**GENERAL EXAMINATION: FOCUSING ON MALNUTRITION/ DEHYDRATION**

**MPH: Dr. Reem/Griffiths**

* **Appropriate Introduction and Consent**
  + Good morning my name is Sushania Pryce. I am a final year medical student and I have been asked to exam your child. Is that okay? May I ask what is his or her name please? How old is he/she?
  + Remember to ask the child permission as well. Always address the child by name
* **Adequate/Appropriate Exposure**
  + Ideally head to toe exposure especially when the focus is malnutrition
  + Can leave the genitals covered (will check when doing wasting)
* **Inspection from the Foot of the Bed**
  + On inspection I see a well-looking/ill-looking or alert/playful/drowsy/lethargic or irritable/apathetic male/female child lying flat in bed in no obvious cardiopulmonary distress
  + *Irritable: Marasmus*
  + *Flat Affect/Lethargic: Kwashiorkor*
  + Urinary catheters, IV lines (what are they receiving), NG tube (secretions), vomit bowls, wheel chairs, O2 tanks
  + Respiratory rate is approximately 22 breaths per minute
  + He/she appears to be of adequate nutrition/wasted, however I would like his/her anthropometry to plot his/her growth chart
  + Head size – need head circumference to plot
  + I see no obvious dysmorphic features
  + No obvious chest wall deformities, no scars (if present qualify), abnormal posturing can get a Cerebral Palsy patient (qualify!)
  + Rachitic/rickety rosary: enlargement of costochondrial junction – Vit.D, Vit.C, copper, phosphate deficiency)
  + Obvious skin abnormalities
  + Oedema and location
* **Hands** 
  + Check for presence or absence of clubbing: loss of nail bed angle, fluctuance
  + Capillary refill
  + Koilonychia/Leukonychia
  + Nail – fungus, colour change
  + Pallor of palm
  + Pulse rate, volume, rhythm, radio-radial synchrony
  + Ask for BP
* **Lymph Nodes**
  + Epitrochlear
  + Axillary – all 5 groups
  + Neck (including occipital nodes) and supraclavicular nodes

**Closer Inspection:**

* Comment on any dysmorphic features as you go through (e.g. head shape)
* **Hair**
  + Scalp hair – dull, dry. thin, fine, sparse, bald (examine occiput)
  + Easy pluckable – atrophy of hair roots
  + Hair loss – look for hair on bed
  + Forest Sign – straightening of the hair at the bottom and curling on the top
  + Flag Sign – alternating bands of discolouration of hair (reddish, blond, or gray, depending on original colour) resulting from fluctuations in nutrition/intermittent malnutrition. Characteristic of kwashiorkor and in diseases with protein depletion such as ulcerative colitis
  + Lanugo hair – excess growth
  + Eyebrows – lost, colour change
  + Eye lashes – long and luxuriant, colour change
* **Eyes**
  + Mucous membranes – pink/pale, moist/dry, icteric/anicteric (liver impairment)
  + Pallor – anaemia
  + Angular palpebritis
  + Corneal and conjunctival xerosis (dry eyes), Bitot’s Spots – Vit. A deficiency
  + Discoloured scleara – allergic rhinitis
  + Sunken eyes – dehydration
* **Mouth**
  + Agular stomatitis/cheilitis – inflammation of the corners of the mouth (IDA)
  + Oral candidiasis – malnourished or immunocompromised (HIV)
  + Tongue – beefy red, swollen, smooth, sores
  + Teeth – missing or erupting, dental caries
  + Gums – bleeds easily, recession
  + Salivary pool
  + High arched or cleft palate – may be the cause of malutrtion in Cerebral Palsy patients
* **Cheeks**
  + Jowls – fullness of cheeks associated with oedematous malnutrition (also in marasmus)
  + Sunken cheeks – disappearance of fat pads (marasmus)
* **Skin**
  + First becomes darker especially over areas and places exposed to minor trauma
  + Crazy pavement dermatosis – drying and cracking of superficial skin revealing pale areas between the cracks
  + Flaky paint dermatosis – dry cracked layer then peels off leaving thin hypopigmented skin
  + Dry skin
  + Skin friable?
  + Ulceration/maceration – perineum, flexures, behind ears (look for decubitous ulcers!)
  + Petechiae
  + Scaling of skin around nostrils – depigmentation/hyperpigmentation
  + Gynaecomastia – liver impairment (palpate liver 🡪Gross hepatomegaly)
  + Skin turgor – look for tenting 🡪dehydration
  + Rashes, scars, papular urticarial 🡪atopic dermatitis
* **Wasting**
  + Must mention evidence of wasting from foot of bed if grossly obvious
  + Prominent ribs and limb joints
  + Redundant skin folds – axillary, gluteal (must turn child over and look!)
  + Winging of scapula
  + Other sites of wasting from top to bottom:

1. Temporalis
2. Shoulder girdle, axillary folds, inter and infra-scapular wasting (back), and wasting of deltoids
3. Prominent ribs and other joints
4. Winging of the scapula
5. Arm and Forearm muscles: triceps and biceps
6. Hand: thenar and hypothenar eminences, guttering
7. Thin pelvic girdle
8. Buttocks
9. Thighs: wasting and guttering of quadriceps

