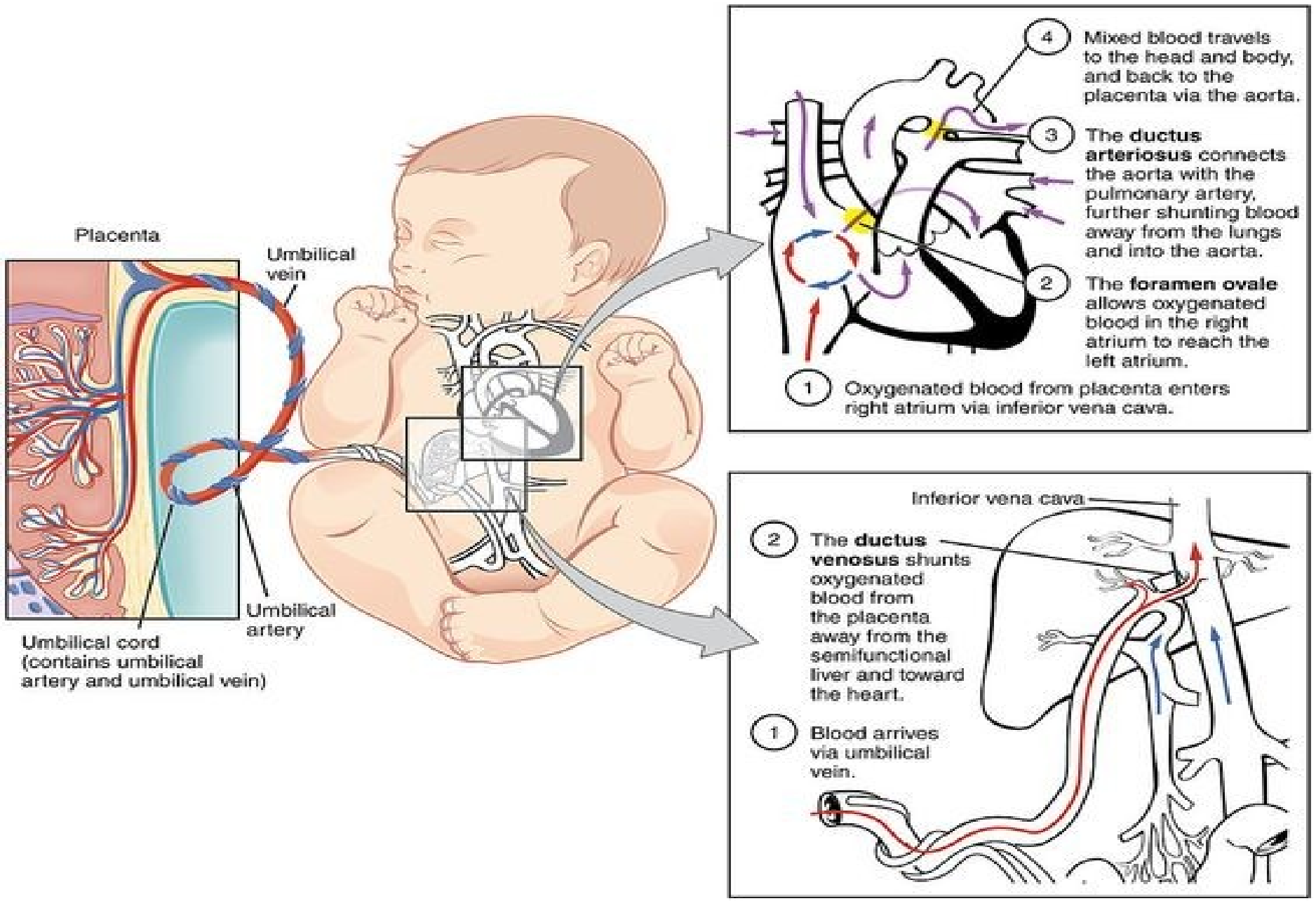
these defects occur in approximately 8:1000 live birth (American Heart Association, 1999).There are a minimum of 35 types of recognized defects. Range from mild e.g. patent ductus arteriosus to complex anomalies e.g. hypoplastic left heart syndromewhich is a variety of deformities characterized by lack of development of the left ventricle secondary to mitral valve atresia or aortic atresia; Left ventricle becomes small, hypoplastic & not capable of any cardiac function.

Cont..

- An infant may have a combination of defects. Majority of the defects are repaired in the first year of life. More complex defects require staged repairs – more than one surgery is required for final correction. For staged repairs – can be done in 2-4yrs.Mild isolated defects may never require surgery e.g. slight vulvar incompetence. Because the heart of a child is the size of the child’s first, intracardiac or open heart surgery can be complex.

Cont…

- To support the child during surgery cardiac pulmonary by-pass (CPB) is implemented. CPB is a treatment used during open heart surgery only, for the repair of many congenital defects as its is a mechanical pump & artificial oxygenator that provides for a short period, substitution of the heart & lungs .Unoxygenated blood removed via vein cannula & delivery of oxygenated blood back to the heart via aortic cannula. The work of the heart is performed by the bypass pump. Let now start by discussing some congenital heart conditions .


Placenta
Umbilical vein
Umbilical artery
Umbilical cord (contains umbilical artery and umbilical vein)
4 Mixed blood travels to the head and body, and back to the placenta via the aorta.
3 The ductus arteriosus connects the aorta with the pulmonary artery, further shunting blood away from the lungs and into the aorta.
2 The foramen ovale allows oxygenated blood in the right atrium to reach the left atrium.
1 Oxygenated blood from placenta enters right atrium via inferior vena cava.
Inferior vena cava
2 The ductus venosus shunts oxygenated blood from the placenta away from the semifunctional liver and toward the heart.
1 Blood arrives via umbilical vein.

PATENT DUCTUS ARTERIOSUS(PDA).

- **Patent ductus Arteriosus (PDA):-**Direct connection between the main pulmonary artery & aorta. In fetus, ductus arteriosus needed for survival.In preterm, a PDA is a common feature depending on developmental maturity. In term newborn ductus begins to close within 12 hours & closed by 2-3 wks. Thereafter, called PDA if not closed.
- When this ductus arteriosus does not close, oxygenated blood from the aorta flows to the pulmonary artery, mixing with the deoxygenated blood there. A large PDA will result in heart failure with all its complications.

Cont…

- It is twice as common in female babies as in males (ratio 2:1). Reasons for its occurrence are unclear. In most cases, the diagnosis may not be made until the child is three to four years old, when the heart murmur may be detected on a routine medical check up.

Cont....

- **Clinical manifestations:** Depend on size of shunt. For small PDA it may be asymptomatic .For large PDA signs of congestive heart failure may be present .eg tachycardia, diaphoresis, edema, decreased pulses, wheezing, orthopnea, ascites, decreased urine output, exercise intolerance and poor weight gain

CONT…

- **Diagnostic evaluation:** Auscultation reveals murmurs in lower left clavicle. Echo cardiogram – studies structures & motion of the heart sound waves are studied. Transducer enables recording of waves on a strip chart.
- **Therapeutic management**: NSAIDS eg indomethacin given as it inhibits synthesis of prostagladins which are responsible for a number of cellular connections.

Maintains potency of the ductus arteriosus in premature infants. Surgical closure for term symptomatic (CHF) infant if indomethacin is not effective here. Prognosis is usually good.

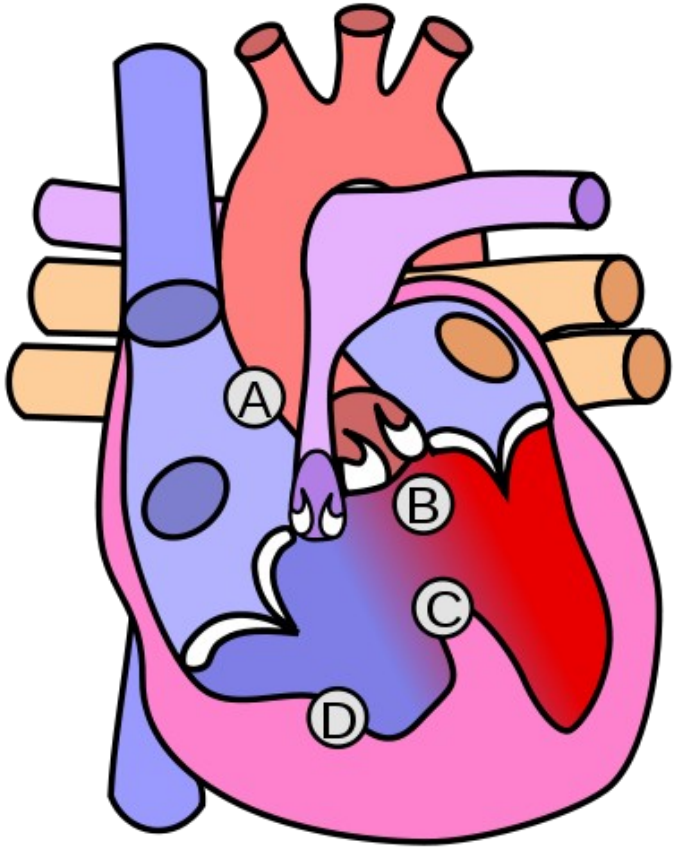
Tetralogy of fallot..

Is a rare condition cause by a combination of four heart defects that are present at birth.

They are:

- Ventricular septal defect (VSD) - abnormal connection between the right and left ventricles .Defect can be located in various positions along the septum. Very common congenital heart defect comprising of 20% overall. Small VSD (75-80%) close in 2 years.
- Pulmonary stenosis - Narrowing of pulmonary valve and obstruction to blood flow from the right ventricle to the lungs. Obstruction can be at:-valve (vulvar), just before pulmonary valve itself (subvalvar), above valve (supravalvar), varying places along the pulmonary artery.
- Right ventricle hypertrophy – due to resistance to pumping blood through the pulmonary artery which is stenosed/ narrowed.
- The aorta overrides the ventricular septal defect (VSD) but this is of little clinical significance but part of these anatomical features of this defect.(the overriding aorta allows blood from both ventricles to enter the aorta.)

