

Tuberculosis in children

A. Learning objectives:

1. be able to list the immunological differences in child and adult.
2. be able to recall the changes after infection
3. be able to recall the symptoms and signs of various form of tuberculosis
4. be able to recall the diagnostic criteria for tuberculosis.
5. be able to recall the treatment protocol for tuberculosis

B. Questions and history:

History one:

Kale aged 9 returned home on day and said he had fallen on his right leg. There was no obvious injury and next day he appeared well. About a month later he began to drag that leg and complained of pain in the groin. This limited his movement and he walked with a limp. On examination there was some wasting of the right thigh. All movements of the right hip were restricted particularly abduction. His blood shows the raised ESR, with the TLC of 6500/cmm and the differentials of P45% and L 55%. Chest x-ray showed a healing primary lesion in the right lung. X-ray of the right hip showed narrowing of the joint space and some erosion of the acetabulum.

What further investigation you would like to do?

How will you treat this child?

History two.

Sarita age six had toothache. She then developed and alveolar abscess with a painful swelling of the submandibular lymph node draining the area. The tooth was removed. The abscess subsided. But the lymph node could still be felt although it was no longer tender. She was treated with antibiotics but the swelling become more prominent. Two weeks later Sarita awoke unusually early and vomited. The next day she was rather irritable and vomited again. She then complained headache and it was obvious she was losing weight. She was seen by a doctor and asked for the blood count. Her TLC was 10.560/cmm, with P: 50% and L:50%. ESR was 45 mm in first hour.

What further investigations is required?

How will you treat this child?

How will you follow-up this child?

History three:

Man Bahadur aged 9 was brought by to the OPD with the presenting complaints of being vaguely unwell for one month. He had a poor appetite and occasional attack of right sided abdominal pain. On examination he has temperature of 38 degree C. His weight was 16 Kg.

What further historical questions you want to ask?

What further examination findings you predict in this child?

What further investigations you suggest?

Nutritional requirements in children

A. Learning objectives:

1. be able to define: nutrient, nutrition, estimated average requirement, recommended dietary allowances, adequate intake, tolerable upper level
2. be able to recall the daily requirement of water, fat, protein in neonate, infant, toddler, school age children.
3. be able to list the nutrition requirement for a child with leukaemia, fever, marasmus, kwashiorkor, persistent diarrhea, diabetes mellitus, renal diseases.
4. be able recall the composition of human milk and approximate nutrients and calorie content of rice, meat, egg, pulse, banana and orange.
5. be able to formulate menu for persistent diarrhea/ marasmus/ kwashiorkor for a child whose weight is 8 kg and age is 5 years.

Questions and history:

A. Short answers as drill

- a. infants basal requirement of calories is: 55kcal/kg/24 hrs.
- b. daily calorie requirement for first year is: 80-120/kg/24 hrs.
- c. in 2-5 yrs the calorie decreases by:10 kcal/kg.
- d. as a general rule the calorie from
fat: 35-45%, carbohydrate: 45-55%, protein: 9-15%
- e. Each 1G of carbohydrate and protein gives: 4 kcal; fat:
- f. The lowest calorie from fat is from: short chain fatty acid: 5.3 kcal.
- g. A consistent calorie imbalance of 500 kcal/24 hrs changes body weight by 450g/wk
- h. Protein requirement in different age group are as follows
0-6 months: 2.05gms/kg/day; 4-6 years: 30gms/day
- i. fatty acids not synthesized by humans are: linoleic and linolenic acid.
- j. the dialy iron requirement in deficiency is 6mg of elemental iron/kg/day.
- k. the elemental iron in ferrous sulfate is 20%
- l. write on preparation that contains iron and write elemental iron content in it.

History one:

An 8 year old child was seen in OPD. On exam, the toddler is anxious, clinging to his older sister. He appears thin, with a large head and subcutaneous wasting. Vital signs are appropriate for age. Weight is 9 kg (<3rd percentile); height is 72 cm (<3rd percentile); head circumference is 47 cm (10th percentile). Exam is significant for subcutaneous wasting, sparse hair, dry skin, and a scaling rash in the diaper area. There are no overt signs of trauma, and no focal neurologic deficits.

What important questions will you ask in history?

Formulate a menu for this child.

History two:

This is a 4 month old boy who is not growing well. His birthweight was 3.5 kg and his current weight is 3.0 kg (less than the 5th percentile). Mother states that he drinks 6 ounces of infant formula every 4 hours (six feeding per day). She also feeds him a small amount of rice cereal, but he is having difficulty holding this in his mouth. There is no history of vomiting or diarrhea. He has about 6 wet diapers per day and stools once or twice daily. His review of systems is negative.

Exam: VS T 37.4 (rectal), P 110, R 30, BP 75/55, oxygen saturation 100% in room air. Weight 3.0 kg (less than the 5th percentile), length 57 cm (10th percentile), head circumference 41 cm (40th percentile). He is thin appearing, but not acutely ill. Head is normocephalic. Anterior fontanelle is flat and soft. He is otherwise normal. Heart regular, without murmurs. His lungs are clear. His abdominal exam is normal. His genitalia are normal. His extremities are thin. His visible perfusion is good. Muscle tone and reflexes are normal.

What further history is important?

What further advise will you give.

Based on history, his fluid intake is calculated at 270 cc/kg and his caloric intake is calculated at 180 calories/kg, plus additional calories from rice cereal. His maintenance caloric intake should only be 100 cal/kg. Thus, it is estimated that his caloric intake is well in excess of maintenance nutritional requirements and he should be growing better than this. He is hospitalized for evaluation. Admission laboratories including a complete blood count and comprehensive chemistry panel are normal. He gains 100 grams daily for the first three days of hospitalization on formula alone, which is calculated at 280 cc/kg and 187 calories/kg. Since this is not much different from what he was getting at home (by history), the medical staff suspect that something in the history is not correct. Upon further questioning, mother was feeding him 6 ounces of formula per feeding as she had initially stated. Instead, she was offering him more diluted feeding i.e. mixing one spoon of lactogen in 3 ounces of water.