**Must palpate all muscle groups (just like for motor exam)**

**When patient is on the side: look for spine abnormalities, sacral dimpling, tuft of hair and sacral oedema!**

* **Abdomen**
  + Palpate the liver and say that you will like to percuss to measure the liver span
  + Ddx: fatty liver, cardiac failure, hepatitis, TORCH infections
  + Is abdomen distended (usually gaseous 2o to bacterial overgrowth), flat, scaphoid (can comment on at foot of bed)
  + Peristalsis if abdominal wall is thin
  + Petechiae and hyperbilirubinemia (liver dysfunction) – poor prognostic sign!
* **Genitalia**
  + Comment on Tanner Stage (look up!)
* **Legs**
  + Pitting Oedema
  + (can have oedema of the feet, legs, thighs, sacrum, hands and periorbital)

**Additional things to mention:**

* If dehydrated say: “Firstly I would like to take a detailed history to see if this patient has an underlying heart disorder and if they are decompensating.”
* The linked station will most likely be a growth chart if the child was wasted, or to calculate fluid resuscitation based on the child’s clinical status.

**Pointers for exam**

* Assessment: Ask for growth chart to plot patient’s growth parameters (age, weight, height and head circumference should be written at the top of the growth chart, if not ask consultant for them)
* Explanation for wasting/Malnutrition: underlying pathology e.g. Underling Neurological Condition 🡪 Cerebral Palsy?
* Discussion: How to classify malnutrition: Gomez, Welcome, Waterlow. WHO
  + Must know how to define the classifications and the parameters measured
* Definitions:
  + **Weight for age:** weight of the child over the weight of a normal child of the same age.
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  + **Weight for height:** Weight of the child over the weight of a normal child of the same height.
  + **Height age:** age that average child of that height would be (so this is extrapolated from finding the weight a normal child of the same height).

*Know how to calculate percentages for each and interpretation of same!*

* **Questions to ask in history:**
* Details re diet and how it has changed
* How is food prepared, how is formula mixed (scoops :water ratio)
* How bottle(s) is sterilized; how many bottles are used
* Water source; how water is sterilized
* Immunocompromised🡪 HIV
* Immunization schedule
* Social history: living arrangements
* How many children she has
* Support system
* **Investiagtions:**
* General:
  + CBC (+ blood smear🡪 hypochromic microcytic/ macrocytic rbcs)- to assess the haemoglobin levels to see if patient is anaemic. To assess WBC and differentials to see if there is presence of underlying infection, or if low 🡪 overwhelming sepsis. Platelets as well
  + U&Es- to assess urea (BUN elevated in cases of dehydration). To specifically assess electrolytes, could be imbalanced due to vomiting or diarrhea causing patient to be dehydrated. Assesses kidney function (urea and creat)
  + LFTs- could have underlying liver pathology (e.g. chronic hepatitis) causing low albumin and protein levels = Oedema
  + GMR!
* Specific
  + Urine dipstick- to specifically assess for proteinuria
* Rapid tests – HIV, syphilis (VDRL) and TORCH

**Treatment: (see lecture)**

1. Resuscitation (1-2 weeks)
   1. Treat infections: broad spectrum antibiotics (10 days)
   2. Treat dehydration: 20cc/kg bolus, then decrease oral feeds (80-100kcal/kg/day) 🡪small frequent feeds (IV fluids tend to worsen oedema)
   3. Treat anaemia: usually no need for transfusion
   4. Treat hypoglycaemia

Monitor urine output and weight: weight loss is good if oedema was initially present.

1. Maintenance (with resuscitation)
   1. Maintain on feeds (80-100kcal/day). Protein 0.7 – 1.2 g/kg/day
   2. Minimal feed: give exactly what is needed and no more
   3. No iron
   4. Monitor clinical features: weigh everyday

**End of Resuscitation/Maintenance:**

* Underlying infections treated
* Resolution of oedema
* Return of appetite
* Return of affect

1. Rapid Catch Up/Rehabilitation (4-6 weeks)
   1. Increasing the calories and feeds as fast and as frequent until they can’t tolerate
   2. Increase in weight and calorie intake
   3. Iron sulphate added
   4. Need to stimulate them during this time (bright coloured clothing, toys, time in play area with other kids)
2. Prepare for home (1-2 weeks)
3. Follow up and discharge
   1. (social worker must be involved and parent education must be implemented)

HOW TO CALCULATE FEEDS:

If patient is 5 kg, then caloric requirement for the day in the resuscitative phase is:

5 kg x 80 kCal/kg/day = 400 kcal/day

**NB.** 1 oz = 30 cc 1oz = 20 kCal

therefore 30 cc = 20 kCal

then x cc = 400 kCal

xcc = 30cc x 400kCal

20kCal

x = 12000/20

x = 600 cc

Child needs 600 cc for the entire day

So 600 cc/24 = 25 cc/hr

600 cc/12 = 50 cc/2 hours

Depending on how child tolerates feed, may need to increase or decrease the feeds (from 80-60kCal).