Diagram.



Cont…

- **Incidence:** Most common cyanotic defect accounting for approximately 10% of all congenital heart disease.
- **Clinical manifestations:** Depend on degree of pulmonary stenosis .Varying degree of cyanosis. Loud systolic murmur is noted at birth. Hypercyanotic episodes called “tet spells” (suddenly develop deep blue skin, nail and lips after crying or feeding or when agitated) occur due to some activity e.g. crying, feeding and defecating.

Cont..

- **Diagnostic evaluation:** Boot-shaped heart caused by hypertrophy of right ventricle is observed on x-ray. Echo- cardiogram – demonstrates clinical features of TOF & is the best diagnostic tool
- **Risk factors**: a viral infection during pregnancy , such as rubella (german measles), alcoholism during pregnancy, poor nutrition during pregnancy, a mother older than 40 years, a parent who has tetralogy of fallot, the presence of down syndrome or DiGeorge syndrome.

Cont…

- **Therapeutic management:** Surgical correction .Manage hypercyanotic symptoms ie hyper spell – place infant in knee –chest position. For older children they can squat .This decrease systemic venous return of unoxygenated and increase systemic vascular resistance is hope of decrease right-left shunt allowing blood to flow to the lungs.
- Oxygen therapy. Phenylephrine used to decrease vascular resistance .
- Surgical repair at 6-12 months to widen right ventricular outflow tract & close VSD.
- There are some possible complications : residual VSD – leaking, pulmonary regurgitation , arrhythmias , Decrease cardiac output ,cardiac failure and sudden death .

Aotic stenosis.

- A congenital aortic stenosis is the narrowing of the aortic semi-lunar valve caused by an obstructive lesion. This hinders the normal blood flow from the lft ventricleto the aorta. It is more common in male babies tha the female. The thickening of the semilunar valves result in stenosis.

Pathophysiology.

The aotic stenosis causes over-dilation of the left ventricle and back flow of blood to the left atrium via the mitral valve. The backpressure is futher extended to the pulmonary veins resulting in pulmonary vascular congestion.

Clinical manifestations.

- Growth failure in severe cases but could be normal in mild cases.
- Cardiomegally, more marked on the left side of the heart.
- The patient is fatigued due to exercise intolerance
- Dizziness and fainting may occur.
- Pulmonary oedema may be experienced chest pain and cardiac murmur

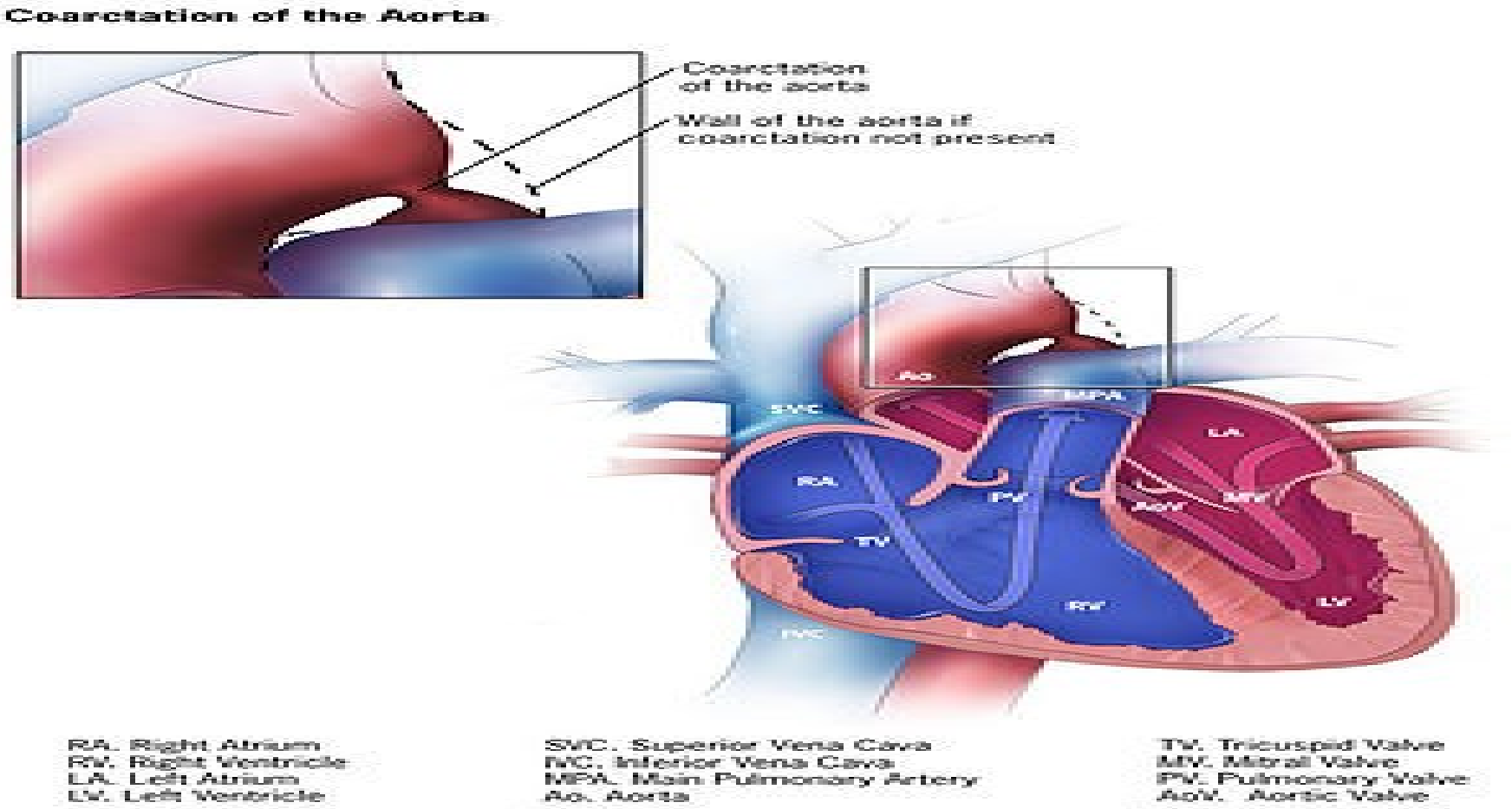
Management.

- The management of the condition entails surgical intervention by operation called valvotomy, which s a method of dividing the fused flaps of the valve. Prosthesis may be required in some cases (valve replacement).
- Open heart surgery is undertaken so that the valve can be seen directly. Post-operative management is best carried out in the intensive care unt with the appropriate equipment.

COARCTATION OF THE AORTA.

- Coarctation also called aortic narrowing is a congenital condition where the aorta is narrow, usually in the area where ductus arteriosus inserts.
- The word “corctation” means narrowing. Coartctaion are most common in the aortic arch.
- The arch may be small in babies with coarctations. Other hearts defects may also occur with coarctation, typically occuring the left side of the heart.
- When a patient has a coarctation the left ventricle has to work harder. Since the the aorta is narrowed, the left ventricle must generate a much higher pressure than normal in order to force enough blood through the aorta to force enough blood through the aorta to deliver blood to the lower parts of the body.

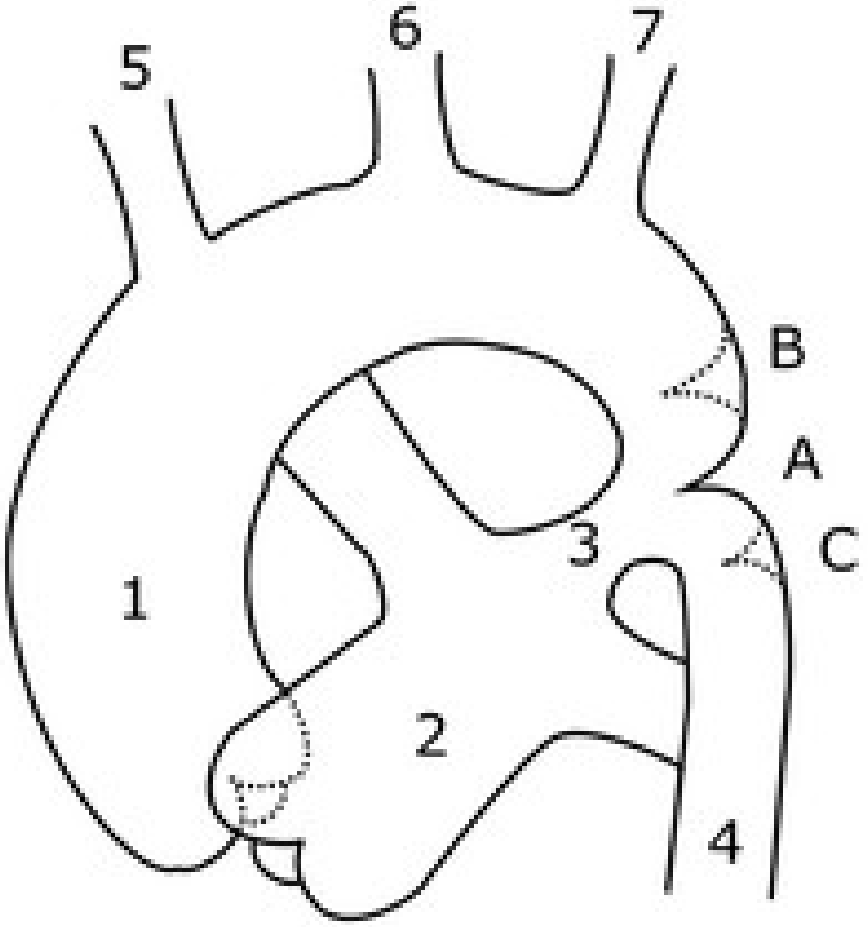
Diagram.