History 3:

This is a 12 month old female who presents for a well child check. Within the past 4 months, her weight has fallen from the 25th percentile to significantly less than the 5th

percentile. Her height has dropped from the 10th percentile to slightly less than the 5th percentile, while her head circumference has remained at about the 25th percentile. Her language, motor, cognitive, and social development are normal. She seems to eat appropriate foods for her age, but the her mother notes that she tends to be restless and fidgety while eating, and that she does not like the texture of certain foods, often leading to parental frustration at mealtimes. Her stools tend to be frequent, with undigested food materials in routine examination of stool was seen. Urine is normal. There are no symptoms of respiratory or neurological disease, and her review of systems is otherwise negative.

Her past medical history is entirely unremarkable. She was born at term, weighing 3.0 kg without any perinatal complications. Her family history is negative for any endocrinopathies or chronic illnesses. Mother is 155 cm (5 feet, 1 inch) 61 inches tall, and father is 168 cm (5 feet, 6 inches). Mother experienced menarche at age 12.5 years and recalls that there were other children in the family who were deemed small as young children but who caught up later in childhood.

Exam: Vital signs, including blood pressure, are normal. Weight 7 kg (< 5th percentile), height 70 cm (5th percentile), head circumference 45.5 cm (50th percentile). She is alert and interactive, and appears to relate well with her mother. Her anterior fontanelle is still open, roughly 2 cm. Two teeth (one just emerging) are present. Thyroid, lymph nodes, heart, lungs, abdomen, genitalia, nervous system, and skin are all normal.

Laboratory studies: CBC, chemistry panel, lead level, TSH, urinalysis, PPD, and stool studies, including ova and parasites all normal. Bone age is consistent with skeletal maturity of an 8 month old infant.

How will you explain the parents of this child for FTT.?

Formulation: Failure to thrive, with components of genetic short stature with a family history of constitutional growth delay. Parental anxiety, active temperament, and oral/tactile sensitivity may lead to feeding difficulties.

Clinical course: This child was followed up in the OPD every few months for support and ongoing education. Two years later, the child is at the 5th percentile for both height and weight and is otherwise doing well.

Questions : Nutritional requirements in children

1. True/False: Technological advances in formula have eliminated the immunological difference between human milk and commercial infant formula (cow's milk and soy protein).
2. True/False: Vegetarian diets are acceptable in a 1 year old child.
3. True/False: During the second year of life, there is a decrease in appetite and low weight gain as children follow normal growth curves.
4. Should fluoride be supplemented? If so, when and under what circumstances.
5. Which of the following is NOT true about breast feeding?
 - a. Recommended food for infants both term and preterm
 - b. 50% of energy from proteins
 - c. Contains immunological benefits (i.e. IgA, active lymphocytes)
 - d. Promotes growth of lactobacillus in GI
 - e. Decreases incidence of allergic disorders
6. Is a 9 kg child who is consuming 8 ounces of formula 5 times a day, likely to grow? Calculate cc/kg/day, calories/kg/day. 1 ounce = 30cc. Formula contains 20 calories per ounce.
7. Calculate the total number of calories for a serving of chicken noodle soup: Serving size=4 ounces, total fat per serving=2 grams, total carbohydrate per serving 8 grams, total protein per serving 3 grams, total sodium per serving 890 mg. Calculate the total calories from carbohydrate, protein and fat separately.
8. A premature infant in the neonatal ICU weighing 850 grams is receiving total parenteral nutrition (TPN). He is getting intralipids 10% (10 grams per 100cc) at 1 cc/hr and a separate infusion at 5.5 cc/hr of crystalloid which contains D12.5% (12.5 grams of dextrose per 100cc) and 2 grams of amino acids per 100cc. How many calories from carbohydrate, protein and fat is the patient receiving per day? How many calories per kg is the patient getting per day? Is this enough to gain weight?
9. Name the classic syndrome:
 - A. Toddler with edema, hepatomegaly, protruding abdomen, alternating bands of light and dark hair, dry skin, and lethargy.
 - B. Cachectic infant with subcutaneous fat wasting, loose dry skin, brittle hair.
10. True/False: Serum albumin is usually decreased in kwashiorkor, or severe malnutrition affecting the visceral protein compartment.
11. True/False: Hemorrhagic disease of the newborn can be prevented with vitamin K prophylaxis (1 mg IM x 1) at birth.

12. Vitamin K is an important cofactor in the activation of which of the following coagulation factors:

- a. factor VIII
- b. factor X
- c. protein S
- d. von Willebrand's protein
- e. factor IX

13. True/False: Vitamin D, in response to serum hypocalcemia, regulates the mobilization of serum calcium through three mechanisms: increased intestinal absorption of Ca and Phos, mobilization of Ca from bone, and increased reabsorption of Ca from the distal renal tubules.

14. The three D's of pellagra are:

- a. diarrhea
- b. dementia
- c. deafness
- d. dermatitis
- e. dissociation

15. Cheilosis and glossitis are features of:

- a. vitamin A deficiency
- b. riboflavin (B2) deficiency
- c. vitamin C deficiency
- d. pyridoxine (B6) deficiency
- e. vitamin E deficiency

16. True/False: Both folate and B12 deficiency produce a megaloblastic anemia. In addition, patients with B12 deficiency may exhibit posterior column defects, such as: paresthesias, sensory deficits, loss deep tendon reflexes, as well as confusion and memory deficits.