Coarctation of the Aorta
Coarctation of the aorta
Wall of the aorta if coarctation not present
Ao
MPA
SVC
LA
RA
PV
MV
AoV
TV
RV
LV
IVC
RA. Right Atrium
RV. Right Ventricle
LA. Left Atrium
LV. Left Ventricle
SVC. Superior Vena Cava
IVC. Inferior Vena Cava
MPA. Main Pulmonary Artery
Ao. Aorta
TV. Tricuspid Valve
MV. Mitral Valve
PV. Pulmonary Valve
AoV. Aortic Valve

Below is a sketch showing alternative location of coarctation of the aorta;

- A. DUCTAL COACTATOION.
- B.PRE-DUCTAL COARCTATION
- C. POST DUCTAL COARCTATION.

CONT...



Clinical manifestation.

- In mild cases; the chld might not show any s/s and the diagnosis may be confirmeduntil later in life.
- When symptoms are present; they include, difficulty in breathing, poor appetite or trouble feeding, failure to thrive.
- Later on children may develop symptoms related to problems with blood flow and an enlarged heart.
- They may experience dizziness and shortness of breath, faint or near fainting epsodes, chest pain, abnormal tiredness and fatigue, headaches or nosebleeds.
- Have cold legs and feet. They have pain in their leg with exercise(intermitent claudication.)

Cont…

- Arterial hypertension in the arms with low blood preesure in lower extremeties Is classic.
- In lower extremities, weak pulses in the femoral and arteries of the feet are found.

Treatment.

- Treatment is conservertiveif asymptomatic, but may reqquire surgical resection of the narrow segment if there is arterial hypertension.
- In some cases angioplasty is performedto dilate the narrowed artery.
- For fetuses at high risk for developing coarctation, a novel experimentaltreatment approach is being investigated, wherein the mother inhales 45%of oxygen three times a day beyond 34 weeks of gestaton. The oxygen is transferred via the placentato the fetus and results in dilation of the fetus and results inin dilation of the featl lung vessels. As a consequence, the flow of blood through the fetal the fetal circulatory system increases including that through the fetal crculation system increases including that under the underdeveloped arch.

AQUIRED HEART DISEASE.

rheumatoid heart disease.

- Acute rheumatic fever , which occurs most often in school age children, may develop after an episode of group A streptococcal pharyngitis.
- Exact pathogenesis of ARF is unknown. Generally, it's thought to be auto immune response to untreated group A streptococci.
- Autoimmune response specifically affects heart, CNS, joints. In the heart it causes pericarditis, myocarditis, and valvutis can occur. Valvulitis usually affects the mitral valve.
- Valvulitis is responsible for mitral regurgitation. Aortic valve can also be affected and develop insufficiency.
- However, aortic insufficiency without mitral regurgitation is uncommon in ARF. Myocarditis & pericarditis in isolation shouldn't be considered rheumatic in origin because they are never encountered in the fever without vulvar involvement.

CONT...

- Polyarthritis of ankles, knees, hips, shoulders. This unlike other forms of arthritis doesn’t result in permanent disability. Central nervous system manifestations present late even years after initial illness. Inflammation changes in CNS result in chorea (Sydenham’s chorea) which is featured by involutary, purposeless movements of extremities .
- Prompt treatment of “strep” throat with antibiotics can prevent the development of rheumatic fever. The streptococcus is spread by direct contact with oral or respiratory secretions. Although the bacteria are the causative agents, malnutrition, overcrowding, poor hygiene and low socioeconomic status may predispose individual to rheumatic fever.

CONT...

NB/ *Vulvar regurgitation can progress to stenosis, hence requiring replacement with artificial valve.*

Clinical features:

- the child complains of headache,vomiting,moderate fever,fur toungue, sweating and occasionally constipation. These are signs of emerging toxemia. Pulse rate is elevated , corresponding to temrature.
- Manifestastion of valvulitis is the most significant feature- with mitral regurgitation – systoli murmur and aortic insufficiency – diastolic murmur.
- Others include: Polyarthritis that is migratory i.e. moves from one joint to the next.It presents with tenderness, pain, swelling, heat, limited movement on affected joints.
- Erythrema marginatum ie a distinctive, fine, pink rash noted on the trunk & extremities (Never on face), pronounced with heat.It is seen with carditis/ polyarthritis .The subcutaneous nodules are firm, painless over the extensor surfaces of the elbows, knees & wrists. These always occur with carditis, never in

CONT…

Diagnostic evaluation: Use clinical manifestation**,** Lab studies – gp A streptococcal infection through culture but throat culture might be –ve since the child might have recovered by time the fever is suspected. Asymptomatic children might be carriers of strept hence +ve culture may result.

Blood tests also good to test strept infection i.e. antistreptolysin o-titer (ASO)

Echo cardiogram: Good for vulvar disease eg mitral regurgitation.

Echo should be obtained for any child suspected to having rheumatic fever because mitral regurgitation & aortic insufficiency might be silent.

Therapeutic management: The aim of treatment in the acute phase is to **e**radicate organism and decrease inflammation process. Use oral penicillin as the initial treatment.

Aspirin – antiiflammation because polyathritis is not responsive to ibuprofen/ acetaminophen. After acute phase, ASA, should administer antacids because of ASA gastric effects.

Bed rest required till inflammation resolves. Restrict activities because of aortic insuff/ mitral regurgitation.

CONT..

- **Secondary prophylaxis**

Oral penicillin 250mg BID or a monthly IM injection of penicillin.This is done for at least 10 years or more.Its important because of recurrence which can induce severe cardiac damage. Compliance is very difficult as many clients feel it's not necessary to continue the treatment. Aortic and mitral value replacement require in adulthood.

Nursing management aspects include: Unless there is severe heart failure, acute rheumatic fever is managed as an outpatient. Timely identification vital for recurrence prevention. Throat infection treated timely & full dose taken to avoid under treatment. Vigilance for Sign and symptoms of the disease. Follow up is vital.

NB/ **Education is the most important nursing intervention for this disease.**

HEART FAILURE.

- Heart failure in childhood is usually acute but may later become chronic, if not dealt with effectively and promptly.
- Heart failure is commonly caused by anaemia, pulmonary diseases and/or inflammatory lesions of the heart, which can cause carditis. Acute heart failure in children needs to be recognised early and treated immediately in order to preserve life. The very young may collapse within hours or days, whereas the older children might fight for their lives for several weeks or months before the condition becomes serious.

Cont.

- LEFT SIDED FAILURE;
- The left side of the heart is responsible for receiving oxygen rich blood from the lungs and pumping it forward to the systemic circulation (rest of the body except the pulmonary circulation.)
- failure of the left side of the heart causes blood to back up into the lungs, causing respiratory symptoms as well as fatiguedue to insufficient supply of oxygen.
- Common signs of are increased breathing rates, rales and cracles, pilmonary edema (fluid in the alveoli), cyanosis, laterally displacedapex apex beat , heart murmurs, dysnea, othopnea.

RIGHT SIDED FAILURE.

- Is often due to pulmonary heart disease (cor pulmonale), which is usually caused by difficultes of the pulmonary circulation, such as pulmonic stenosis.
- Presents with; edema, ascites, and liver enlargement, jugular venous pressure, jaundice and also coagulopathy may occur.

Signs and symptoms.

- Cyanosis and pallor of the mucous membranes
- The infant may become dyspnoeic with rapid respiration
- Sweating and tachycardia.
- A persistent cough accompanies breathlessness and this leads to production of thick viscid secretion, which may block the airway if not sucked out immediately
- The infant becomes restless and irritable and often throws their arms above the head in an attempt to improve respiration
- Difficulties in feeding, which is often slow and rarely completed

Cont…

- The infant tends to put on weight in spite of refusal to feed. This weight gain is brought about by the fluid retention, which results in oedema
- Abdominal distension and vomiting may be present
- Jugular venous distension is marked if congenital cardiac failure is developing
- Tachycardia
- Hepatomegaly

Treatment.

- **Digoxin (Lanoxin)**
  This is given according to body weight. The most recommended
  dosage is an initial digitalizing dose in the first 24 hours 0.1mg/kg
  body weight. The first dose is half the total, followed by a second
  dose, which is a quarter of the total, followed by a third dose,
  which is a quarter of the second or the previous total. A maintenance
  dose of 0.02 mg/kg body weight in 24 hours is recommended.

Cont…

- **Frusemide (Lasix)**
  A quick acting diuretic is given to facilitate excretion of urine.
  The recommended dose is 0.5 mg/kg body weight IM.
  Then 2mg/kg body weight orally. Due to rapid fluid and potassium depletion when this drug is used, extra potassium should be administered on a daily basis.

Cont…

- **Morphine Sulphate**
  This is commonly given to older children to sedate the patient and to reduce metabolism. The recommended dose is 0.2mg/kg body
  weight six hourly when necessary.
- **Chloral Hydrate**
  This mixture is a relatively useful sedative for the restless, anxious older child to ensure rest is maintained.

Cont..

- **Antibiotics**
  These are also administered as a prophylactic measure to guard against infections.

URINARY TRACT PROBLEMS AND DISORDERS.

Acute glomerulonephritis

- This is sudden inflammation of glomeruli within the kidney which results in acute renal failure. Glomerulus gets damaged, hence referred as intrarenal acute renal failure. It may affect glomerular capillaries or membrane.

Cont…

- **Incidence/ Etiology:** Rare in <3yrs and peak at 7 years. More common boys: girls 2:1.
- Infectious agent is usually in the body 2-3wk before clinical manifestation.
- It could be bacterial (streptococcus group A-commonest) E.g. acute post streptocccocal

glomemlonephritis or viral.

Cont…

Pathophysiology: Viral or bacterial agents invade body.

- Immune system produces antibodies against them.
- Antibody/ antigen reaction in the kidney glomeruli forms immune complexes and inflammation occurs.
- End result is scared/ damaged glomeruli.
- Membrane permeability altered by immune response – protein leak into urine.
- Glomeruli filtration rate decreases.
- Sodium and water are retained and oedema occurs.

Cont…

- **Clinical manifestations:** hematuria, dependent & periorbital edema, diminished urinary output, proteinuria, Increased BP, fatigue ,decrease filtration, increased serum Na^+ level & increase K^+ levels, BUN & creatinine increase, low grade fever and urine becomes blood- tinged, smoky or tea coloured.

Cont..

- **Diagnostic evaluation**: Based on clinical manifestations above, physical examination, immunologic tests to detect streptozyme and Serum complement

Therapeutic management.

- Depend on degree of kidney damage. The aim is to treat source of inflammation, maintain fluid & electrolytes and maintain BP within normal range.
- **Note: Do a thorough physical examination to know the source of inflammation**

Cont..

- For a child with normal BP & urine outputs, you can manage at home.
- Those with oedema, increase Bp, oliguria, hematuria are hospitalized because acute renal failure may occur.
- If there is generalized oedema diuretics need to be used.
- Increased BP use antihypertensives.
- Dietary restrictions based on degree of BP & edema eg Na^+, K^+, fluids.

Nursing management.

- The patient should be put on complete bed rest in a warm well ventilated room untl his/her temprature subsides, the blood pressure falls and no blood or protein is visible in the urine.
- Vitals should be monitored regularlarly. BP should be taken lying down and standing to exclude postural hypotension.

CONT...

- The nurse should maintain input and output chart and report any negative balance.
- Restrict the patients fluid intake to 500mls in 24 hrsplus the amount of urine passed during that period. Aim being to lessen kidney activity.
- Urine should be tested four hourly for protein and blood. 24 hour urine collection to estimate the amount of protein lost in the urine may be sent to the laboratory.

Cont..

- The nurse shoould weigh the patient daily as a means of determining whether the edema is decreasing.
- The nurse should pay particular attention to the hygiene of the skn, mouth and pressure areas.
- Antipyretics are administered for pyrexia.
- Antibiotics usually penicillin V OR benzylpenicillin are recommended for sorethroat or any other respiratory diseases.

Cont..

- occupational therapy and psychological care are also inportant.
- finally while providing care to the patient, you should be a ware of the main complications that may present, which in this case are chronc nephritis and acute or chronic renal failure.

Cont..

Nephrotic syndrome

- Clinical entity characterized by massive proteinuria and hypoalbuminemia leading to edema and hyperlipedemia

Cont…

Types:

- Idiopathic (primary) – due to glomerular disease of kidney. The most common type.
- Secondary – renal malfunctioning due to systematic disease, drugs or toxins e.g. hepatitis, systemic lupus erythematosis, lead poisoning, child cancer therapies – put stress on the renal system.

Cont…

- **Etiology :** More common in males than females ie 2:1.It commonly affects those aged between 2-6yrs.Idiopathic type is thought to be immune response while the other is caused by infections, drugs and toxins as discussed above.

Cont…

- **Pathophysiology:** The inflammation process from immune response or disease makes glomeruli to become permeable to proteins (protenuria).Fluid shift from intravascular to intestinal space which subsequently leads to odema/ ascites, hypovalemia

Cont…

- **Clinical manifestations:** Just as child with renal failure it will cause edema, anorexia, abdominal pain & tenderness due to inflammation of kidney, abdominal swelling and fatigue.

Cont…

- **Diagnostic evaluation:** Dependent upon proteinuria. Urinalysis shows protein, red blood cells, serum albumin, serum cholesterol, triglycerides, creatinine, hematocit, platelet count.

Therapeutic management.

The aim of management to reduce protein, oedema and prevent infection.

- The mainstay of treatment is corticosteroids e.g. prednisolone which decrease inflammation and loss of proteins hence restoring oncotic pressure and promoting diuresis .The period of treatment is usually 4-8wks.
- Relapse is a possibility. Immunosuppresants e.g. cyclophosphanide, chlorambucil and cyclosporine are used. A weekly WBC is also necessary if a patient is on immunosuppresants.

Cont..

- Antibiotic may be required incase infection due to excessive use of steroids.
- Diuretics like frusemide can be used but because they can cause a decrease in Na^+ K+ & hypovolemia monitoring electrolytes closely is important. Or potassium sparing diuretic can be administered.
- Decrease salt intake because of edema & increased blood pressure.

Cont..

- **Nursing considerations:** Maintain fluid &electrolytes, administer medication and prevent infection and skin breakdown.

RENAL FAILURE.

- **Acute Renal failure** (ARF): Sudden onsets of impaired renal function. Most children with ARF regain function. ARF classified according to part o renal system affected, thus we have;
- pre -renal,
- intra- renal and
- post- renal failure.

CONT...

- **Etiology /incidence:** ARF is uncommon but can be life threatening.
- **Pre- renal** – sudden decrease in renal blood flow or perfusion to kidney. Common cause include; DH_2O, hypovolemia,shock, sepsis, renal artery obstruction .

Cont…

Intra-renal.

Intra renal is due to damage of kidney tissues . That is damage to the glomeruli or the kidney tubules. Acute tubular necrosis (ATN) is the most common type of intrinsic ARF.

- Characteristics of ATN are intratubular obstruction, tubular back leak (abnormal reabsorption of filtrate and decrease urine flow through the tubule.), vasoconstriction, and changes in the glomerular permiability.
- These processes result in decrease of GRF, progressive azotemia and fluid and electrolyte imbalance.

Cont..

post renal, it’s due to obstruction of urine at some point between kidney & urinary meatus.

- It’s on outflow obstruction that cause “back-up” of urine and put pressure on endothelial lining & ultimately diminishing renal function.

PRE-RENAL FAILURE

- Volume depletion resulting from; hemorrhage, renal losses(diuretics, osmotic diuresis), gastrointestinal losses (vommiting , diarrohoea) ,
- Impaired cardiac efficiency resulting from; myocardial infaction, heart failure, dysrhythmias, cardiogenic shock.
- Vasodilation resulting from, sepsis, anaphylaxis, antihypertensive medications.

Intrarenal failure

- Myoglobinuria (trauma, crush injuries, burns).
- Nephrotoxic agents such as aminogycoside antibiotics such as (gentamicin, tobramycin).
- Infectious processes like acute pyelonephritis and acute glomerulonephritis.

Post-renal failure.

- Urinary tract obstruction, calculi(kidney stones), benign prostatic hyperplasia, strictures, blood clots.

Cont..

- **Clinical manifestations:** electro & fluid imbalance, metabolic acidosis, dehydration, Pallor, lethargic, anorexia, vomiting and seizures.

Cont…

- **Diagnostic evaluation**: Through history, laboratory evaluation and physical examination.
- Urine output varies from scanty to a normal volume, hematuria may be present and the urine has a low specfic gravity (compared to with the normal value of 1.010 to 1.025). – one of the earliest manifestations of of tubular damage is the ina bility to concentarte urine.
- Patients with pre-renal zotemia have decreased amount of sodium in the urine (less than 20 mEq/L.)

Cont..

- Patients with intarenal azotemia usually have urinary sodium levels greater than 40 mEq/l with urinary casts and other cellular debris.
- The BUN level increases steadily at a rate dependent on the degree of catabolism (breakdown of protein), renal perfusion, and protein intake.

Cont..

- With decline in the GFR, oliguria and anuria, patients are at high risk for hyperkalemia. Protein catabolism results in the realease of cellular potassium into the body fluids, causing severe hyperkalema. Hyperkalemia can result to dysrhythmias, such as ventricular tachycardia and cardiac arrest.

Prevention of acute renal failure

- Provide adequate hydraton to patients at risk gor dehydration.
- Prevent and treat shock promptly with blood and fluid replacement.
- Monitor central venous arterial pressures and hourly urine output in critically ill patients.
- Treat hypotension promptly.
- Prevent and treat infections promptly infections can cause renal failure.

Cont…

- Pay particular attention to wounds, burns and other precursors of sepsis
- To prevent infections from ascending in the urinary tract, give meticulous care to patients with indwelling catheters.
- To prevent toxic drug effects, closely monitor dosage, duration of use, and blood levels of all medications metabolised or excreted by the kdneys.

Cont..

- **Therapeutic management:** The aim is to restore renal perfusion and correct electrolyte and fluid imbalance .Management modalities include: fluid & Na^+ restriction if increased, dialysis if there is congestive heart failure or severe increase blood pressure.
- Metabolic acidosis and hyperkelemia need to be corrected.

Cont..

Nutritional therapy;

- ARF causes severe nutritional imbalances (because nausea and vommitting contribute to inadequate dietary intake)., impaired glucose use and protein synthesis, and increased tissue catabolsim.
- The patient is weighed daily and loses 0.2 to 0.5 kg daily if the nitrogen balance is begative (that is; caloric intake falls below caloric requirement.) if patient gains weight fluid retention should be suspected.
- use of high carbohydrate diet which will spare protein breakdown.

Nursing management.

- **Monitoring fluid and electroly te balance**.- hyperkalemia is the most life threatening electrolyte imbalnce in renal failure. The nuurse should check for jugular vein distenstion,alterations in heart soundsand increased difficulty in breathing.
- **Reducing ,metabolic rate** by giving complete bed rest.
- **Promoting pulmonary function-** the patient is is assisted to turn, cough and take deep breaths frequently to prevent atelectasis and respirartory infections.