17. The features of scurvy, or vitamin C deficiency, include:

- a. bone disease in growing children
- b. hemorrhagic disease, including mucosal involvement, subperiosteal bleeds, and bleeding into joint spaces
- c. cheilosis, glossitis
- d. impaired wound healing
- e. anemia

18. "Organic" and "non-organic" FTT are clearly defined conditions which enable pediatricians to focus treatment on "organic" cases. (true or false)

19. Hospitalization is indicated when a child is at risk of serious medical morbidity or abuse/neglect. (true or false)

20. In addition, all children with FTT should be hospitalized to distinguish between "organic" and "non-organic" etiologies. (true or false)
21. Blood pressure is useful in evaluating young children with FTT. (true or false)
22. If both parents are of short stature, then the child must have genetic short stature. (true or false)
23. History, growth chart review, and physical are key in the evaluation of FTT. (true or false)
24. In evaluating a child with FTT, it may be important to elicit any history of excessive thirst, increased urination, and family members with renal disease. (true or false)

Answers to questions

1. False. Formula still lacks the immunological advantages of breast milk.
2. False. Vegetarian diets are NOT recommended for the first two years of life. 3. True.
4. Yes, at 6 months in children in a community with a non-fluorinated water supply.
5. b. 50% of energy from FAT.
6. No, this child will lose weight (failure to thrive). This child is consuming 40 ounces per day which is only 800 calories per day. This child needs 900 calories (100 cal/kg/day) just for maintenance alone. Growth requires a caloric intake in excess of maintenance.
7. Roughly 64 calories. Protein=4 calories/gram, carbohydrate=4 calories/gram, fat=10 calories/gram. 12 calories from protein, 32 calories from carbohydrates, 20 calories from fat, no calories from sodium total calories=64 calories (roughly).
8. This child is receiving 10% (10 gram/100cc) intralipids at 1cc/hr, or 24 cc/day, which is 2.4 grams per day, which is 24 calories from fat per day. He is getting D12.5% (12.5 gm/100c) at 5.5cc/hr, or 132 cc/day, which is 16.5 grams of dextrose per day, which is 66 calories from carbohydrates per day. He is getting 2 grams of amino acids per 100cc, which means that he gets 2.64 grams of amino acids per day, which is 10.5 calories from protein per day. He is getting a total of 100.5 calories per day, which is 118 calories per kg/day. Since his maintenance caloric requirement is 100 calories/kg/day, he is getting more than maintenance which should give him the potential to grow.
9. A. kwashiorkor. B. marasmus

10. True

11. True

12. b, c, e

13. True

14. a, b, d

15. b, d

16. True

17. a, b, d, e

. 18.F, 19.T, 20.F, 21.T (can help detect renal disorders), 22.F, 23.T, 24.T

Diseases of peripheral nervous system:

A. Learning objectives:

1. Be able to differentiate symptoms and sign of CNS , PNS, and myopathy diseases.
2. Be able to recall important symptoms and signs of muscular disease.
3. Be able to recall important symptoms and signs of neuromuscular junction disorders
4. Be able to list symptoms and signs of common motor neurone neuropathies.
5. Be able to list the symptoms and signs of common sensorimotor neuropathies
6. Be able justify the different investigations and treatment for disorders of PNS

<i>Signs</i>	<i>CNS</i>	<i>PNS</i>	<i>Myopathies</i>
Atrophy	-	++++	++
Fasciculations	-	+++	-

Tone	++	-	+/-
Distribution of weakness	Pyramidal/regional	Distal/segmental	Proximal
Tendon reflexes	+++	-	+/-
Babinski's sign	++	-	-

B. Questions and history

History one:

A six months old child was brought to the OPD with the presenting complaints of inability to roll over and sit-up. His mental development is normal.

What is the most probable diagnosis?

Infantile muscular atrophy.

What specific clinical findings you will look for?

Symmetrical muscle weakness, deep tendon reflexes absent, tremor in upper extremity,

What are the specific diagnostic tests?

Normal CPK, increased motor unit action potential which is prolonged and polyphasic, presence of spontaneous, rhythmic muscle activity at a frequency of 5-15 per second, which can be activated by voluntary effort (specific), decreased conduction velocity, denervation atrophy of the affected muscle on biopsy.

What are the differential diagnosis?

Congenital muscular dystrophy, polymyositis, myasthenia gravis, cerebral palsy, benign congenital hypotonia.

History two:

An eight year old child presented with difficulty in walking for one month. The father describes the child as clumsy, falling easily and tipping over his own feet. The father says his brother had similar condition at the age 23 years.

What is the most likely diagnosis?

Peroneal muscular atrophy.

What specific clinical findings you will look for?

Stork like gait (late feature), atrophy of small muscle of hand, reduced vibratory and position sense over the distal portions, vasomotor signs (flushing and marbling of skin), absence of CNS involvement, palpably enlarge nerves.

What are the specific diagnostic tests?

Abnormal peripheral nerve conduction velocities in patient and one of his parent, slowed conduction of visual evoked potential, raised CSF protein content, normal CPK, Histology of sural nerve shows interstitial hypertrophic neuropathy.

History three:

A five year old child presented in the ER because of inability to stand after awakening in the morning. Father is poultry farmer. He had similar two episode within one year.

What is the most likely diagnosis?

Chronic relapsing polyradiculoneuropathy.

What specific clinical findings you will look for?

Bilateral symmetrical muscle weakness, cranial nerve palsy (facial), elevation of CSF protein in second week, absent deep tendon reflexes, motor fibres conduction velocity normal or slightly reduced in first week, normal CPK.

What is your concern in this patient?

May develop ascending paralysis and bulbar palsy.

What are other differential diagnosis?

Acute transverse paralysis, poliomyelitis, toxic neuropathies, HMSN, Krabbe's disease, metachromatic leukodystrophies, refsum disease, polyarteritis nodosa, thiamine deficiency.