Cont..

- **preventing infections-** asepsis is essential with invasive lines and catheters to minimize the risk of infections and increased metabolism. Avoid foley catherizaton.

- **Providing skin care-** the skin may be dry or susceptible to breakdown as a result of edema;therefore meticulous skin care is important.

chronic renal failure....

chronic Renal failure (CRF): Progressive disease. Irreversible damage has taken place for 50% renal function & the condition has lasted for at least several months.

- if considered permanent/ irreversible – end stage renal failure (ESRF) is diagnosed. Chronic renal failure first progresses to uremia (where toxic nitrogenous waste products, blood urea, creatinine build up in system) and if not reversed the patient will to ESRF.

Cont…

Etiology:

- It is associated with prematurity, nephrotoxic medications e.g. aminoglycosides, renal obstructions, glomerulonephritis, and pyelorephritis.
- Immunological dysfunction may also cause injury to renal system. Pathophysiology is variable and depends on cause.

Cont…

Clinical manifestation.

- Fluid & electro imbalanace ,
- dehydration ,oedema,
- metabolic acidosis (poor pH regulation in the proxima tubules)
- systemic increase in blood pressure,

Cont…

- anemia, Pallor, fatigue, (erynthropoietin is not being procud by kidneys.)
- anorexia, vomiting,
- slowed linear growth, organic failure to thrive,
- renal bone disease/ osteodystrophy (vitamni D metabolite , 1,25-dihydroxycholecalcirerol is not being produced in the body, and also due to calcium and phosphate imbalace ie incresed born resorption of calcim causing vascular calcification.)

Cont…

- **Diagnostic evaluation:** Is through history, laboratory evaluation and X-rays of long bones to detect any osteodystrophy.
- **Therapeutic management**:
- the aim is to restore & maintain fluid & electrolyte balance.
- For edema restrict fluid and use diuretics ,
- increase in blood pressure use antihypertensives, restrict proteins ,
- vitamin D supplement used to boost ca^{++} levels to deal with bone disease.
- If above treatment fail renal dialysis is done or renal transplantation is done.

- Phamacological therapy.
- Calcium and phosphorus binders; calcim carbonate the binders is administered with food.
- Antihypertensives and cardiovascular agents is given.e inotropic agents, fluid restriction, sodium restriction.
- Antiseizure agents.
- Erynthropoietin to crrect anemia.

UTI.

- This infection occurs in infancy affecting both girls
and boys equally. In the first years of life, however, more girls than boys are infected because the former tend to have shorter urethra.
- Children tend to suffer more from lower urinary infections, that is, infections of the urethra and bladder.

Cont…

- The micro-organisms commonly responsible for urinary tract infection are Escherichia coli (E. coli).
- They ascend from the vulva and urethra to the bladder. Occasionally, as the problem develops, the ureters and renal pelvis are involved resulting in pyelonephritis.

etiology.

There are many predisposing factors, but only a few are directly responsible for childhood urinary tract infections. These include ;

- congenital abnormalities of the renal tract, especially those that interfere with the flow of urine, for example, hypospadias and epispadias.
- Meningomyelocele and paralysis of the urinary bladder, especially those associated with spinal injuries (paraplegia) are also common causes.
- Unrecognized phimosis
- local infections due to injuries caused by children playing or inserting foreign bodies into their own genitalia may also be causal factors. LOL!!!!

pathothysiology.

- The *Escherichia coli* (E. coli) is the most common causative micro-organism but others may also be responsible.
- The infection begins in the lower portion of the urinary tract, causing inflammatory changes and involving the sphincter valve at the base of the bladder.
- This makes the valve incompetent and results in urinary reflux to the ureters. The reflux allows upper urinary tract infections to occur, causing a gradual dilatation of the renal pelvis. Recurrent bladder infections cause tissue irritation, which makes the patient have desire to frequently micturate.

Clinical manifestation.

The patient with a urinary tract infection will present with some of the following symptoms:

- There will be burning painful micturition (dysuria)
- Lower abdominal pain and desire to pass urine more frequently
- The patient is pyrexial and irritable
- An unexplained persistent fever
- Diarrhoea and/or vomiting
- The child is usually restless and unable to sleep at night. They may cry frequently
- Urine passed may have foul smell and be bloodstained
- Loss of appetite

Diagonistic procedures.

- Commence by taking a concise personal history from the parents, guardians or older siblings. Carry out a physical examination and order a laboratory urinalysis for microscopy culture and sensitivity, blood and albumen.

Cont..

Medical Treatment

- The following medication may be prescribed:
- **Septrin (co-trimoxazole) syrup**
  Dosage: Six weeks to five months – 120mg BD x 14 days.

  Six months to five years – 240mg BD x 14 days.
- **Sulphadimidine mixture/tablets**
  Dosage: 100mg/kg per day six hourly x 14 days.

Cont…

- **Nitrofurantoin (furadantin)**
  Dosage: 3 - 5mg/kg tds up to 400mg per day x 7 days.
- **Other antibiotics**
  Amoxycillin 50mg/kg per day (in divided dose given qid).
  Ampicillin 50mg/kg per day (in divided dose given qid).

- Ciprofloxacin, ceftriaxone, azinthromycin, and doxycycline.

Nursing management…

- Unless the child looks very ill with high temperature, they should be managed at home as an outpatient.
- If in hospital, the child should be nursed on bed rest until they are a pyrexial. Temperature, pulse and respiration are taken and recorded four hourly.
- You should report any abnormalities to the doctor as soon as possible. The child should be given plenty of oral fluids to flush the urinary system.

Cont…

- General skin hygiene, especially in the genital area should be emphasized.
- A high protein diet should be encouraged. Oral toilet on a four hourly basis is also maintained.
- In case there are indications of chronic urinary tract infections, an x-ray investigation of the renal system must be performed.

Inguinal hernia and hydrocele.

These conditions are similar in clinical manifestations and treatment

.Inguinal hernia is a scrotal or inguinal swelling or both that include abdominal contents.

The incidence is 10-20: 1000 live births.Common in boys than girls 4:1.

Incidence increase with prematurety & Low bith weight.

Those receiving peritoneal dialysis due to increased abdominal pressure are also at higher risk.

Infantile Inguinal hernia is diagnosed in first month of life. Hydrocele occurs in 6% of full term boys.

etiology/.

- inguinal hernia occurs in the lower abdomen; a sac of peritoneum, containing fat or part of the bowel, bulges through the weak part (inguinal canal) of the abdominal wall.
- Inguinal hernia occurs when abdominal contents exit Peritoneal cavity & protrude into processus vaginalis (a fold of peritoneum that precedes the testicle as it descends through the inguinal canal into the scrotum) .

Cont..

- An incomplete processus vaginalis at birth allows peritoneal fluid/ abdominal contents to enter the scrotum which result in hydrocele/ hernia. Processus vaginalis follows same descending pathway of the testes into the scrotum.common clinical manifestation include:

Cont…

- Inguinal hernia – cause bulge/swelling in scrotum/ groin – size increase with increased abdominal pressure.
- Pain if strangulated – possible necrosis & perforation – irritability, vomiting, abdominal distension, tachycardia.
- If hydrocele is present: Scrotal swelling is painless & doesn’t change in size/ shape when abdominal pressure increases with or by cough, cry. It is not reducible & easily transiluminated.

Cont…

- The diagnosis is made through physical examination of scrotum,
- Differentiated by; hernia is – boggy, reduced by pressure & reducible (usually) while hydrocele – fluid filled, feel tense and not reducible.

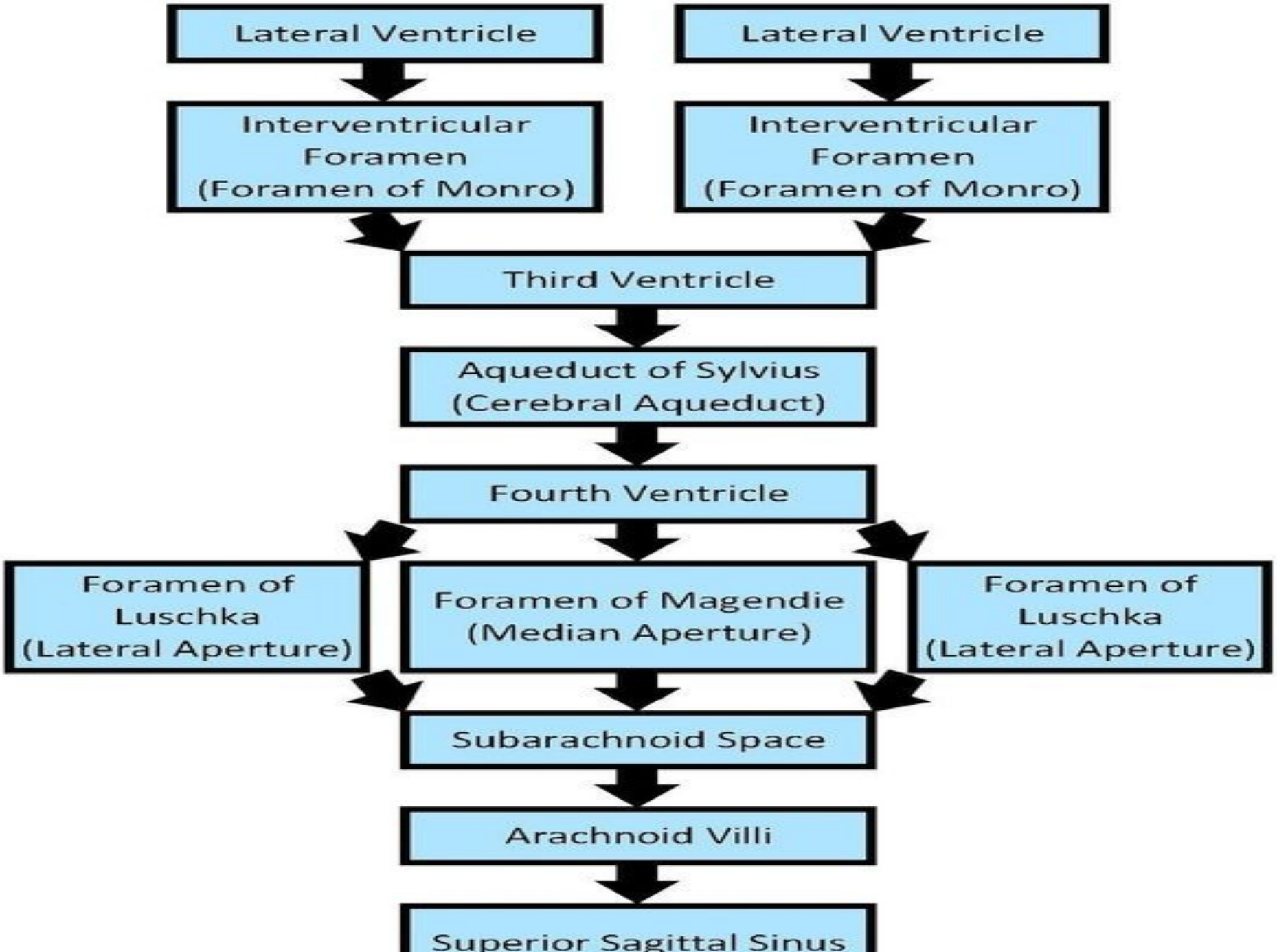
Cont..

- **Therapeutic management**: Inguinal hernia herniorrhapy is done outpatient basis.For hydrocele it resolvess within 1 year of age-spontanouesly. If not, means hermia present & repair same – hydocelectomy.

HYDROCEPHALUS.

The brain contains four irregular-shaped cavities, or ventricles, containing cerebralspinal fluid;

- Right and left lateral ventricles
- The third ventricles
- Fourth ventricles.


Lateral Ventricle
Lateral Ventricle
Interventricular Foramen (Foramen of Monro)
Interventricular Foramen (Foramen of Monro)
Third Ventricle
Aqueduct of Sylvius (Cerebral Aqueduct)
Fourth Ventricle
Foramen of Luschka (Lateral Aperture)
Foramen of Magendie (Median Aperture)
Foramen of Luschka (Lateral Aperture)
Subarachnoid Space
Arachnoid Villi
Superior Sagittal Sinus

The lateral ventricles

- They lie within the cerebral hemispheres, one on each side of the median plane just below the corpus callosum. They are separated from each other by a thin membrane, the septum lucidum, and are lined with ciliated epithelium
- They communicate with the third ventricle by interventricular foramen.

The third ventricle.

- The third ventricle is a cavity situated below the lateral ventricles between the two parts of the thalamus.
- It communicates with the fourth ventricle by a canal, the cerebral aqueduct.

Fourth ventricle

- The fourth ventricle is a diamond- shaped cavity situated below and behind the third ventricle, between the cerebellum and pons.
- It is continuous below with the central canal of the spinal cord and communicates with the suarachnoid space by foramina in its roof.
- Cerebral spinal fluid enters the subarachnoid space through these openings and through the open distal end of the central canal of the spinal cord.

csf

- CSF is secreted into each ventricle of the brain by choroid plexus. These are vascular areas where there is proliferation of blood vessels surrounded by ependymal cells in the lining of ventricle walls.
- CSF passes back into the blood through tiny diverticula of arachnoid mater, called arachnoid villi (arachnoid granulations) which project in to the venous sinuses.

In hydrocephalus

- The volume of csf is abnormally high and is usually accompanied by increased ICP.
- An obstruction to the CSF is the most common cause.
- Its described as ;

- ***communicating*** when there is free flow of CSF from the ventricular system to the subarachnoid space. Interference is with absorption of the cerebro-spinal fluid in the arachnoid villi. In this type, the obstruction is outside the ventricular system.

Cont…

- ***non-communicating*** when there is not, i.e; there is obstruction in the system of ventricles, foramina or duct. Causes:
- -congenital defect-developmental, for example, Arnord Chiari malformation and aqueduct stenosis
- -aquired defects , for example, cerebral abscess, compression of the aqueduct by either aneurysm or hematoma, brain tumor of either cerebellar haematoma, brain stem haematoma and /or colloid cyst

Management..

- A physical exam should be undertaken to a certain the extent and seriousness of the condition, taking into account the infants age and period of the onset.
- the head circumference (occipital-frontal circumference) should be regularly measured.
- medical treatment with acetazolamide should be commenced to reduce production of csf in mild cases of hydrocephalus.

Cont..

- repeated lumbar puncture should be performed to maintain normal cerebral spinal fluid pressure.
- surgical intervention may be undertaken, depending on the severity of the condition.This consists of the removal of obstruction such as tumours, cysts and haemorrhage (hematoma).

Cont..

- When progression of hydrocephalus is established , ***surgical intervention*** should be considered.
- This consists in shunting the cerebral fluid past the obstruction. The best result are currently obtained by a ventriculo-atrial or ventriculo-peritoneal shunt with a pump and one-way valve.

Cont..

- Complication of the shunt would include blocking of the tubes an infection and will require removal of the foreign body as well as administration of antibiotics.
- Another procedure that may be performed is a ventriculostomy, which involves the destruction of the third and fourth ventricle or the choroid plexus.

Pre-operative nursng care.

- The nurse monitors the signs of increased intracranial pressure and reports to the surgeon any changes,
- Nurse should continuosly monitor the head circumfrence.
- The nurse should palpate the fontanelles gently for possible separation of sutures and tension.
- Vital signs should be taken and recorded (TPR/BP). Any deviation should be reported immediately.
- The chld’s behavoural changes, including persistent cries should be recorded and reported.
- Regularly change the child’s position in bed to prevent bedsores 2 hourly. the head should be supported when being moved.

Post –operative nursing care.

- The pre-op care should continue after surgery, in addition to routine postoperative care.
- Immediately after surgery, vital signs should be monitored and recorded in one-hour intervals,paying particular attention to increasing intracranial pressure (bloodpressure/ pulse rate , temperature and respiration rate carefully noted). Other neurological observations, for example, the assessment of the level of consciousness should also be continued.

Cont…

- The dressing on the operation site should be checked regularly.
- You should always ensure that the chld lies on the good site to pevent pressure on the shunt valve. Alternatively, he or she should lie flat on his or her back. Careful regular feeds should be given. Parental education should be continued from admission to discharge.

SPINA BIFIDA

- This is a congenital abnormality, which results from a defect in the formation of the skeletal arch enclosing the spinal cord. Although it may occur in any part of the spinal column and on the skull, it is more common in the lumbar region.

Diagram.