Principle of fluid therapy in diarrhea and vomiting

A. Learning objectives:

1. Be able to recall the daily fluid and electrolyte requirement in children.
2. Be able to recall the signs of dehydration.
3. Be able to describe the physiology of gastric and intestinal secretion and absorption of water and electrolytes
4. Be able to describe the pathological process of excessive loss of fluid and electrolytes from the GI tract.
5. Be able to list the content of common IV and Oral Rehydrating fluids.

Questions and history

Case history one

A Two-and-half-year old female child presented with loose foul smelling stools from seven days and paucity of movements of all four limbs.

On examination there is marked hypotonia, deep tendon reflexes could not be elicited. There is also past history of recurrent loose stool in child since 9 month of age.

What is the diagnosis?

What further investigations are necessary?

How this child should be treated?

Child was dehydrated and has decreased urine output for last two days. Serum electrolytes done are Na^+ - 143, K^+ - 0.7. ABG of the child shows pH 7.15, pCO_2 21,

HCO₃ 7, BE -14. At the time of admission child had shallow respiration and abdominal distension. Bowel sounds were diminished. Child was started on iv fluid with K⁺ 60 meq/l infusion under strict ECG monitoring. After 6 hr K⁺ improved to 1.2, after 12 hr 1.5. Following which rate of infusion was decreased to 40 meq/l. Weight of the child is 6.1 kg. Length of the child is 71 cm. Hemogram of the child shows Hb 7.4 g%, TLC - 6,300, p/s - dimorphic anemia. After 48 hour of fluid therapy and acid base correction serum potassium of the child improved to 2.6. Tone and the power of the child improved. Stool culture of the child was sterile. In this case there is severe diarrhea with acidosis and life threatening hypokalemia because of loss of both HCO₃ and K⁺.

Serum potassium is extremely low. Unlike Sodium, potassium is an intracellular ion. Serum levels do not reflect the total potassium loss in the body. Presence of acidosis means the intracellular potassium is further low as acidosis only draws potassium out of the cells. As a rough estimate if the serum potassium falls from 3.5 mEq to 2.5 mEq, there is approx 100 mEq loss of total body potassium, from 2.5 mEq to 1.5 meq 200 mEq of total body potassium is lost.

The following are the rules regarding hypokalemia management:

1. As far as possible correct potassium orally than IV
2. when used as IV the concentrations in the fluid exceeding 40 mEq/l should be strictly given under ECG monitoring.
3. NEVER GIVE BOLUS POTASSIUM
4. The rate of infusion should be 0.3 mEq/kg/hr, life threatening hypokalemia like in the present case one may give upto 1 mEq/kg/hr and may go upto 200 meq/l concentration but under strict ECG monitoring
5. There is no formula to calculate the potassium replacement as it is an intracellular ion. Approximately 3 mEq/kr for deficit and 3 mEq/l for maintenance.
6. Oral potassium liquids give 21 meq/15 ml and IV gives 2 mEq/ml

In this child respiratory paralysis is impending, short term ventilation along with potassium correction should be rewarding

Case history two

Mother of infant of 6 weeks on no drug therapy was brought in the ER with the complaints of weight loss and vomiting.

What are the differential diagnosis?

What is the first step investigations?

The initial blood tests showed the following:

Sodium	134	mmol/L
Potassium	3.0	“
Chloride	72	“
Bicarbonate	48	“
Urea	12.7	“
Arterial pH	7.60	

H+ 25 “ (35-45)
How are the abnormalities in electrolytes caused?

How will you treat this child?

Case history three

A three year old child presented with history of acute diarrhea. This child has warm, doughy, velvety skin, dry mucous membranes, muscular signs such as twitching and hyperreflexia. Patient is very irritable.

What is your diagnosis?

How will you treat this patient?

1. Calculate the water deficit
2. Replete water and electrolytes over 2 to 3 days.
3. Correct any associated abnormalities

1. The water deficit is calculated as:

$$\text{water deficit} = 0.6 * \text{body weight (kg)} * (1-140/\text{serum Na})$$

2. Repletion:

In moderate hypernatremia (serum Na between 155 and 175), one half of the free water deficit is given in the first 24 hours. In severe hypernatremia (serum Na greater than 175), one third is given in the first 24 hours. Electrolyte-free solutions are never given, at a minimum, use 0.2% NS. During repletion, serial chemistries can be obtained to follow the rate of decrease of serum sodium concentration. For concentrations greater than 165 mEq/L, values should be obtained every 4 hours until they approach normal.

3. Correct associated abnormalities:

Hypernatremia is associated with hyperglycemia and hypocalcemia. Insulin is rarely required to manage the hyperglycemia, which should improve dilutionally. It may be necessary to use a solution with less than 5% dextrose, such as D2.5%1/3NS. The calcium level may fall under 9 mg/dL, but tetany is rare. Central nervous system complications of hemorrhage or thrombosis may also occur.

Example: Severe dehydration, moderate hypernatremia

A 3 month old is brought to the ER with a history of diarrhea, a small amount of vomiting, and decreased po intake. A rotavirus antigen assay is positive. Serum sodium

is 165. The patient is rousable, but not very active. By physical exam, the patient looks about 5 to 10% dehydrated, but has poor skin turgor. The patient's weight is 4.7 kg.

The assumption is that this patient is more dehydrated than she appears, perhaps as much as 15%.

The patient's free water deficit is: $0.7 * (4.7 * 1.15) * (1-140/165) = 573 \text{ mL}$

0.7 is used because at this age, total body water comprises about 70% of the patient's body weight. The patient's weight is corrected for 15% dehydration by multiplying by 1.15. The sodium is corrected in the formula to an optimal value of 140.