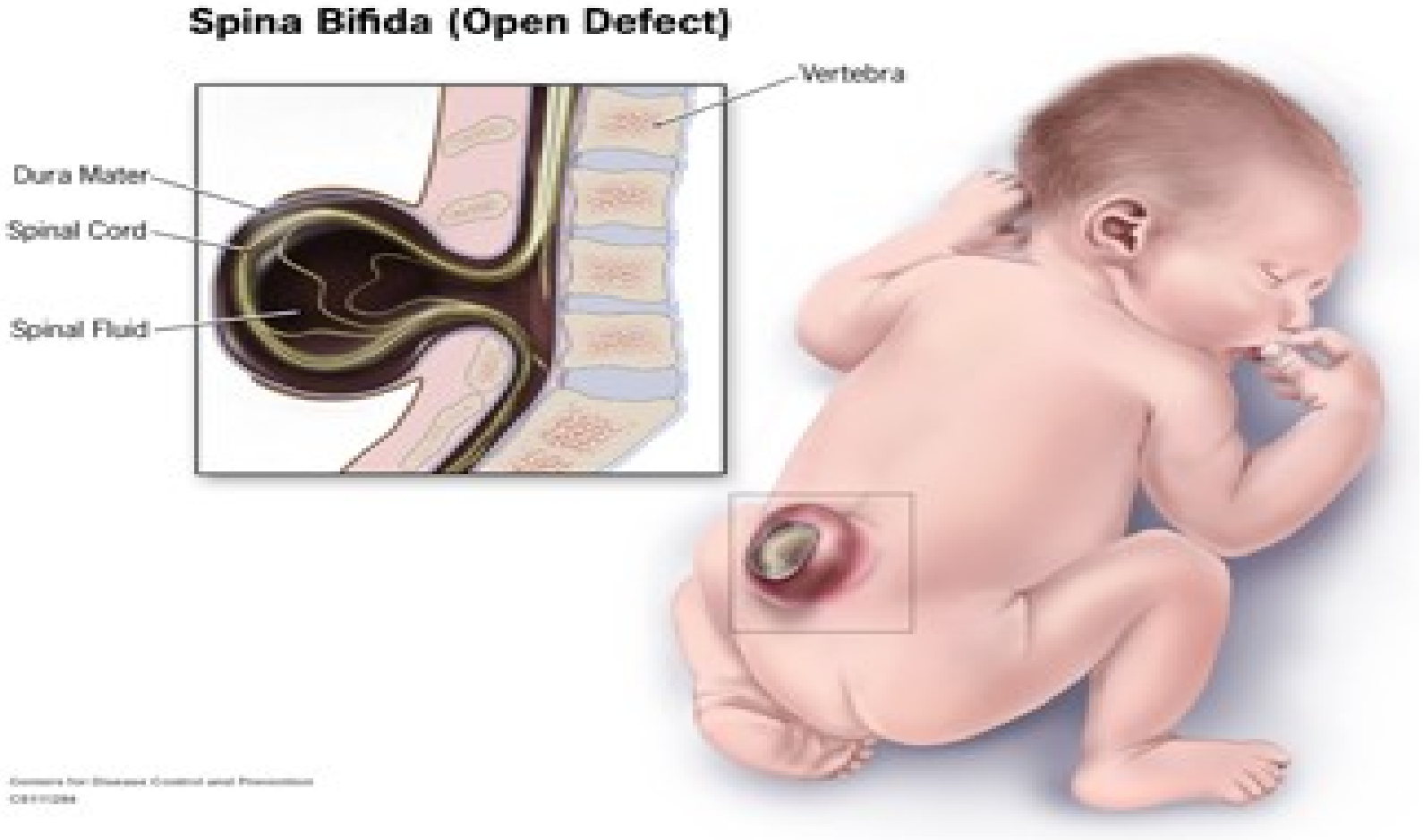
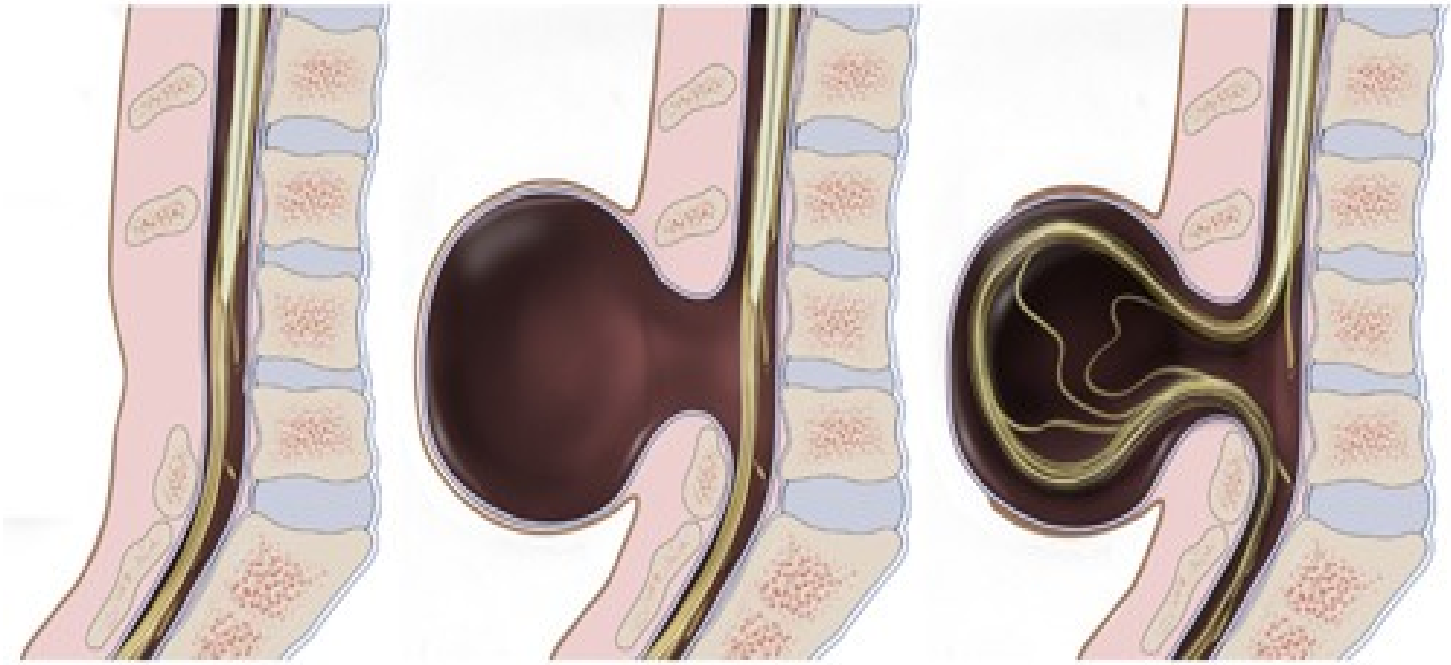

Spina Bifida (Open Defect)
Vertebra
Dura Mater
Spinal Cord
Spinal Fluid

Diagram.



Spina bifida occulta

Meningocele

Myelomeningocele

Etiology.

- The causes are not known, although the condition is associated with dietary deficiency of folic acid at the time of conception.
- This neural tube defect may be of genetic origin or due to environmental factors; e.g, irradiation, or maternal infection (rubella) at a critical stage in development of fetal vertebrae and spinal cord. The effects depend on the extent of the abnormality.

pathophysiology.

Spina bifida is a common developmental defect of the central nervous system occurring in 1-2 of every 1000 newborn infants. The posterior portion of the lamina of one or more vertebrae fails to fuse with or without defective development of the spinal cord, and tends to occur mostly in the lumbar or lumbo sacral region.

Cont…

Spina bifida oculta.

- In the milder type (spina bifida oculta), there may be no need for any medical intervention while in the meningocele and meningomyelocele surgical intervention is
called for.

Cont…

Meningocele.

- The skin over the defect is very thin and may rupture after birth. There is dilation of the subarachnoid space posteriorly. The spinal cord is correctly positioned.

Cont…

Meningomyelocele.

- The meninges and spinal cord are grossly abnormal. The skin may be absent or rupture . In either case there is leakage of CSF, and the meninges may become infected . Serious nerve defects result in paraplegia and lack of sphincter control causing incontinence of urine and feaces. There may also be mental impairment.

Cont..

- AFP- Stands for alpha-fetoprotein, a protein the unborn baby produces. This is simple blood test that measures how much AFP has passed into the mother's bloodstream from. A high level of AFP might mean that the baby has spina bifida. An AFP test might be part of a test called the 'tripple screen' that looks for neural tube defectsand other issues.

Cont…

- Ultrasound
- Aminocentesis- a sample of of amniotic fluid. High levels of AFP might mean that the baby has spina bifida.

Management.

- Since meningomyelocele occurs more commonly than the other two forms, and is more severe in its clinical presentation, surgery is indicated and should be performed at the earliest opportunity to prevent possible neurological damage.

Pre/post op care.

- The objectives of care should be to prevent infection and injury to the sac, skin damage and urinary tract infection, which is likely to occur. These are achieved by performing aseptic technique dressing using warm normal saline until the operation is performed. The dressing should be changed at least four hourly.

Cont..

- You should continue with your assessment of the child's general condition, paying particular attention to the musculo skeletal functions, which may occur due to exposure of the nerve fibres. The vital signs should be taken and recorded every two to four hours and any deviation from norms reported to the surgeon.

MICROCEPHALY.

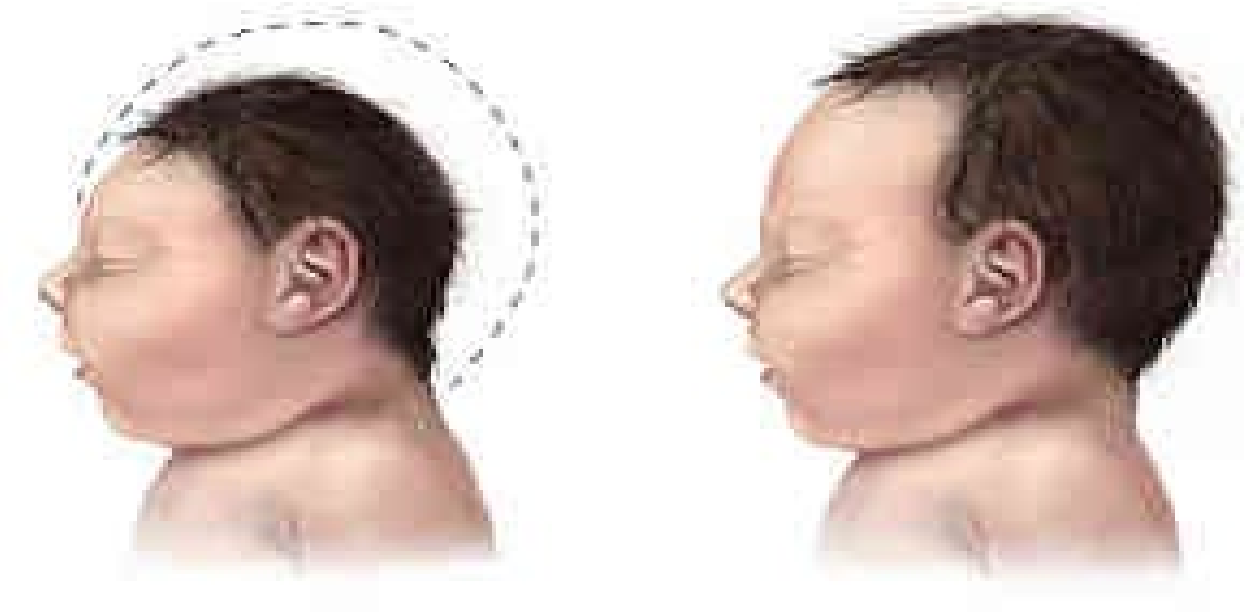
Microcephaly

- This is a relatively uncommon congenital condition where there is a defect in the growth of the brain. The size of the brain becomes three times smaller than normal. There are several predisposing factors which include:

Cont…

- Foetal radiation
- Maternal phenylketonuria, which is an inherited metabolic amino acid phenylalanine because the liver has failed to release an enzyme called phenylalaninase
- Congenital infections may also contribute to this condition, for example, syphilis, neonatal herpes, rubella
- Intrauterine or neonatal anoxia

CONT..



Cont…

- The condition presents in several ways: the ears are relatively large, the forehead slopes backwards and the head appears smaller.

Cont..

- Microcephaly has been linked with the following problems;
- Seizures
- Developmenta delay,such as problems with speech or other developmental milestone like sitting, standing and walking.
- Intellectual disability
- Problems with movement and balance
- Hearing and visual loss.