	H2O	Na	K	Cl
Maintenance (for 2 days)	1080	32	22	22
Dehydration losses	810	65	49	49
Total	1990	97	71	71
per liter	1000	49	36	36

The goal is to give 287 mL of free water on day #1. If the above were repleted with NS, there would be no free water (i.e., water in excess of isotonic), thus something with less Na must be chosen. $\frac{1}{2}$ NS is half free water; thus if 995 mL were infused in one day, it would be the equivalent of given 497 mL of free water.

Approach to a child with vomiting

A. Learning objectives

1. Be able to recall the physiology of vomiting.
2. List the common causes of vomiting according to different age group
3. Be able to discuss the symptomatology according to cause
4. Be able list the investigations to confirm or discard the different causes

5. be able to treat according to the cause.

Older children

Infective:

High fever/sepsis/meningitis
Otitis media
UTI
Gastroenteritis
Appendicitis
Cholelithiasis /Infective hepatitis
Sinusitis
Helicobacter Pylori Infection

Metabolic:

Diabetes Mellitus
Diabetic Ketoacidosis
Porphyria, Acute

Endocrinal:

Pheochromocytoma

Mechanical:

Gastroesophageal Reflux
Intestinal Obstruction, Malrotation
Pyloric stenosis
Hirschsprung Disease
Crohn Disease
Ulcerative Colitis
Ureteropelvic Junction Obstruction
Volvulus
Tubercular

Psychogenic:

Eating Disorder: Bulimia
Mood Disorder: Depression
Munchausen Syndrome by Proxy

Misc:

Space occupying lesions
Cyclical vomiting
Drugs

B. Questions and case history

Case history one

A one week old male child presented in the ER with the presenting complain of vomiting since two days. He was born at term with the birth weight of 2.5 kg. His APGAR score at 1 minute was 7.

What further historical questions will you ask?

What specific examination will be necessary?

What further investigation is necessary?

Case history two

An eight year old female child presented in the ER with repeated history of vomiting since morning. She went to bed after having her regular meal and suddenly woke up in the mid night and vomited. The vomit contained food material. On examination she is afebrile and not dehydrated. She is conscious.

What historical questions will you ask?

What specific examination is necessary?

What further investigation will you suggest give reasons.

Case history three

A 9 year old boy attended emergency complaining vomiting of blood. 8 weeks previously he had developed a mild, diffuse abdominal discomfort which was relieved by taking thick whitish liquid medicine as given by a medical shopkeeper.

What historical questions will you ask?

What specific examination is necessary?

What further investigations will you suggest give reasons?

Approach to a child with abdominal pain

A. Learning objective:

1. Be able to list the causes of abdominal pain (should include local and referral)
2. Be able to list the associated symptoms and signs according to the organ involvement.
3. Be able to list the investigations for the acute and recurrent abdominal pain

B. Questions and case history:

Case history one:

An eight year old male child presented in the OPD with the acute onset of abdominal pain. There was a preceding history of cough and cold with mild fever. His father told that he has observed rashes over the legs since yesterday.

What further historical questions are important?

What examinations findings you expect in this child?

What further investigations are necessary and why?

On sixth day after the treatment, this child complained acute onset of headache and vomiting in the midnight. The child was brought in the ER where he developed convulsion.

What immediate resuscitation measures you apply?

What important investigations will you ask for?

What complications may develop during the course of illness?

Case history 2

A six year old child presented in the OPD with the history of fever for three days. He is also vomiting frequently for last one day. He is also complaining of abdominal pain after the onset of vomiting.

On examination his oral temperature is 101 degree F. There were no other specific findings.

List the common causes which could be related with this patient.

What further historical questions are important?

He continued to develop fever with intermittent vomiting. He became more lethargic. He was treated with oral amoxicillin without any relief of symptoms. On examination he was mildly icteric and had tender right upper abdomen.

What further treatment is needed?

Case history 3

A 12 year old female child presented in the ER with acute abdominal pain for last three hours. She went to school this morning and was attending her class, in the middle of her class she felt acute pain and fainted. She used to have similar pain for last one year.

On examination: She was conscious. Her vitals were normal. Her abdomen was soft and non tender.

List the causes that could be associated with this patient.

List the investigations you would like to do with reasons.

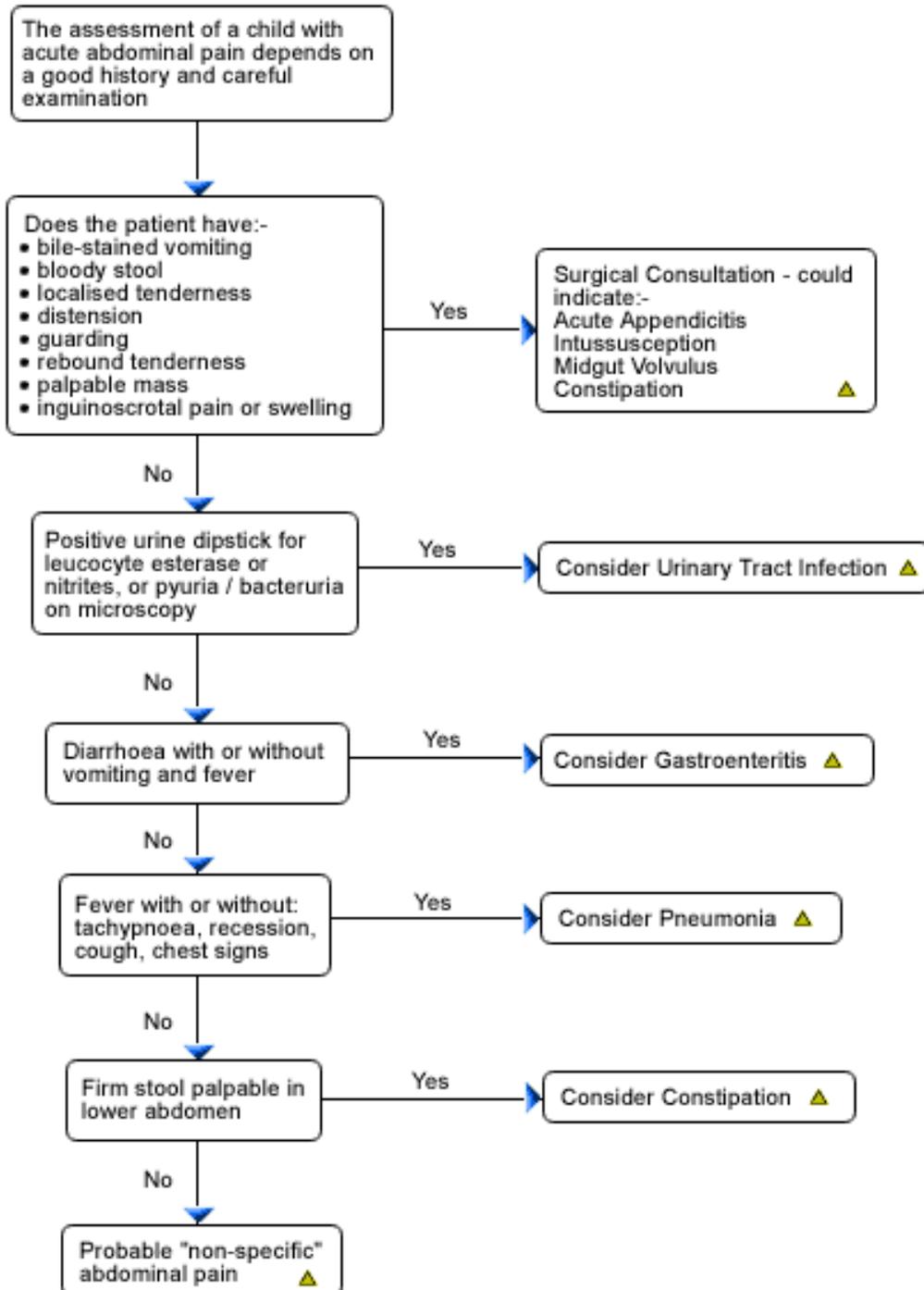
Case History 4

An eight year old male child was brought by the nursing staff on the OPD because of acute onset of abdominal pain since morning with fever. The child was pyrexial and was on agony. He did not allowed to touch the abdomen. There were no rashes.

What investigations you will suggest.

Routine Urine examination showed: RBC and plenty of pus cells.

Algorithm for the management of ACUTE ABDOMINAL PAIN



Nutritional requirements in children

A. Learning objectives:

1. Be able to recall the calorie requirement at different age groups.
2. Be able to recall the calorific value of common foods used by children.
3. Be able recall the different proportions of carbohydrate, fat and protein required during health.
4. Be able to calculate the required amount of food in treating malnutrition, nephrotic syndrome, diabetes mellitus, etc.

B. Questions and case history:

History one:

A 3 year old male child presented with the history of not gaining weight adequately. The child was born by normal vaginal delivery at term. His birth weight was 3.4 kg. There were no any neonatal problem. He was on exclusive breast feeding for first five months when his weight was 6.2 Kg. He was weaned at 5 months with Cerelac. He is still being fed by parents. The present weight is 9 kg.

What further historical questions are relevant?

What is the total required calorie for this child?

What is the recipe you will suggest to the mother?

History two

You have been asked by a school head master to prepare a menu for his boarder students.

What are the menu you will suggest for children of nursery, class 4 and high school?

History three

Give the feeding advise for the following conditions:

- a. Persistent diarrhea
- b. Nephrotic syndrome
- c. Diabetes mellitus in a 14 year old child.

Assessment of growth

A. Learning objectives:

- a. be able to recall the principles of growth.
- b. Be able to use the different growth charts and interpret accordingly.
- c. Be able to recall the different body proportions
- d. Be able to recall the skeletal and dental development

B. Questions and case history:

History one:

A one year old child has the weight of 7.5 Kg, and length of 75 cms. His head circumference is 42 cms. He was born by normal vaginal delivery at term with the birth weight of 2 kg and length of 45 cms.

What are the possible causes?

How will you investigate further?

History two:

A three year old child has the U/L segment ratio of 1.7.

What further investigations are necessary?

History three:

A 3 month old child has the OFC of 42 cms, weight of 16 kg and length of 55 cms.

What further investigations are important?

History four:

What is the body mass index with 25% in a child of 8 years?

Fill up the gaps:

Teeth	age at eruption	age at shedding
Primary Central incisor maxillary	6-8 m	7-8 y
Primary First molar	10-16 m	10-11 y
Secondary first premolar maxillary	10-11 y	

Assessment of development

A. Learning objectives:

- e. Be able to recall the principles of development.
- f. Be able to use the different instrument of developmental assessment and interpret accordingly.
- g. Be able to recall the developmental milestones at different age group
- h. Be able to list the developmental delay warning signs
- i. Be able to recall the sexual maturity staging
- j. Be able to recall the milestones of prenatal development
- k. List the determinants of parenting
- l. Be able to discuss the biopsychosocial models of development

Some principles of development are summarised below:

- Development is a continuous process from conception to maturity.
- Development depends on the maturation and myelation of the nervous system.
- The sequence of development is the same for all children, but the rate varies from child to child.
- Certain primitive reflexes anticipate [develop before] corresponding voluntary movement and have to be lost before the voluntary movement develops.
- The direction of development is cephalocaudal [from head to toe].

Screening and Surveillance

The screening and surveillance of the growth and development of children can occur through informal observation, age specific questions for parents and physical assessments and measurements. Additionally it can be more formal with the administration of such tests as the Denver Developmental Screening Test (DDST).

Surveillance:

Surveillance is the identification of the needs of children, assessment of their growth and development, the detection of variations, delays and problems and ensuring that early intervention and treatment is accessible.