Cont…

- **Nursing Management**
  There is no treatment available for this condition. Parents should be supported and made to understand that.
- Therapies like helping with speech, occupational and physical therapies.
- Sometimes madication also are needed to treat seizures or other symptoms.

CEREBRAL PALSY.

- Is a disorder of the movement, muscle tone or posture that is caused by damage that occurs to the immature, developng brain most often before birth.
- In general, cerebral palsy causes impaired movemnt associated with abnormal reflexes, floppiness or rigidiity of the limbs and trunk, abnormal posture, involuntary movement, unsteady walking or some combination of these.

s/s

- The disability associated with cerebral palsy may be limited primarily to one limb or one side of the body.
- The brain disorder does not change with time, so the symptoms usually doent worsen with age.
- However muscle shortening and muscle rigidity may worsen if not treated aggressively

Cont…

- People with cerebral palsy may also have;
- Difficulty with vision and hearing, intellectual disabilities , seizures, abnormal touch and pain perception, oral diseases, mental health conditions and urinary incontinence.

causes

- Mutations in genes.
- Maternal infections.
- Fetal stroke a disruption of blood supply to the developing brain.
- Infant infections that cause inflammation in or around the brain.
- Traumatic head injury
- Lack of oxygen to the brain (asphyxia.)

Risk factors.

- Maternal health; german measles, chickenpox, cytomegalovirus, herpes, toxoplasmosis, syphillis, exposure to toxins, zika virus infection.
- Fetal illness; breech births, complicates liver and delivery, low birth weight , multiple babies. Premature birth.

complications

- Contractures
- Mulnutrition- swallowing or feeding problems can makeit difficult for someone who has cerebral palsy, particularly an infant.
- Mental health problems; people with cerebral palsy may have mental health conditions, such as depression and isolation.
- Lung disease.

Cont..

- Osteoanthritis- pressure on jonts or abnormal allignment of joints from muscle spacity may lead to early onst of painful degenerative bone disease.
- Ostopenia-fractures due to low bone density can stem from severalcommon factors such as lack of mobilty, nutritional shortcomings ana antiepileptic drig use.

diagnosis

- Physical examiinatin
- Brain scans like; MRI- an MRI uses radio waves and a magnetic field to produce detailed 3-D or cross-sectional images of child’s brain.
- Cranial ultrasound
- Electrencephalogram
- Lab tests to screen genetic or metabolic problems.

Management;

- therapies
- Physical therapy.- for muscle training and exercise.
- Occupational therapy- using alternative strategies and adaptive equipment, occupational therapies work to promote child’s independence.
- Speech and language therapy
- Recreatioal therapy.

Cont…

- Surgery.
- severing nerves -that supplies the spastic nerves a procedure called selective dorsal rhizotomy. Ths relaxes the muscle and reduces pain.
- Othorpeadic surgery – children with severe contracturesor deformities may need surgery on bones or joints to place arms, hips or legs in the correct order.

CONT...

- Medications.
- When spacity is isolated to one muscle group , onabotulinumtoxinA injections (***is made from a bacteria that causes botulism. the botulism toxins blocks nerve activity in the muscles, causing temprary reduction in muscle activity.***)is given directly into the muscle, nerve or both.
- For generalized spacity –if the whole body is affected , oral muscle relaxants may relax stiff , contracted muscles. These drugs include ; diazepam, dantrolene and baclofen.

Child abuse/neglect..

- Health care workers especially doctors, nurses and social workers must be on the lookout at all times during their clinical practice for signs of child abuse or neglect. Although these problems are known to exist in the world, incidence has increased in terms of numbers and frequency.

Cont…

- Additionally, societies have become more open and it is now easier to expose cases of child abuse than ever before. The media have been increasingly vocal in pointing out incidents of child abuse.
- The health care worker must be constantly vigilant to be able to detect, investigate and report to the rightful authorities so that remedial activities can be taken before further injuries are inflicted to the helpless children.
- It may be argued by some that certain activities affecting children are merely cultural practices carried out in some African traditional societies to maintain their way of life. The problem is that the children’s consent has never been sought.

Child’s right.

The United Nations has come up with a list of basic children's rights, which should be observed and protected, by all world member countries. They are summarised as follows:

- The right to live
- The right to acquire a name and nationality
- The right to enjoy parental care
- The right to proper food and health care
- The right to education
- The right to be protected from all kinds of harm
- The right to moral upbringing
- The right to a culture

Types of child abuse and neglect.

- There are different types of child abuse and neglect, including physical abuse, neglect and abandonment, sexual abuse, emotional and psychological abuse.
- Nutritional abuse can well be incorporated within one of the first four. These abuses may occur singly or in combination. The different types of abuse will now be covered in more detail.

Physical Abuse (battered baby syndrome or battered child syndrome)

- This is the most common form of child abuse, which is easily recognised by health care workers and lay persons alike. The child displays non-accidental injuries on their body. The majority of victims in this group are infants or pre-school children.

Cont..

- About 60-70% are below three years old in Europe and America, while in Africa the age goes up to five years.
- The child’s behaviour is abnormal, demanding too much attention, behaving aggressively or withdrawn.
- The child may have a chronic illness or be physically disabled.
- Some of these children may belong to single mothers who had unwanted or unplanned pregnancies and are unable to cope with the strains
of motherhood.

Cont…

- Various types of injuries may be observed. These include burns, cigarette burns, cuts, bruises, lacerations, fractures and bites. Some of these injuries may be in the healing stage while others may be fresh.
- This is an indication of repeatedly inflicted injuries. Injuries are predominantly seen in the genital areas, buttocks, back, limbs, face. Ruptured internal abdominal organs and fractured skull may also be identified.

Cont…

- Physical abusers may include individuals suffering from stress, alcoholics, mentally ill individuals, those who were themselves battered in childhood or drug addicts.

How might you manage a child that has suffered physical abuse?

- Once child abuse is detected or suspected, the child should be removed to a safer environment and involve the health care worker and children's departments.
- The child needs to be hospitalised in order to undergo a thorough physical and mental assessment to detect other previous injuries that may have been sustained.

Cont..

- This detection is necessary in case of legal action being taken against the person who inflicted the injuries on the child.
- When a child is admitted to hospital, an x-ray, physical examination, medical or surgical treatment should be carried out as appropriate.

Cont..

- The parents or guardians will require counselling especially if they are the ones causing injury to the child.
- The child's nutritional status should be improved before being transferred to a children's home or a foster home.
- These transfers are usually undertaken with the approval of the ***court of law, the Children's Department and Probation Office.***

Cont..

- It is recommended that the offenders or abusers undergo corrective measures instead of a punitive corrective approach. Many, if not all, are referred to psychiatrists for assessment and assistance.

Child Neglect and Abandonment

- In African societies, this problem was unheard of until a few decades ago.
- This problem has been brought about by social changes, which have led to the gradual erosion of extended family ties.
- Children who are abandoned are usually malnourished and may have other diseases as a result of low resistance to infection.

Cont..

- A great number of factors have contributed to this social problem in developing countries.
- Often both parents are economically unable to meet their basic needs due to poverty.
- Additionally, some children are brought up by single parents, who may not be able to earn enough to support their family.
- Perhaps the problem originates from the death of a spouse or a divorce, which leaves the remaining partner unable to provide for the family.

Cont..

- The children of physically and mentally handicapped mothers may be abandoned if they are unable to cope with the demands of motherhood.
- In certain conditions, a child may be separated from the mother for a prolonged period as a result of imprisonment.
- Similar problems may also be noted when a mother is an alcoholic.

Management of Neglected and Abandoned Children

- A child needs love, accommodation and food. You should make an effort to provide these in the health care facility while arrangements are being made to provide a suitable home for the child outside the hospital environment. Apart from these, medical treatment is provided as appropriate.

Sexual abuse..

- Child abuse is a form of child abuse in which an adult or older adolescent abuses a childfor sexual stimulation.
- Sexual abuse refers to the participation of a child in a sexual act aimed towards the physical gratification or financial profit of the person commiting the act.

Cont..

- Forms of child sexual abuse include asking or pressuring a child to engage in sexiual activities (regardless of the outcome) indecent exposure of the genitals to a child, displying pornography to a child, actual sexual contact with child, physical contact with child’s genitals, viewing of the child’s genitalia without physical contact, or using a child to produce pornography.

Management..

- Less than 10 percent of substantiated child abuse cases have physical findings on examination; therefore , the history is most important part of the sexual abuse evaluation.
- Documentation should include the childs exact words.

Cont..

- An examination should be done promptly if a child with suspected maltreatment complaind of dysura, anal and vaginal bleeding, vaginal dischargeor pain on defeacation.
- A through physical examination should be performed at a time of initial interview if the reported incident occuured less than 72 hours.

Cont..

- Examination should be done by health care professionals familiar with forensic examinations (experienced primary care physicians , emergency department personnel, or sexual assault nurse examiners).
- Examination under anaesthesia should be considered for acutely assaulted prepuberal girls with persistent vaginal and rectal bleeding or severe abdominal pain.

Emotional abuse.

- Emotional abuse may be the most difficult form of abuse to recognize in clinical practice.
- It develops as a result of repeated damaging interactions.
- The office on child abuse and neglect defines emotional abuse as abuse that results in demonstratable harm (e.g impaired psychological growth and development.) of a child.

Cont..

- Several sub-types of emotional abuse including; rejection, isolation, terrorrism, ignorance, psychological unavailability, corruption and inappropriate expectations of or demands on the child.
- Patterns of behaviour that should raise concern about the possiblity of emotional abuse include social withdrawal, excessve anger and aggression, eating disorders, failure to thrive, developmental delay and emotional disturbance e.g(depression,anxiety, fearfullness, history of running away from home.)