The aim of surveillance programs is to optimise the healthy growth and development of children in order that they reach their greatest potential, physically, emotionally, intellectually and socially.

The surveillance of children includes:

- the measurement and recording of physical growth
- monitoring of developmental progress
- the administration of screening tests
- offering and arranging intervention when necessary
- prevention of disease by immunisation and other means
- providing information and support to parents

- health education

Developmental Screening Tests and Milestones

Developmental screening can be performed on individual children to see whether a developmental problem is likely. Developmental screening looks at groups of children to see if there are any developmental problems which require early intervention. This is in contrast to developmental assessment in which the development of an individual child is assessed in relation to developmental milestones for that age.

Developmental milestones can be conveniently grouped into four main areas:

- Personal~Social
- Fine Motor Adaptive
- Language Skills
- Gross Motor Skills

PERSONAL - SOCIAL MILESTONES

ITEM	50th Percentile	90th Percentile
Regards face when held about 12" away.	Birth	1 mo
Smiles responsively when talked to and smiled at.	3.5 wk	1.5 mo
Smiles spontaneously.	2.5 wk	2.1 mo
Self feeding eg. Finger feeds	5.4 mo	6.5 mo
Indicates wants (not crying), eg pointing, pulling, reaching and making sounds.	9.1 mo	12.9 mo
Drinks on own from cup without lid and spilling less than*.	12.7 mo	17.1 mo
Helps in the house in response to simple requests.	14 mo	17.1 mo
Uses spoon/fork, getting most food into the mouth.	15.2 mo	19.9 mo
Remove garment other than hat. Socks or shoes easily slipped off.	16.8 mo	23.9 mo
Put on any clothing.	23.5 mo	2.5 yr
Wash and dry hands, using soap.	22 mo	3.1 yr
Puts on T-shirt without help.	2.6 yr	3.4 yr
Dress, no help (except laces).	3.5 yr	4.5 yr
Brush teeth, no help or supervision, at least some of the time.	3.4 yr	5 yr

* age at which this percentage of children can do the task

FINE MOTOR ADAPTIVE

ITEM	50th Percentile	90th Percentile
With child lying on back, follows movement of a face about 8" away to midline (vertical).	Birth	5 wk
Follow past midline	3.8 wk	2.8 wk
When lying on back, child brings hands together at the mid line of the body	2.5 mo	4 mo
Follows 180 degrees	3 mo	4.5 mo
Reaches for objects, when sitting on parent's lap at table top level.	4.7 mo	5.6 mo
Passes object such as a block from one hand to the other.	6 mo	7.7 mo
Takes object in each hand at the same time.	6.2 mo	9.1 mo
Thumb-finger grasp of small object such as sultana	8.2 mo	10.2 mo
Bangs 2 objects such as blocks together.	7.6 mo	10.9 mo
Scribbles with pencil may place in hand and encourage, but not demonstrate.	13.2 mo	16.3 mo
Tower of 2 cubes (give up to 3 trials)	14.8 mo	20.6 mo
Tower of 4 cubes (give up to 3 trials)	19.2 mo	23.8 mo
Imitate vertical line drawn with the child watching (give up to 3 trials)	2.4 yr	3.2 yr
Tower of 8 cubes (give up to 3 trials)	2 yr	3.5 yr
Copy circle when shown a drawing of a circle and told to draw one like it.	3.4 yr	4 yr

LANGUAGE

ITEM	50th Percentile	90th Percentile
Responds to bell in any way when rung out of sight to the side	Birth	2 wk
Vocalises any sound other than crying.	Birth	3.3 wk
Squeals high pitched, happy sounds.	1.7 mo	4.3 mo
Turn to voice when name whispered from 6-12" on either side.	4.6 mo	6.6 mo
Imitate speech sounds such as clicking of the tongue or kissing.	5.2 mo	8.8 mo
Dada/mama non-specific.	6.5 mo	9.1 mo
Jabbers unintelligible conversation	6.9 mo	12.1 mo
Dada/mama specific to the person.	9.3 mo	13.3 mo

3 words other than family names.	13.6 mo	18 mo
Combine words	19.8 mo	2.1 yr
Points to 6 named body parts.	19.8 mo	2.4 yr
Names 1 colour.	2.8 yr	3.7 yr
Speech all understandable.	2.3 yr	4.2 yr

GROSS MOTOR

ITEM	50th Percentile	90th Percentile
Equal movements of limbs when on back.	Birth	2 wk
Lift head momentarily so chin off surface when on stomach.	Birth	2 wk
Head up 45 degrees when on stomach.	1 mo	2.7 mo
Head up 90 degrees when on stomach.	2.2 mo	3.6 mo
Roll over either way.	3.2 mo	5.4 mo
Pull to sitting with no lagging of the head behind the body.	3.4 mo	6.2 mo
Sit - no support.	5.9 mo	6.8 mo
Pull self to stand from sitting position, eg using chair	8.4 mo	9.7 mo
Stand alone for more than 10 seconds.	11.5 mo	13.7 mo
Walks well.	12.3 mo	14.9 mo
Walk backwards for several steps without falling	13.8 mo	16.6 mo
Walk up steps, using rail for support, but not person.	16.6 mo	21.6 mo
Kick ball forward along the ground	18.3 mo	23.2 mo
Balance - each foot 1 second.	2.5 yr	3.4 yr
Hops on 1 foot 2 or more times in a row.	3.5 yr	4.2 yr

A. Denver Developmental Screening Test (DDST): it was designed and first published in 1967. It was standardised on a Denver (USA) population to aid the health providers in detecting potential problems in young children. Since its original publication DDST has been used widely in many different countries and much has been learned and evaluated, resulting in a revised version, Denver II, now being used.

The Denver II is administered to well children between birth and six years of age, using standard test material. The materials are: ball of red wool, box of raisins, rattle with handle, small bottle, bell, tennis ball, 8 blocks (1 inch cubes); see below:



It is a valuable tool in assessing development because it can screen children who are apparently normal for possible problems, confirm intuitive suspicions objectively and it can be utilised to monitor children who are high risks because of past history such as perinatal difficulties.

Developmental deviations in young children can often be overlooked because it is difficult and sometimes impossible to detect them through routine checks.

It should be noted that the Denver II is not an IQ test nor will it predict what the level of the child's future intelligence and ability will be. The test is also not to be used to diagnose. It must be administered in a standardised manner by trained personnel.

The Denver II is designed to test the child on twenty simple tasks and items that fall into four sectors: **Personal - Social** These tasks will indicate the child's ability to get along with people and to take care of himself / herself. **Fine Motor Adaptive** These tasks will identify the child's ability to see and to use his hands to pick up objects and to draw. **Language** These tasks will indicate the child's ability to hear, follow direction and to speak. **Gross Motor** These tasks will indicate the child's ability to sit, walk and jump.

B. Parents' Evaluation of Developmental Status (PEDS) - requires parents to complete a ten item questionnaire which the GP can then score and interpret according to a predetermined algorithm. The results of this may then lead to referral for specialised developmental assessment (second stage developmental assessment), parental counselling or the provision of appropriate information to address parental concerns.

Influences on Development

The developmental history should reveal factors which may have influenced the child's development. One must make appropriate allowances for prematurity. For example, if a child was born at 33 weeks then 7 weeks should be subtracted from the chronological age when assessing development, thus milestones would be expected to be reached nearly 2 months later than for a full-term baby. Environmental factors also influence child development. Children who live in a stimulating environment with a wide variety of play experiences and good language stimulation may reach milestones in advance of the average for their age. In contrast to this, the child who is emotionally deprived, receives little language stimulation and who has little opportunity to practise crawling or walking, for example, may show delay in achieving the milestones.

AAP Developmental Delay Warning Signs

The American Academy of Pediatrics outlines signs of developmental delay during the first month of a baby's life to include:

- Sucks poorly and feeds slowly.

- Doesn't blink when shown a bright light.
- Doesn't focus and follow a nearby object moving side to side.
- Rarely moves arms and legs, seems stiff, or seems excessively loose in the limbs or floppy.
- Lower jaw trembles constantly, even when not crying or excited.
- Doesn't respond to loud sounds.
- Does not crawl by twelve months.

(1-2 years)

- Cannot walk by eighteen months.
- Fails to develop a mature heel-toe walking pattern after several months of walking, or walks exclusively on her toes.
- Does not speak at least fifteen words by eighteen months.
- Does not use two-word sentences by age two.
- By fifteen months does not know the function of common household objects (brush, telephone, bell, fork, spoon).
- Does not imitate actions or words.
- Does not follow simple instructions by age two.
- Cannot push a wheeled toy by age two.

(2-3 Years)

- Frequent falling and difficulty with stairs
- Persistent drooling or very unclear speech.
- Inability to copy a circle by age three.
- No involvement in pretend play.
- Little interest in other children.
- Extreme difficulty separating from mother.
- Inability to communicate in short phrases.

3-5 years old

- Doesn't respond to people outside the family.
- Cannot grasp a crayon between thumb and finger.
- Lashes out without any self-control when angry or upset.
- Doesn't use "me" and "you" appropriately.
- Rarely uses fantasy or imitation in play
- Shows little interest in playing with other children.
- Is unable to separate from parents without major protest.

DETERMINANTS OF PARENTING

Parenting a newborn infant requires dedication because a newborn's needs are urgent, exhausting, and often unclear. To know what to do, parents must attend to an infant's signals and respond empathically. Many factors influence parents' ability to assume this role.

PRENATAL FACTORS.

Pregnancy is a period of psychologic preparation for the profound demands of parenting. Most women experience ambivalence, particularly (but not exclusively) if their pregnancy was unplanned. If financial worries, physical illness, prior miscarriages or stillbirths, or other crises interfere with their working through the ambivalence, the neonate may arrive as an unwelcome guest. For adolescent mothers, the demand that they relinquish their own developmental agenda (e.g., the need for an active social life) may be especially burdensome.

The early experience of being mothered may establish unconsciously held expectations about nurturing relationships that permit mothers to “tune in” to their infants. Research has linked the quality of these expectations (or working models) with the quality of later infant-parent interactions. Mothers whose early childhoods were marked by traumatic separations, abuse, or neglect may find it especially difficult to provide consistent, responsive care. Instead, they may re-enact their childhood experiences with their own infants as if unable to conceive of the mother-child relationship in any other way.

Social support during pregnancy is also important. A supportive relationship with the child's father predicts satisfaction in mothering. At the other extreme, conflict with or abandonment by the father during pregnancy may undermine the mother's ability to become absorbed with her infant. After delivery, anticipation of an early return to work may make committing to the task at hand more difficult. Six months of maternity leave from work may help, although career and financial pressures often force an earlier return.

PERIPARTUM AND POSTPARTUM INFLUENCES.

During labor, the continuous presence of a woman trained to offer friendly support and encouragement (a doula) results in shorter labor, fewer obstetric complications, and reduced postpartum hospital stays. Skin-to-skin contact between mothers and infants immediately after birth may correlate with an increased incidence of breast-feeding and longer duration of lactation. An opportunity for increased mother-infant contact over the next several days may result in improved mother-child interactions in the long term and a reduced risk of child abuse. Early separation, although predictably very stressful, does not inevitably impair a mother's ability to bond with her infant. Most new parents value even a brief period of uninterrupted time in which to get to know their new infants. Early discharge home from the maternity ward may undermine bonding in cases in which a new mother is required to resume full responsibility for a busy household.

B. Questions and case history:

History one: