MANAGEMENT OF MEDICAL EMERGENCIES IN RESOURCE-POOR PRIMARY HEALTHCARE SETTINGS

Swasthya Swaraj Society

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INTRODUCTION

Unlike in secondary and tertiary healthcare, primary healthcare settings, especially those located in remote tribal areas are disproportionately disadvantaged. In the tribal areas, communities reside in remote and often geographically isolated regions, and they face unique hurdles in obtaining adequate medical care. In such resource-poor settings, the management of medical emergencies takes on a heightened significance, demanding simple solutions, adaptability, and a deep understanding of the context in which healthcare is delivered. Often very sickly patients coming with complicated clinical problems are visiting the modern healthcare for the first time in primary healthcare centre and they refuse to go to any higher centre located far away.

The doctor in primary care centre is at a greater disadvantage- working alone, managing busy OPD and emergencies all alone. The nurses too have to manage many emergencies by themselves. Teleconsultation is not often possible due to poor or no network connectivity.

This handbook, "Management of Medical Emergencies in Resource Poor Primary Healthcare Settings," is brought out as a guide for healthcare practitioners, tasked with addressing the urgent needs of tribal communities. It is It is an earnest endeavour to bridge the gap between the highly technology-based frameworks of emergency management and the practical realities encountered in primary healthcare settings. It is brought out from Swasthya Swaraj team of doctors' commitment to and experience of providing high quality primary healthcare in remote tribal areas for the past 10 years.. Drawing upon evidence-based practices this book delves into emergency preparedness, response, and recovery, offering insights that are both pragmatic and compassionate.

The collection of topics in this book is meant for helping the doctors ,and the nurses to manage cases with or without doctors' availability physically or telephonically. The selection of topics was based on the common emergencies seen in our centres. I wish more up-to-date managements will be added by doctors in the future.

This book is dedicated to all the doctors and nurses, paramedics and support staff who selflessly work in remote tribal areas and manage emergency cases in extremely limit circumstances.

We acknowledge the timely support, consultation and references provided by many senior doctors across the country. We acknowledge resources taken from JSS Ganiyari, KC Patty CF Healthcentre, CMC handbook of Emergency Medicine and from national guidelines.

Swasthya Swaraj team.

Contents

IN ANY EMERGENCY,
DO THESE STEPS.

1. CALL FOR HELP to someone.
2. DO NOT waste time writing OP & IP cards
3. ASK to relatives or patient what happened IN SHORT.
4. Take BP, PULSE, RR, TEMPERATURE, and SpO2.
5. if patient is unconscious/ drank poison/ convulsing, make him/her lie down on right or left lateral position.
6. PUT IV CANNULA and take blood samples. Do GRBS immediately.
7. start initial treatment as your initial work up.
8. Read protocol properly and start treatment.
9. Call Doctor. If doctor not available on the spot, call him/her.
10. If patient is very sick, inform the relatives, and REFER immediately after first aid.

What is A B C?

1. **Airway: open the airway to breathe in, make the patient to lie down in lateral position, put airway tube if available, put NGT to protect from aspiration and remove secretions from mouth with suction pump. With this patient's airway will be open and he can breathe in.**

2. **Breathing: start oxygen if SpO2 is below 90%.**

3. **Circulation: give IV fluids if BP is below 90/60 mmHg.**

This need to be done in any emergency patient who is unconscious or semiconscious.

IF DOCTOR IS NOT AVAILABLE,

Do all the above steps as above and follow next steps.
1. READ DOCTORS ORDERS slowly and properly.
2. Read once AGAIN.
3. UNDERSTAND it properly
4. CALCULATE DOSE given in order
5. READ VIAL and 'each ml contains' dose.
6. CHECK PATIENT's NAME by asking patient or relative.
7. GIVE MEDICINE AS ADVISED
8. OBSERVE PATIENT for 10 mins after giving any injection.

BASIC LIFE SUPPORT/CARDIOPULMONARY RESUSCITATION FOR ADULTS

BLS consists of the following:

- Chest compression
- Airway
- Breathing
- Defibrillation

Overview of Initial Basic Life Support

- Assessment
- Remove victim from the hazardous environment to a place where care may be provided without putting the victim or BLS provider at risk.
- Look for response and breathing pattern. If there is no response and the victim is not breathing or is gasping, shout for help
- Check the victim's carotid pulse (take at least 5 sec and not more than 10 sec).

Chest compression:

- Position yourself beside the patient.
- Keep pt in supine position, on a firm surface.
- Place the heel of one hand on the lower half of the patients's sternum.
- Place the heel of the other hand on the top of the first hand and interlock your fingers.
- Keep the elbow straight, position your shoulders directly over your hands.
- Push hard and fast.
- Allow for complete chest recoil.
- Minimize interruptions.

Airway , rescue breaths:

- Head tilt, chin lift to open the airway.
- In case of cervical spine injury avoid head tilt and chin lift.
- Provide two rescue breaths keeping the nose pinched after every 30 compressions.
- Use face mask
- Look for a chest rise with each breath.

Ventilation:

- Respiratory arrest is a condition where the patient's respiratory efforts are either inadequate to maintain oxygenation or completely absent.
- Administer O2.

- Keep the airway open using basic airway adjuncts.
- Suctioning if necessary to clear secretions.
- Provide basic ventilation using bag & mask equipment.
- Secure an advanced airway.
- Identify the cause.

Oropharyngeal airway:

- Choose the correct size. It should be the distance between incisor teeth and angle of mandible.
- In adults, insert the airway with concavity upward, then rotate it in 180 degree when it touches the back of the throat.
- In children and infants, insert the tube with the concavity downward while using the tongue depressor to hold the tongue forward.
- It is contraindicated in unconscious patient as it can induce a gag resulting in vomiting.

Nasopharyngeal airway:

- In unconscious patients.
- Size: distance between tip of the nose and earlobe.

Rescue breaths:

- Ventilation may be provided mouth to mouth or mouth to nose.
- Use bag and mask
- Give two rescue after every 30 chest compressions
- Give sharp rescue breaths, each over one sec.
- Provide enough tidal volumeto see the chest rise, but avoid excessive ventilation.
- In an in-hospital setting, get a bag-mask for ventilation.

Bag mask ventilation (BMV):

- Self-inflating reservoir mask along with a mask.
- A one-way valve which prevents rebreathing the exhaled air.
- Oxygen port for supplying supplementary oxygen.
- E-C technique. One rescuer stands at the head end of the patient and holds the mask frmly with both the hands over the patient's face using E-C technique.
- The other rescuer slowly squeezes the bag over 1 sec to provide and effective chest rise.
- Avoid explosive squeezing.

Defibrillation & Cardioversion:

Defibrillation is the nonsynchronised delivery of a shock that depolarizes the entire cardiac tissue into a refractory period, making it unable to sustain or propagate an aberrant circuit. It is performed **during a cardiac arrest in a pulseless patient**.

Indication: pulseless VT, VF

300 J (biphasic),

Cardioversion is the delivery of energy that is synchronized to the QRS complex, thus only depolarizing the active circuit causing arrhythmias. It is used to revert **arrhthmias in awake patients.**

Indication: refractory SVT, unstable AF, unstable VT with pulse.

50-200 (biphasic)

Using an automated External Defibrillator (AED):

- Read the instructions on AED
- Stick the pads on the chest wall.
- Place the right pad (white) below the right clavicle and the left pad (red) on the left inferior lateral chest, lateral to apex.
- If the patient has open thorax injury, place the respective pads in the axilla.
- Turn on the AED and follow the voice prompts.
- The AED will analyze the cardiac rhythm and will deliver the defibrillation if a shockable rhythm is present.

Using a Biohasic Defibrillator:

- Turn on the defib to the manual mode.
- Select the desired energy- 200 J in adults and 2 J/kg in children.
- Remove paddles, apply gel on paddles.
- Charge paddles using charge button on the paddles or on device.
- Place paddles on the chest wall.
- Resusc team stay away from the cot, disconnect O2.
- Deliver shock by using discharge button.
- Resume CPR immediately, do not pause to check pulse/electrical rhythm soon after shcok.

Cardioversion using Biphsic Defib.

- Obtain consent from the patient and administer sedation with ketamin 1 mg/kg or Midazolam 2mg/Kg plus Fentanyl 50 µg.
- Turn on Deib to manual mode.
- Select desired energy (50-200).
- Place paddles, apply jelly.
- Turn on synchronized mode.
- Keep paddles on contact for at least 5 sec. while holding discharge till shock is delivered.
- Check pulse and electrical activity immediately after shock.
- If arrythmia perists, repeat the shock.

CARDIAC ARREST

As soon as cardiac arrest is identified, alert the emergency response system as per BLS protocol and follows the steps below;

1. Oxygen
2. Connect the patient to cardiac monitor/ defibrillator.
3. Establish peripheral venous access.

VT/ VF (shockable rhythm)	Non-shockable(asystole/PEA
Shock 200 J	IV Adrenaline
Resume CPR for 2 min/ 5 cycles	continue CPR
Shockable rhythm- shock 200 J	non-shockable rhythm
Resume CPR for 2 min/5 cycles IV Adrenaline stat.	IV Adrenalin every 3-5 mins
Shockable rhythm- shock 200 J IV Lignocaine	Intubate the patient
Resume CPR for 2 min/ 5 cycles	
Shockable rhythm- shock 200 J Rpt IV Adrenalin & Lignocaine	

Adrenalin dose: 1 ml in 10 NS IV push.
Lidocaine dose: 1- 1.5 mg/kg bolus
Second dose: 0.5-0.75mg/kg

Reversible causes of Cardiac arrest:

Hypoxia	Tension pneumothorax
Hypovolemia	Tamponade cardiac
Metabolic acidosis	Toxins
Hypo/hyperkalemia	Pulmonary Embolism
Hypothermia	Coronary artery Thrombosis

Management of bradycardia:
IV Atropine 1 mg IV stat, repeat every 3-5 mins.
Adrenalin or Dopamin infusion

Look for and treat any reversible cause like hypoxia etc.
If medications do not work consult and send for transvenous pacing.

SEVERE MALARIA

Is a medical emergency. An important cause of death among underfive children in malaria endemic areas. Falciparum malaria is the usual cause of severe malaria. Patient usually present with short history of 1-4 days duration, and rapidly worsening. In this area which is hyperendemic for malaria it is usually children who are the victims.

Signs and symptoms:

1. unconsciousness or irrelevant talk
2. convulsions
3. Baby lethargic and not able to suck.
4. Severe prostration- not able to sit up or walk without support (big children and adults)
5. Severe vomiting, not able to retain anything taken orally.
6. hypotension- systolic BP <80mmHg
7. Hypoglycemia- RBS < 50mg/dl
8. Jaundice
9. Blackwater fever – urine black
10. Hemoglobin <5 gm/dl
11. Tachypnea- respiration rate > 30/min in adult and >50/min in children
12. SpO2 < 90 %
13. Very high parasite count in peripheral smear (>2 lakhs/micro litre blood)
14. Urine output less
15. Bleeding from nose, gums, black stool..
16. Hyperpyrexia (temperature >106^{o}F

If a patient with fever has PS MP positive for malaria, and has any one of the above points is YES, then it is Severe malaria.

The above symptoms may be present alone or in combination.

Immediate investigations: PS for MP (type of MP & parasite load),
Hb
RBS

NB: *Where microscopy is not available, do RDT and collect smear for MP to be seen by technician.*

Management:

Admit patient.
Inj Artesunate IV at 0 hr, at 12 hrs and 24 hrs.
Repeat PS MP & Parasite load after the third dose.

Artesunate dose:

- 3mg/kg for children below 20kg,
- 2.4mg/kg for children above 20kg per dose. (each time open fresh vials.)

NB: If Hb is < 4gm/dl, patient needs blood transfusion urgent.

- Adult dose of IV Artesunate: 120mg per dose. At 0 hr, 12 hrs, 24 hrs.

Supportive therapy:

- Tab. Paracetamol TID/QID +/- cold sponge
- IV 10% Dextrose/5% D , if there is hypoglycemia
- Inj Metoclopramide 0.2mg/Kg IM if there is vomiting.
- Oxygen to keep oxygen saturation > 96%.
- IV Diazepam 0.2mg/kg/ Midazolam 0.1mg/kg for convulsions
- Oral feeds as soon as patient is able to drink

NB*:* *Do not give Iron supplements for anemia in the acute stage.*

After the 3rd dose of Inj Artesunate – Repeat PS MP (to look for parasite clearance).

After 3rd dose, if parasite clearance has not occurred, continue IV Artesunate at every 24 hrs x2 more doses. Repeat PS MP every 24 hours till parasite load clears completely.

Switch over to oral ACT (4mg/kg body wt) soon after the parasite clearance.
Along with oral ACT, add Tab. Primaquin (0.75mg/kg b. wt) one dose for destroying gametocytes. Avoid Primaquin in children below one year and in pregnant women.

MALARIA IN PREGNANCY:

Malaria in pregnancy is an important cause of maternal and newborn mortality. Pregnant women are vulnerable to malaria with its deadly consequences.

Malaria in pregnancy leads to:
persistent anemia in the pregnant woman (which does not respond to iron),
abortions, IUGR, preterm delivery, still birth, low birth weight babies who have less chance of survival.

All Antenatal check ups (in the hospitals and ANC camps) should have screening for malaria once in 2 months in this area.
The newborns get passive immunity to malaria from the mother and it lasts till 2 months only.

Treatment:

In 1st Trimester: Tab Quinine 10mg/kg/dose 8 hourly x 7 days
Can add Tab. Clindamycin 10mg/kg BD x 7 days
No A C T kit in 1st trimester.

NB: If patient develops tinnitus while taking Quinine, stop Tab Quinine.

In 2nd & 3rd trimester: ACT Kit x 3 dys
OR
Tab Artemisin Lumifantrine combination 1 tab BD x 3 days.

NO PRIMAQUIN IN PREGNANCY.

Make sure that pt takes oil items(eg badam/groundnuts) when she takes Artemether-Lumefantrine tabs, as it is better absorbed with oily food.

DIARRHOEA WITH DEHYDRATION

A common medical emergency.
Patient dies if prompt action is not taken.

- Assess the degree of dehydration. If the patient is a child:
  examine Ant fontanelle, eyes, tongue, skin turgor, urine output.
- If the patient is adult- check BP, Pulse, check for postural hypotension.
- Observe the stool- watery/rice water stools/ mixed with blood.

Management:
Fluid replacement is the mainstay of therapy.
Start ORS orally as soon as possible.
Inj. Metoclopramide if patient is vomiting (0.2mg/kg IM stat)

IV fluid replacement:
Total fluid to be given- 100ml/kg.

- Out of this, 30ml/kg in the first 1 hour, followed by 70ml/kg in the next 5 hrs **(for children 0-2yrs age).**

- 30ml/kg in the first 30 mins followed by 70ml/kg in the next Two and half hours (**for children >2 yrs to adults)**

- **Selection of IV Fluid- NS/ RL**

Watch for urine output.

Lab investigation: if urine output not adequate, check S. Creatinine & Electrolytes.

Use of antibiotics:

- NO Antibiotics if there is no fever.
- For those with fever start on:
- For children Cefixime 10mg/kg OD
- For adults: Cap Doxy 100mg BD x 3 days OR Tab Ciprofloxacin 500mg BD x 3 days

Health Education at the time of discharge:

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DENGUE SHOCK SYNDROME (SEVERE DENGUE)

Marked plasma leakage leads to circulatory collapse (shock) as evidenced by narrow pulse pressure or hypotension.

Caused by marked plasma leakage that leads to circulatory collapse (shock).

Diagnosis:

- Narrow pulse pressure (20mmHg)
- Hypotension for age (<80 mmHg for children <5 yrs age and <90 mmHg for >5 yrs age)
- Cold clammy skin and restlessness
- Haemorrhagic manifestations
- Thrombocytopenia and Leukopenia
- Elevated liver enzymes
- Ascites, Pleural effusion
- High hematocrit

Diag Lab confirmation:

- RNA detection by RT-PCR,
- NS1 Ag detection by ELISA 1
- Serological tests- Dengue virus specific IgM positive

TREATMENT:

Initial fluid resuscitation with crystalloids- NS/DNS

- 10 ml/Kg over 1 hour, then 7ml/Kg/hr for 2 hours, 5 ml/kg/hr for 6 hrs, then 3ml/kg/hour for 12hrs.

- Whole blood or packed cells transfusion for significant bleeding

CONVULSIONS/SEIZURES

A common emergency

Generalized seizures classically presents with tonic-clonic activity, loss of postural tone, unconsciousness, incontinence and a prolonged post-ictal period of lethargy.

Postictal confusion/ drowsiness is the most sensitive clinical feature in making sure if the case is seizures or not. Postictal period is the time between the end of seizure until the return to baseline mental status. During this time pts may be confused, obtunded,and may have amnesia for events since the seizures. This period can typically last from minutes to hours. Postictal paresis (Todd's paralysis) is a transient neurological deficit that lasts for hours or rarely days after an epileptic seizure.

Tongue biting, head turning, unusual posturing are the most specific clinical features in diagnosing seizures.

Nonconvulsive seizures presents with subtle signs- such as automatisms, facial or extremity twitchings, eye deviation, periods of preserved mental staus alternating with periods of impaired consciousness.

Seizures can be:

- **Generalized seizures**: may begin as generalized, or partial seizure with secondary generalization. Usually tonic- clonic (GCTS), tonic, clonic, atonic, myoclonic, and absence.

- **Partial seizures**: begin focally.

- **Simple partial**: Consciousness is not impaired. Can be motor (hand jerking), sensory (focal tingling), autonomic (sensation of epigastric rising), and psychic (de javu).

- **Complex partial**: Consciousness is impaired. Include TLE (automatisms sucha as lip smacking or picking at clothes, staring, behaviour arrest), frontal (hypermotor behaviour) or occipital(visual hallucinations).

DO THE FOLLOWING FOR THE CONVULSING PATIENT IMMEDIATELY:

1). Make the patient lie down on the bed or on the floor. DO NOT make the patient stand or sit. Remove all the objects nearby.

2). Turn the patient to left or right lateral position.

3). **AIRWAY**: clear secretion from mouth with suction pump. DO NOT waste much time on it.

4). **BREATHING:** start Oxygen at 2 lits/hour if SpO2 is less than 90%.

5). **CIRCULATION**: put IV cannula. Take samples for RBS, PS for MP, TC & DC. Do GRBS immediately, and if RBS is less than 70mg/dl, start (25% dextrose/50% dextrose/D5/D10) depending on how low is the RBS. See management of hypoglycemia.

6). Give Inj. DIAZEPAM IV stat. **slowly** over 3-5 minutes.
children: 0.2-0.4 mg/Kg IV stat
Adults: 10-15mg IV stat over 2 mins.

OR

Inj. MIDAZOLAM IV stat. SLOWLY over 1-2 mins.
Children: 0.1-0.2 mg/kg
Adults: 5-10mg.

7) If convulsions occur again, you can repeat the half dose of above injection after 15-30 mins.

8). If FEVER is present, do cold sponging and do PS for MP, and TC & DC.

9). DO NOT GIVE ANYTHING ORALLY ,till patient is fully conscious.

10). If patient is on medicines for convulsions/ epilepsy, continue the medications after patient becomes fully conscious.

History: In the history, ask for Family h/o epilepsy, developmental delay, trauma, information regarding pre-existing medical conditions, medications, drug allergies, alcohol, drug use etc. Ask the patient for any prodrome/ aura. Obtain witness's description of the event about incontinence, tongue biting and how the pt behaved after the event ended.

Phy exam: Look for signs of meningeal irritation, focal neurologic deficits, pregnancy, hypertension (hypertensive encephalopathy). Seizures in a pregnant lady unless otherwise proved, is eclampsia. But if pt is febrile/ having neck stiffness, evaluate for meningitis.

Investigations:
Diagnosis is essentially clinical. Few invs may be useful:
Metabolic work up- Blood glucose, electrolytes (Na, Ca), Hb, TC, DC, creatinine, VDRL, consider poisoning.
L.P. CSF when infection is suspected.
CT/MRI: to diagnose structural lesions.

Neurological/neurosurgical consultation required in the following:
- Known case of Seizure Disorder, not returning to normal mental status within 24 hrs.
- Focal neurological deficits

- Focal seizures
- Seizures with Ear discharge/ chronic sinusitis
- Recent head injury/ on anticoagulant therapy
- h/o malignancy
- multiple seizures all of recent onset.

Fever with seizures and neck stiffness:
LP CSF study.

Antiepileptic therapy in primary healthcare settings:

Starting an antiepileptic drug (AED) is usually not indicated after a single unprovoked seizure.

Diagnosis of epilepsy is made after two or more unprovoked seizures. AED treatment is generally started after the second seizure as the risk for subsequent seizures is very high.

Choose the drug based on seizure type, age, pregnancy status, cost.

Associated condition	**Drug of choice**	**Avoid using**
Pregnancy	Phenobarb/ Carbamazepin	Phenytoin, valproate, clonazepam
Lactation	Valproate/Phenytoin/Carbamaz	Clonazepam
SLE	Carbamazepin/Phenobarb	Phenytoin, Etosuximide
Liver disease	Phenobarb/clonazepam	Valproate, Carbamazepin
Renal failure	Phenytoin	
Obstructive sleep apnea	Valproate	
Cranial nerve neuralgia	Carbamazepin/Clonazepam	
Diabetic neuropathy	Carbamazepin	
Alcohol withdrawal	Carbamazepin	valproate
Porphyria	Valproate	Phenytoin, carbamazepine, phenobarb, primidone

AED

Drug	**Dose**	**Seizure type**	**Steady state**	**Cost (100 tabs)**
Phenytoin	Start -100mg TID Build up to 200-400 mg.OD	GTCS/PS	5-10 days	Rs 45-93 (100mg tabs)
Carbamazepine	Start with 200mgBD 600-1200mg in 2 d.d	GTCS/PS	3-4 days	Rs. 95-120 (100mg)
Valproic acid	Start with 600mg in 2 d.d 1.5-2.0 gm in 3 d.d	GTCS/PS Petitmal Myoclonic seizure	2-4 days	Rs. 200 (200mg)

Clonazepam	Start with 0.5-1mg OD. Increase by 0.5/d every 3-7 days to a max of 20 mg.	Petitmal Myoclonic S.		Rs. 90 (0.5 mg)
Phenobarb	Start with 60-120mg HS, go up by 30mg/day 100-200mg OD	GTCS.PS	14-21 days	Rs. 70 (30mg)

AED Dosage:

AED	**Starting dose-Children**	**Maintenance dose-children**	**Maintenance Dose-adults**	**frequency**
Sod valproate	10mg/kg/day	20-40mg/Kg/day	400-3000mg/day	Bd-tds
Carbamazapine	5mg/kg	10-25mg/kg	400-2000mg/day	Bd-tds
Phnytoin	5mg/kg	5-8mg/kg	200-700mg/day	OD-bd
Phenobarb	5mg/Kg	5-8mg/kg	60-240mg/day	Od/bd
Clonazepam	0.025mg/kg	0.025-0.1mg/kg	2-8mg/day	Od/bd
Clobazam	0.25mg/kg	0.5-1.0mg/day	10-40mg/day	Od/bd

STATUS EPILEPTICUS

Status Epilepticus(SE) is - greater than 30 mins of continuous seizure activity or recurrent seizures without full recovery between episodes. A seizure lasting for more than 5 mins should be also treated as SE. SE is a medical emergency.

Management:

Do all the steps **1, 2, 3, 4, 5, 6**

Position of patient

A- Airway: Put patient in left lateral position, clear the airway by suction of secretions in mouth quickly
B- Breathing: start oxygen
C- Circulation: put IV canula. Take blood sample for RBS, PS MP, TC & DC,

- IV access
- Glucometer RBS
- 25-50 ml of 50% dextrose, Thiamine if pt is alcoholic (before dextrose).
- IV Diazepam 10 mg over 2 mins. (repeat after 10 mins if needed).
- Regardless of the effect of Diazepam, Inj Phenytoin (**18-20mg/Kg**) IV at the rate of 50mg/min directly.
- At any point after this, be ready to intubate.

- If seizures stop -- investigate the cause of seizures. Long term anticonvulsant therapy indicated.

- If seizures continue--- pt needs ICU care. If it is not possible to refer immediately, Phenobarb. 10-20mg/Kg IV slow- diluted 1 in 10, not exceeding a maximum of 100 mg/min until seizures stop or a maximum dose is reached. Anticipate respiratory depression and hypotension.

- If Still seizures continuing: Consider Diazepam drip upto 1-2 mg /hr.

- Alternative: Midazolam drip (loading 0.2 mg/kg, maintenance 0.05-0.2 mg/kg/hour.
- Still continuing: consider Thiopentone sodium/ GA, mechanical ventilation.

ACUTE SEVERE BRONCHIAL ASTHMA/ STATUS ASTHMATICUS

Status asthmaticus is Prolonged severe episode of asthma that is unresponsive to initial standard therapy and may lead to respiratory failure.

Patient is usually young, no history of smoking, and presents with:

1. severe difficulty in breathing
2. wheezing (whistle like sound while breathing air out)
3. not able to complete sentence or taking breath many times while speaking
4. known patient of Bronchial Asthma not taking medicines,
5. SpO2 < 92%.

Pathologic process is airway obstruction and expiratory airflow limitation.
Increased workload placed on the respiratory muscles results in increased O2 consumption and CO2 production, setting up a vicious cycle.

Management:

Rapid evaluation of the patient, focusing on key points of history - such as duration of symptoms, potential inciting exposures, medications use, and age of onset of asthma attacks.

- Prop up patient with backrest
- Check SpO2, BP, Pulse, Temp.
- Start O2 inhalation.
- Inj Hydrocortisone 100mg IV stat in adult.
- Nebulize the patient with **Salbutamol/ Asthalin**. 5mg (1ml + 3ml saline) – nebulize. Repeat every 20 mins for 1 hr, x 3 doses.
- **Ipratropium/Ipravent** 0.5 mg nebulization every 20 minutes along with Salbutamol.

After this initial treatment if BP is normal, SpO2 is >90% and patient feels much better, NEXT STEP:

1. Salbutamol nebulization 6 hourly.
2. Inj Hydrocortisone 100mg 6 hrly.
3. If fever, cough with yellow sputum is present, then start antibiotics (Inj Ceftriaxone 1 gm IV BD OR Cap Amoxicillin 500mg TID)

<u>IF PATIENT DOES NOT SHOW IMPROVEMENT, Get the Chest Xray at the earliest to look for Pneumothorax, Pneumonia etc.</u>

NB: *Do not give Formeterol inhaler, Inj Deriphylline etc. in acute phase*.

- In children, ask for h/o ingestion of any foreign body. In such case you will hear rhonchi over a limited area of the chest and not all over the lungs. REFER such cases ASAP.

ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

When to say severe exacerbation of COPD/ severe Broncial Asthma:

1. pulse rate less than 60/min.
2. BP less than 90/60 mmHg
3. Very low RR or silent chest.
4. Confusion or coma
5. No improvement after initial treatment
6. Breath sounds heard only on one side of the chest, on auscultation.

COPD patients presents in middle age or old age, have h/o smoking for many years, chronic cough and breathing difficulty.

Acute exacerbations of COPD present with worsening of wheezing, purulent sputum, and increase in sputum volume.

Initial clinical evaluation includes history of smoking, presence of other associated conditions like diabetes, hypertension.
Temp, BP, Pulse, RR, SpO2
TC, DC, RBS, S. Creat.
Chest Xray

Treatment:
O2 therapy with low flow oxygen. SpO2 should be 88-92% only.
Ipratropium Nebulization- 0.5mg every 4-6 hours
Asthalin Nebulization 5mg every 4-6 hrs
Inj Hydrocortisone 100mg every 6 hours
Antibiotics: Amoxicillin/Doxycycline/Azithromycin

In acute respiratory failure, agitation/ decreased mental status, hemodynamic instability, excessive secretions, structural abnormality precluding mask fitting, extreme obesity- in these conditions:

Consider BiPAP therapy.

COMMUNITY ACQUIRED PNEUMONIA

CAP is the leading cause of mortality and morbidity in adults and children.

Risk factors in adults: age > 65 yrs, chronic comorbidities, concurrent or recent respiratory viral infections, smoking, alcohol abuse etc.

Microbiology: respiratory viruses (particularly Covid 2), Strep Pneumoniae, H. influenzae, atypical bacteria,

Diagnosis: Patient with fever, dyspnea, cough and leukocytosis
In this patient chest infiltrate on chest Xray

Determining severity of illness: CRB-65 score

- C- confusion (of recent onset)
- R- RR >30/min
- B- BP (systolic <90mmHg and Diastolic < 65mmHg0
- Age >65 yrs
    - CRB 65 score 0 →OPD treatment,
    - Score 1-2 →Admit patient
    - Score >3 →Admit to ICU

Treatment:

Inj Ceftriaxone IV + Tab Azithromycin (or Doxycycline) for 5-7 days.

Immunocompetent patient with respiratory failure due to CAP will require glucocorticoids as early as possible – Hydrocortisone continuous infusion 200 mg daily for 4 days.

CAP IN CHILDREN

No single symptom or sign is pathognomonic of pneumonia in children. May present with fever, cough, abdominal pain and neck stiffness.
Cough, chest pain, shortness of breath, difficulty in breathing—are classic features of pneumonia, but nonspecific.
Inability to suck, convulsions, hypoxia, alae nasi moving, intercostal indrawing, grunting- indicate severe pneumonia.
Absence of tachypnea rules out pneumonia.
Cough >4 weeks rules out acute pneumonia. Look for other causes

Diagnosis: combination of Fever, cough, tachypnea
Xray findings
Assess severity of pneumonia
Coplications of sever pneumonia in children: empyema, necrotizing pneumonia, lung abscess, pneumatocele, and hyponatremia. Suspect these in children who do not respond to treatment promptly.

SICKLE CELL DISEASE

Sickle cell disease is a congenital hemoglobinopathy where one amino acid substitution in the DNA chain of hemoglobin causes deformation of the RBCs into a sickle shape when exposed to cold, hypoxia or dehydration. These rigid RBCs lead to reduced tissue blood flow, intermittent vascular occlusion and hemolysis.

TREATMENT GUIDELINES for SICKLE CELL DISEASE - 2024

Every suspected person (Naik, Goud, unexplained aches & pains) should be screened with a metabisulfite sickle cell prep screen (SCP)or Solubility test.

If this is positive a serum Hb electrophoresis is done to separate trait (AS) from disease (SS). If the patient has SCD, blood is tested again by a different test - point of care or HPLC to confirm the diagnosis.

Once confirmed the patient and family are counselled and the patient is started on treatment.
The SCD stamp is put on the card , clinical Team is informed and patient's details are entered in the computer SCD database.

Those who have sickle cell trait need genetic counselling only, as they are otherwise normal.

Every SCD patient has a blue sickle cell book which is kept at hospital record section.

All pregnant women belonging to nontribal casts are screened for Sickling along with initial screening tests. The newborns identified as Sickle positive undergo Hb electrophoresis at 9 months of age to confirm the diagnosis.

Sickle cell patients have chronic anemia (Hb 7-10) and alternate between periods of good health and crises.

Types of Crises that occur in SCD patients:

1. ***Vaso occlusive crisis:*** is due to thrombosis and obstruction of small vessels in the bones, lung, brain and spleen. This leads to severe pain and permanent ischemic tissue damage.
Vaso occlusive crisis in Bones: a) ***Dactylitis*** is common in children below 4 yrs. The child presents with hand foot pain with nonpitting edema of hands and feet, warmth and tenderness. ***b). Avasular necrosis of head of femur. C) in the long bones of UL and LL.***

2. ***Acute Splenic sequestration crisis:*** this happens in young children because of pooling of a large quantity of their peripheral blood in the spleen. They present with severe abdominal pain in upper quadrant, pallor and massive splenomegaly and hypovolemic shock.

3. ***Sepsis in Sickle cell disease:*** This occurs suddenly and is often fatal in children. As they are asplenic (autospelenctomy by the age of one year), they are prone for infections. Usual organisms are H. influenzae, pneumococci and salmonella. Any febrile illness in children with SCD is a medical emergency. Start appropriate antibiotics immediately and manage shock.

4. ***Aplastic crisis:*** This occurs with decreased production of RBCs in the bone marrow and this exacerbates the chronic hemolytic anemia. Hematocrit and Retic count is decreased.

5. ***Acute Chest Syndrome:*** Child presents with fever, cough, pleuritic chest pain. On CXR, pulmonary infiltrates and pleural effusion may be seen. Infection with Pneumococci or Mycoplasma are the usual cause of acute chest syndrome.

6. ***Hemolytic Crisis:*** occurs with acceleration of hemolytic process and worsening of anemia and deepening of jaundice.

7.Stroke: This is usually thrombosis of a large vessel- middle cerebral artery or internal carotid artery). This is uncommon in children less than one year.

Infection, cold weather, and dehydration are precipitating events.

Management of Sickle Cell Disease

General principles:

Sickle Cell Disease patients should be counselled and encouraged to

- drink plenty of fluids – adults 2-3 litres/day so that the urine is not yellow
- take a nutritious diet
- avoid strenuous work
- avoid getting wet and cold
- be properly clothed

All patients should have:

- All patients are given folic acid 5mg/day, B complex with B12 daily and paracetamol tablets as needed.

- *Iron tablets are given to menstruating females only. It is avoided in other pts to avoid iron overload*

- The Health team must see patients at least once in 3 months to ascertain if there are any symptoms
- Those with 2 or more admissions/year should be seen monthly
- At every visit, the patient must be questioned regarding pain and work status and checked for pallor, jaundice, spleen size

- The following tests are done regularly –

CBC,- once in 3 months when on a stable dose of 5HU,
S.creatinine, RBS/FBS, SGPT(ALT), S transferrin, TIBC once yearly.

USG abdomen to look for gallstones routinely once in a year and in between if there is abdominal pain or increasing jaundice

ECHO and carotid doppler.

Infection, cold weather, and dehydration are precipitating events.

In addition:

For Children 0-2 yrs:

- Administer penicillin (Kaypen), 125 mg twice a day, with folic acid and B complex with B12

DO NOT ADMINISTER HYDROXYUREA unless they have had at least 1 documented crisis

Children 2-5 yrs:

- Administer a single dose of Pneumo-23 vaccine 0.5ml intramuscularly or subcutaneously (preferably in the deltoid or mid-lateral thigh) and stop oral penicillin.
- Start 5-Hydroxyurea (5HU) 10mg/kg /day in all patients even if they have no documented hospital admissions in crisis.
- Increase 5HU dosage by 5mg/kg every 3 months to a max of 35 mg/kg/day if there is no improvement in the pain.
- For doses less than 500 mg/day, the correct amount of powder is taken from the capsule and given to the patient with a little honey.

Patients 5 yrs and above:

- Administer Pneumo-23 vaccine via intramuscular/subcutaneous route if not given previously.
- Administer hydroxyurea 10mg/kg by weight
- Increase 5HU dosage as above to a max of 35mg/kg

Monitoring of all patients on 5HU:

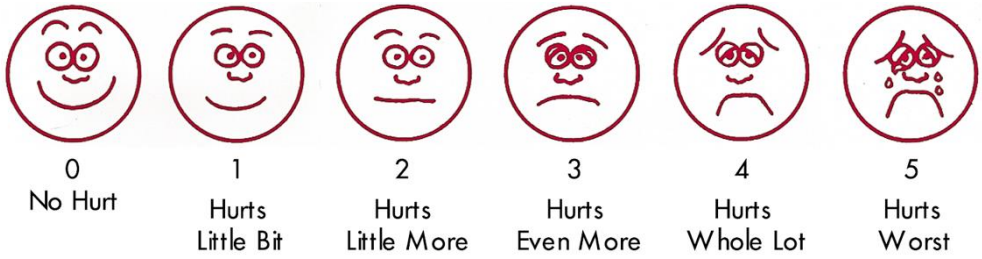
- Check the WBC count seven days after the first administration of 5HU.
- If normal, check the WBC count monthly.
- If the total WBC count falls below 3500/mm, or the ANC (absolute neutrophil count) falls to 1500/mm stop 5HU for seven days and recheck the count.
- If the total WBC count goes up after seven days, restart 5HU at a reduced dose or frequency (3-5 days per week).
- Adjust hydroxyurea dosage only after consulting the doctor
- 5HU can be increased to a max of 35 mg/kg if the patient has recurrent crises or a persistently high white count

Management of Crises in SCD

- Standard patient monitoring of patients with SCD admitted in crisis should include at least 4-hourly SpO2 monitoring, heart rate monitoring and blood pressure monitoring.
- SpO2 should be measured on room air to enhance the sensitivity and specificity of the test to detect significant hypoxia and this is particularly helpful if the patient is located in the general ward.
- Frequent clinical examination is also required as changes take place rapidly

1.Severe pain – Vaso occlusive crisis(VAO)- Most common cause for admission is pain in the long bones, back or chest. The area may be swollen and the pain is caused by bone infarction.

Pain Scale



Management of pain:

a) Of Pain based on Pain Scale Initiate vigorous analgesia as early as possible to break the pain cycle

•Mild to moderate pain (1-3) is treated with paracetamol, diclofenac (after food and with omeparazole 20mg bid to avoid gastritis),
•Severe pain (4, 5)is treated with Narcotics – oral tramadol, Inj morphine sc/im is started and titrated to control pain.

b) Hydration as the patient is often too sick to drink fluids

- Blood transfusion if pain and anemia are worsening and Hb has dropped by 2gm% from baseline
- Antibiotics- it is difficult to decide initially if the patient needs antibiotics as pain is often accompanied by low-grade fever. If the fever persists >3 days, or increases or the patient's condition worsens or if the painful area is tender and there is an increase in the swelling with Inc WBC count start IV ampiclox (for S.aureus) + Ceftrioxone (for S.typhi & S.aureus)-
- Continue or increase 5 HU dosage by 5mg/kg/day, and check ANC.

2. Acute Chest Syndrome

The patient presents with fever, pleuritic chest pain suggestive of pneumonia, and increasing respiratory distress . O2 saturation may be low.
Chest X-ray may show an infiltrate.
Start

- IV hydration
- O2 by mask or canula to keep O2 sat >95%
- PO azithromycin 500mg od + IV ceftriaxone 1-2 gm od
- Blood transfusion is the most important treatment if the patient condition is worsening. Ideally, exchange transfusion is advised

3.Sequestration-

This is generally in children 2-5 years of age

Child is usually crying/refusing to eat because of abdominal pain. The mother notices the child appears paler. On palpation of the abdomen the spleen is found to be enlarged and tender

This is an emergency as the blood gets sequestered in the spleen and the Hb drops precipitously. The child needs to be rushed to the hospital and transfused immediately.

This is one cause of death at home.

4.Severe anemia and jaundice- (hemolysis or parvovirus infection)

- Blood transfusion if Hb has dropped more than 2gm from the baseline
- USG abdomen to diagnose gallstones and obstructive jaundice

Hyroxyurea Pregnancy- Warning

5HU has been assigned to pregnancy category D by FDA . Animal studies have revealed that the drug crosses the placenta. Its use has been associated with embryotoxicity, fetal malformations, growth retardation, and impaired learning disability. There are no controlled data in human pregnancy. If 5HU is used during pregnancy or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential harm to the fetus. Women of childbearing potential should be advised to avoid becoming pregnant while on 5HU.

Hydroxuurea in Breast feeding -Warning

HU is excreted into human milk. Because of the potential for serious adverse reactions with 5HU a decision should be made either to discontinue nursing or to discontinue the drug, taking into the importance of the drug for the mother

ANAPHYLACTIC SHOCK

Anaphylaxis is clinical manifestation of IgE mediated immediate hypersensitivity reaction and can be life threatening. Reaction may develop within minutes after exposure to the triggering substance.

More rapid reaction occur with parenteral medications.

Clinical manifestations:

- Flushing, pruritus and a sense of death.
- Clinical features may involve skin, eyes, respiratory and gastrointestinal tracts, cardiovascular and central nervous systems.
- Cardiovascular collapse (shock) occurs in 30% . This is manifested as hypovolemia, hypotension, and bradycardia.
- Upto 50% may have respiratory symptoms- and may progress to acute respiratory failure due to upper airway edema, bronchospasm, or pulmonary edema.

Diagnosis: is based on clinical features.
Differential diagnosis: status asthmaticus, panic attacks

Treatment:

If there is, or impending *respiratory collapse*(stridor, wheezing, tachypnea, dyspnea, dysphagia) or signs of shock (*cardiovascular collapse*)-

- Make the patient lie down flat.
- Large bore IV access immediately.
- Start Normal Saline drip 1-2 lits.

- Continuous monitoring of BP, pulse, O2 saturation, respiration rate and resp symptoms.

- Intubation if needed immediately, as delay may lead to difficulty in intubation

- ***Inj Adrenaline 0.25-0.5 mg IM on anterior or lateral thigh***.

- Can repeat the IM Adrenaline after 5 min (if response is poor to first dose). 70% may require a second dose).

- Inj Diphenhydramine (Avil) 25-50mg IV stat

INSECTICIDE/ORGANOPHOSPHORUS POISONING

a. relatives telling that patient drank poison
b. relatives telling patient became unconscious while spraying in farm
c. smell of insecticide when patient is brought to the clinic.

1. Find out what poison was taken, and at what time it was taken. Get the packet or bottle of the poison.

Symptoms in OP poisoning: vomiting, salivation, altered sensorium, sweating.
Smelling of the insecticide.
Pupils in both eyes constricted (pinpoint pupils).

If patient is brought with any of the above complaints, do the following:

2. **Lie down patient** on bed in lateral position as given below and **change all cloths**.

3. start **A B C**

Airway- clear secretion from mouth with suction pump.
Breathing- start oxygen at 2 lit/ hour if SpO2 is <90%
Circulation- Put IV cannula and start IV fluids

4. If RBS is below 50, then give 25% or 50% Dextrose stat and start DNS

5. STOMACH WASH: If the poison is taken in the last 4 hrs, do a stomach wash. Put bigger Ryle's tube (NGT) 18 no. in adults- and do stomach wash with 2-4 bottles of NS.

NB: <u>Do not do stomach wash if patient is unconscious</u>.
If doctor is around, and patient has taken poison less than 2 hours ago, and unconscious, intubate the patient and inflate the cuff to prevent aspiration, and do stomach wash.

<u>Do not do stomach in patient with kerosene poisoning , do not make them to vomit or do stomach wash.</u>

<u>If the patient has taken bleaching powder as poison, do not do stomach wash</u>. Give them plenty of milk.

If the patient is very uncooperative and stomach wash not possible, avoid it.

6. Activated charcoal: Mix 50G of activated charcoal in a little water and put it into the stomach through the stomach wash tube or an NG tube if you did not do a stomach wash. Flush the charcoal down the tube with a little plain water. If they are

cooperative and conscious they can drink the activated charcoal. If they vomited the activated charcoal within 30 minutes, repeat the dose.

7. Inj Ranitidine 50 mg (1 amp) IV stat.

DO NOT GIVE Inj. Metoclopramide. DO NOT ALLOW TO EAT until patient becomes fully conscious.

REFER Patient, if no doctor available and patient is critical.

Lab.Investigations:

Take blood samples for RBS, Cholinesterase levels (RBC ChE reduced to 20% of normal values & Serum Ch E reduced to 50% of normal is diagnostic)

Specific therapy for OP poisoning:

a) . *Inj Atropine* 2-4 amps IV stat.

Repeat 1-2 mg every 15 mins.

Atropine can also be given as infusion 0.02-0.08mg/kg/hour till the endpoint is reached. (endpoint: tracheobronchial secretions decrease, delirium, tachycardia (pulse rate 150/min) restlessness, and dilatation of pupils).

b) *Inj Pralidoxime (PAM)* 1 gm in 100 ml saline IV over 30 mins.

This can be repeated after one hour and subsequently every 6-12 hrs . (maximum dose 12 gm in 24 hrs). PAM is effective if patient is seen within 6 hours of poisoning.

c) Inj Diazepam in case of convulsions 5-10 mg IV.

d) Patient may develop <u>"Delayed Syndrome"</u> after 1-4 weeks, presenting as flaccid paralysis of limb muscles. Relatives have to be told about this at the time of discharge.

e) <u>"Intermediate Syndrome"</u> which may occur within 24-96 hrs is characterized by weakness of neck muscles, proximal limb muscles, cranial nerves or espiratory paralysis.
Treatment is supportive. Assisted ventilation may be needed.

f) Counselling of the patient at the time of discharge.

ELECTRIC SHOCK: MANAGEMENT

The signs and symptoms of electric shock depend on the type of current, how high the voltage is, how long the person was in contact with electricity, and his/her overall health.

Patient may present with:

- Difficulty in breathing or respiratory failure
- Weak, irregular pulse, or no pulse palpable
- Burns
- coma
- Cardiac arrest.

DO THE FOLLOWING:

- Immediately separate the person from the current source.
- **C P R**
- IV fluids- Normal saline
- O2

Check for other injuries.
If there is electrical burn, put the burnt area under running water for 20 mins, then cover with a sterile gauze bandage or a clean cloth.

Electric shock can be of different types:

- **Normal voltage (240V) house current**. Causes small entry wound (where the current entered the body) and also small exit wounds (where current left the body). So always check for an entry and exit wound. The person may not be able to let go of the wire that is shocking him because of muscle spasm (he cannot move his hand or foot to let go). The Heart may stop beating (arrhythmia) and he may die. Arrhythmia can occur for up to 4 hrs after the shock. Sudden muscle contraction (spasm) can cause fractures or dislocations of joints.

- **High tension current (around 500V or more):** This shock will cause severe deep injury to blood vessels, muscles and organs. Damaged muscles will let out a protein called myoglobin, which will damage the kidneys by blocking them. Swelling of muscles within tight tissue (compartment syndrome) will cause more damage unless pressure is released. Most of these patients die immediately but if they survive they need transfer to a larger hospital after ABCDE care.

- **Lightening:** Lightening current usually spreads through skin and does not enter deep tissues. The person may die immediately because the current causes the heart to stop or the breathing to stop. However, because internal damage is not severe, they may be resuscitable more than

those hurt by other electric shock. Skin burns may be a major problem. They may also have been thrown off a long way causing injuries.

In all electric emergencies the priority is still resuscitation first along normal rules:

Follow ABC. If you were present when the shock occurred, turn off the current before touching them! Immediate resuscitation has a fair chance of success even if their heart has stopped because the cause is arrhythmia. If you were successful in restarting the heart, you may need to continue ventilation for some hours because muscle weakness takes time to recover.

After ABC,

a) **Normal voltage shock:**
Look for entry and exit wounds and treat them. Look for fractures and dislocations and treat them. You may need to monitor their pulse and heart rate for 4 hours to make sure they do not have abnormal heart rate. They can then be discharged depending on the type of other injuries that they have.

b) **High voltage shock:**
This leads to rhabdomyolysis leading to AKI requiring Dialysis. These people need referral once stabilized. Make sure that they have enough fluids given to keep renal output high (1ml/kg/hr)

c) **Lightning**:
After resuscitation, look for injuries if they were thrown off. Assess amount of skin burns and treat as in burns notes. Keep for 4 hours and if no arrhythmias, patient can be discharge if no other problems.

HEAT STROKE

Most severe form of heat illness wherein the body overheats and can't cool down by sweating because of dehydration.
It can cause death or permanent disability if emergency treatment is not provided.
It is a multisystem failure.

Symptoms:
Heat exhaustion is more common and less extreme manifestation of heat-related illness.
This consists of: Dizziness or fainting, thirst, weakness, headache, and malaise.

Exertional heat stroke is a condition primarily affecting younger, active persons. It is characterized by rapid onset.

Heat stroke manifestations are:

- Hot and dry skin
- Very high core body temperature of 104^0 F or more
- Lack of sweating
- Throbbing headache
- Behavioral changes such as s confusion or disorientation
- Muscle weakness or cramps
- Nausea, vomiting
- Tachycardia
- Rapid shallow breathing
- Unconsciousness

These manifestations are thought to be an encephalopathic response to a systemic inflammatory cascade.

Treatment- immediate steps:
1. Move the patient to a shady spot or indoors
2. Make the patient lie down with the foot end elevated.
3. if conscious, make him sip cool water.
4. remove his clothing
5. cool the patient by pouring cool water
6. cold sponge or apply ice packs to the axilla, neck, and groins.
7. use a fan to direct air to the body.
8. A B C

Cooled Normal saline can be administered IV.
(Gastric, bladder and rectal cold water lavage can be tried with minimal invasion).
Medications have not been found effective.
Cooling to be stopped when core temp falls to 100.4^oF.

Close monitoring needed. 20% develop irreversible brain changes.

CEREBROVASCULAR ACCIDENT/CVA/STROKE

(Dr Anand Zachariah)

CVA is an abrupt onset of neurological deficit that is attributable to focal vascular cause.

Quick identification of stroke:

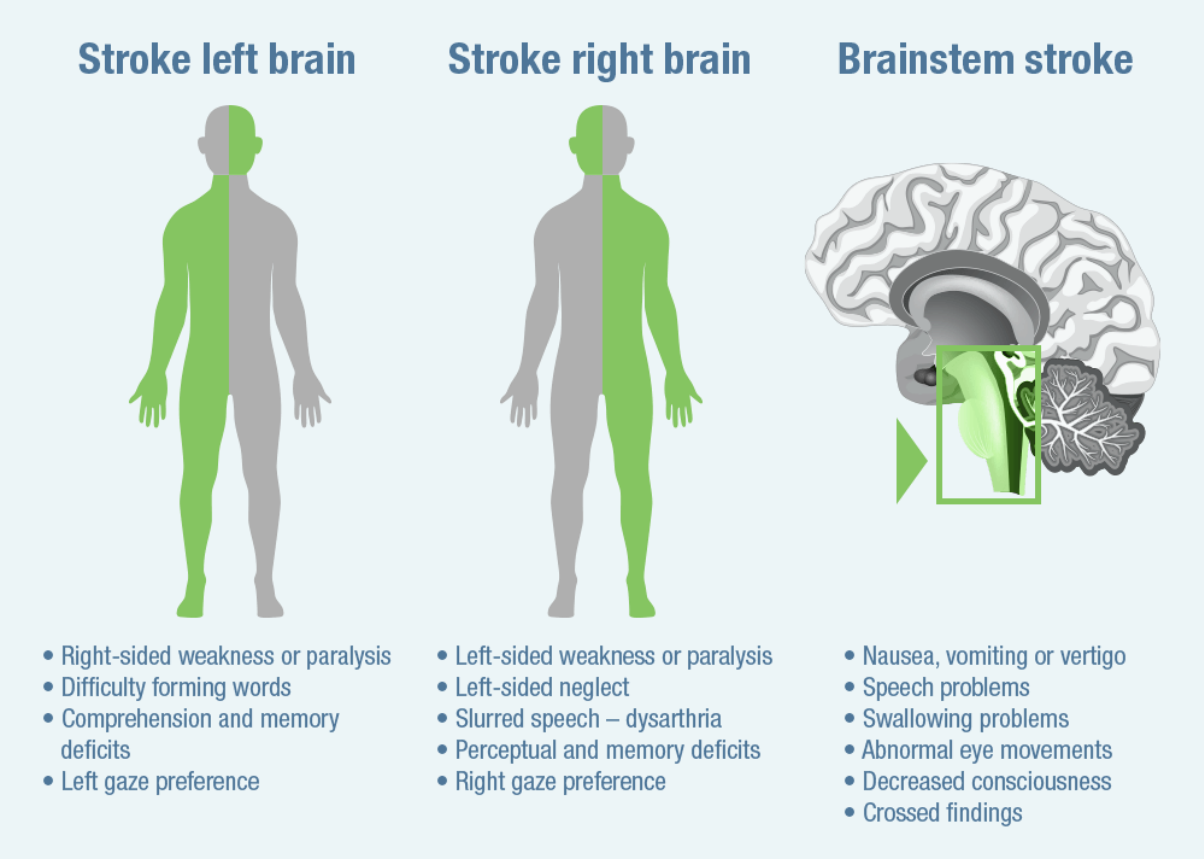
FACE: one side of the face droops, patient's smile is uneven, drooling of saliva from one side the mouth.

ARM: When asked to raise both arms, only one arm is mobile, or one arm is weaker, numb or drifting downward.

SPEECH: Slurred or incoherent speech, inability to understand or repeat simple sentences.

TIME: If any of the above signs are present and sudden in onset, patient may have had an acute stroke.

Time is of the essence and patient needs to be transported to hospital.



Clinical Localisation of Stroke:

1) CORTICAL:

Eye deviation – gaze palsy
Aphasias
Facial palsy
Hemiplegia/hemiparesis
Hemianesthesia
Hemianopia

Alexia, agraphia, right and left disorientation

2) Subcortical:

Disproportionate weakness of arm and leg
Faciobrachial paresis

3)Internal Capsule:

Dense hemiplegia
Hemianesthesia
Hemianopia
Facial palsy

4) Thalamus:

Hemisensory loss

5) Brainstem stroke:

- Crossed hemiplegia (cranial nerve involvement on one side and contralateral hemiplegia)
- Involvement of IX, X and XII nerve involvement
- Altered sensorium
- Cerebellar signs
- Crossed sensory loss

Intraparenchymal haemorrhage (bleeding into brain parenchyma)

- Nausea, vomiting
- Headache
- Unilateral weakness
- Decreased consciousness
- Very High BP

Subarachnoid Haemorrhage (bleed into space between arachnoid membrane and pia mater)

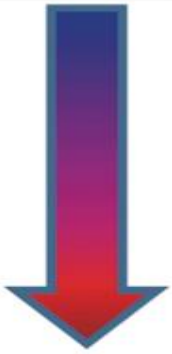
- Worst headache of life
- Intolerance to light
- Neck stiffness

NIHSS scoring:

Table 1
National Institutes of Health stroke scale score

1a. Level of consciousness	0 = Alert; keenly responsive 1 = Not alert, but arousable by minor stimulation 2 = Not alert; requires repeated stimulation 3 = Unresponsive or responds only with reflex
1b. Level of consciousness questions: What is the month? What is your age?	0 = Both answers correct 1 = Answers 1 question correctly 2 = Answers 2 questions correctly
1c. Level of consciousness commands: Open and close your eyes Grip and release your hand	0 = Performs both tasks correctly 1 = Performs 1 task correctly 2 = Performs neither task correctly
2. Best gaze	0 = Normal 1 = Partial gaze palsy 2 = Forced deviation
3. Visual	0 = No visual loss 1 = Partial hemianopia 2 = Complete hemianopia 3 = Bilateral hemianopia
4. Facial palsy	0 = Normal symmetric movements 1 = Minor paralysis 2 = Partial paralysis 3 = Complete paralysis of 1 or both sides
5. Motor arm 5a. Left arm 5b. Right arm	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity; limb falls 4 = No movement
6. Motor leg 6a. Left leg 6b. Right leg	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement
7. Limb ataxia	0 = Absent 1 = Present in 1 limb 2 = Present in 2 limbs
8. Sensory	0 = Normal; no sensory loss 1 = Mild-to-moderate sensory loss 2 = Severe to total sensory loss
9. Best language	0 = No aphasia; normal 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute, global aphasia
10. Dysarthria	0 = Normal 1 = Mild to moderate dysarthria 2 = Severe dysarthria
11. Extinction and inattention	0 = No abnormality 1 = Visual, tactile, auditory, spatial, or personal inattention 2 = Profound hemi-inattention or extinction
Total score = 0–42	

Adapted from National Institutes of Health, National Institute of Neurological Disorders and

NIHSS SCORE	STROKE SEVERITY	IMPACTED BRAIN DENSITY
0	No Stroke	
0 – 4	Minor Stroke	
5 – 15	Moderate Stroke	
16– 20	Moderate to Severe Stroke	
21 - 42	Severe Stroke	

Stroke interpretation.

Management in resource poor setting:
Send for CT scan within 4.5 hrs, when possible.

BP control:

- Monitor BP q2h
- Lower BP only if BP < 220/120 mm Hg
- Lower BP by 15% in first 24 hours
- Usually BP reduces by itself in first 24 hours
- Lebatolol 10-20 mg IV bolus
- Avoid calcium channel blockers (sudden lowering of BP)
- Do not rapidly bring down BP with SL preparation
- BP medicines can be started after 24 hours in known hypertensive and if neurologically stable

IV fluids:

- IV Fluids preferably NS
- Continue longer if patient is nil by mouth
- Avoid dextrose for first 24 h

Oxygen:

- Recommended in patients with hypoxia, drowsiness or hypotension
- A pilot study of oxygen replacement shown apparent beneficial effect on early neurological recovery

FeSS protocol:

Fever management:

- Release of excitotoxic aminoacids or enhancement of detrimental inflammatory response
- Actively seek out source of infection, Paracetamol administration
- Reduction in death and dependency, beneficial effect on functional outcomes

Sugar management:

- Hyperglycaemia has poor outcome regardless of diabetic status
- Rigorous glycaemic control does not improve outcomes
- Maintain blood sugar between 90–200 mg/dL

Swallow assessment:

- Swallowing assessment desirable; NPO until assessed
- If swallow assessment failed early NG Feeds

Swallowing test:

- Assess alertness and cooperation
- Direct assessment of swallowing (choking, wet cough and hoarseness of voice)
- Protrude tongue
- Pharyngeal sensation
- Administer 50 ml of water
- Check swallowing
- Positive test- Deglutition problem, involuntary cough, drooling, and voice change after swallowing

If swallowing test fails, pass Ryle's tube.

Management of complications:

PNEUMONIA

- Semi upright position
- Frequent suctioning, Chest PT
- Formal swallow before initiating oral feeds
- Early treatment in case of pneumonia
- Prophylactic antibiotics not beneficial in prevention

PREVENTION OF DVT AND PE

- Prophylaxis
- Treatment: UF Heparin: 5000 Units BD s/c; LMWH: Enoxaparin (started on day 1 or 2)
- May increase risk of hemorrhagic transformation
- Graduated pressure stockings ineffective
- Intermittent pneumatic compression treatment of choice

URINARY INCONTINENCE

- 40–60% of acute stroke patients
- Treat cause: UTI, Regular toileting.
- Avoid Urinary Catheter unless urinary retention

RAISED ICP

- Elevate the head 15^0 to 30^0
- Mannitol 0.25-0.5gms/kg/4-6 hourly or Inj. Mannitol 20% 100 ml IV q6h
- Hypertonic saline - 3% saline
- No role of steroids
- Given on day 2-3 for moderate to severe stroke, clinical deterioration or mid line shift on CT scan

Secondary prevention of Ischaemic sroke:

- Antiplatelet Therapy:
    - Aspirin 75 mg once daily, Clopidogrel 75 mg od
- Statins:
    - Atorvastatin 80 mg per day
- Anticoagulation
- Control of other risk factors

Rehabilitations:

Physiotherapy
Speech therapy
Occupational therapy

Early Discharge:

- Median length of stay following acute stroke is 7.3 days
- Families/carers should be fully involved in discharge planning
    - Assessment of discharge needs
    - Identification of recovery goals
    - Early rehabilitation input
- Appropriate for patients with mild/moderate disability

MANAGEMENT OF INTRACEREBRAL HAEMORRHAGE

1) Management of Hypertension:

- Target: BP ≤140/90 mm Hg
- Aggressive control of BP

Reduce systolic BP to < 180 mm hg in 1 hour

If diastolic BP > 140 mm hg ---→ IV Nitroglycerine

If diastolic BP 105-140 mm hg -→ IV Lebatolol

If BP < 180/105 --→ oral medication can be used

2) Cerebral edema:

- Osmotherapy : Mannitol 0.25-0.5 Gms/Kg 4 hrly
- No role of steroids
- Hyperventilation

3) Coagulopathy:

If there is coagulopathy due to

Vitamin K antagonist,

- Treat with FFP and Inj. Vitamin K1

- Fresh frozen plasma

Indications for surgery:

- Cerebellar haematoma large > 3 cm
- Hydrocephalus
- Clinical deterioration
- Surgery can be life saving for patients with lobar haematoma 30-60 ml with clinical deterioration.
- Surgery should not be considered for brain stem and basal ganglia haemorrhage

CARDIO-EMBOLIC STROKE

- Anti-coagulation:

Large cardio-embolic infarcts are at high risk of hemorrhagic transformation.

Anti-coagulation is with-held in the first 48 hours after a cardio-embolic stroke because of the risk of hemorrhagic transformation with large cortical strokes.

Mild stroke anticoagulation started after 48 hours

In moderate to severe stroke, anticoagulation started after 7-10 days

- Oral anticoagulants with (Acitrom or Warfarin) are started at lowest dose and dose increased based on PT INR monitoring every 2-3 days to achieve a target of INR 2-3.

Primary prevention of cardio-embolic stroke in patients with high risk:

1. Rheumatic heart disease with atrial fibrillation: Anticoagulation is indicated to prevent cardio-embolic stroke- Vitamin K antagonist.
2. Non-rheumatic atrial fibrillation: Vitamin K antagonist or NOAC

SETTING UP STROKE UNIT (SU) IN RESOURCE POOR SETTING:

Training of local physician:

- Key components of basic SU care, assessment, and monitoring with selected clinical assessments
- Medical and rehabilitation management in the acute phase

Training of stroke team (SU nurses, physiotherapists, and occupation therapist):

- Acute nursing care
- Secondary complications management
- Importance of the multidisciplinary approach
- Early mobility and post-stroke rehabilitation
- Discharge planning
- Formal multidisciplinary team meetings to discuss cases daily

How do we address stroke in rural community?

- Community education
- Screening of risk factors
- Treatment of hypertension, diabetes, dyslipidemia
- Tobacco and alcohol cessation
- Reduction in salt intake
- Diet- increase fruit and vegetables and reduce saturated fat intake

Kitchen garden/community kitchen (broadening diet)

HEAD INJURY , TRAUMA

In cases of Head injury, Do the following:

Scoring on Glasgow Coma Scale

BEHAVIOUR	RESPONSE
EYE - OPENING RESPONSE	**4. Spontaneously** **3. to speech** **2. to pain** **1. No response**
VERBAL RESPONSE	**5. Oriented to time, person & place** **4. Confused** **3. Inappropriate words** **2. Incomprehensible sounds** **1. No response**
MOTOR RESPONSE	**6. Obeys commands** **5. moves to localized pain** **4. Flex to withdraw from pain** **3. Abnormal flexion** **2. Abnormal extension** **1. No response**

1. Assess the sensorium of the patient on Glasgow coma scale. If patient is unconscious.

2. look for bleeding or watery discharge from ear, nose, or inside throat

3. Vomited more than 3 times in last 24 hours or vomited blood

4. Pt not able to recognize

5. Memory loss

6. Talking or behaving nonsense

7. Severe back pain

8. Injury to eye and not able to see

9. Not able to open mouth

10. Suspicion of any fracture.

FIRST AID in case of Trauma:

1. Lie down patient and check BP, Pulse, RR and SpO2
2. If trauma site is bleeding, press with a clean cotton pad on bleeding site with continuous pressure for 10 minutes. DO NOT Check if bleeding is stopped or not, within that 10 minutes
3. Put IV cannula and start NS if BP is below 90/50 mmHg.
4. Clean and suture the wound immediately if it is bleeding
5. Give Inj Tet Toxoid 0.5 ml IM stat
6. While writing referral letter, mention vital records and treatment you have given.

If Patient is conscious,

1. clean the wound with NS or boiled and cooled water. Do not use savlon , betadine or spirit on wound.
2. Give local anesthesia from inside the wound margin.
3. suture the wound and do the dressing
4. Give Inj TT 0.5 ml if not taken in the past 2-3 years.
5. Give Tab PCM SOS for pain
6. Tab Cotrimoxazole or Cap Ampiclox can be given in case of large swelling and foot wounds for 5 days.

HYPERTENSIVE EMERGENCIES

SEVERE ELEVATION OF BLOOD PRESSURE WITH EVIDENCE OF ACUTE/ ONGOING TARGET ORGAN DAMAGE.

Hypertensive Urgency:

Severe HTN with diastoci BP >120mm Hg in asymptomatic patients is referred to as hypertensive urgency. In them there is no evidence of acute target organ damage unlike in hypertensive emergency. Reduction of BP in hours or days in them.

- HYPERTENSIVE ENCEPHALOPATHY: characterized by irritability, headache, and mental status changes caused by significant and rapid elevation in BP.
- ACCELERATED/MALIGNANT HYPERTENSION: characterised by fundoscopic findings of papilledema and/or acute retinal hemorrhages and exudates.

Hypertensive emergency is different from severe hypertension. Every case of severe HTN has to be evaluated for hypertensive emergency.

Evaluation of Severe Hypertension - usually BP > 180/120 mmHg

Quickly look for signs and symptoms of Target organ damage (TOD).

1. BP in both UL, LL, pulse, SpO2

2. General exam: agitation, anxiety, restlessness

3.Fundoscopic exam : exudates, haemorrhages, papilledema

4. CVS: S3, S4, diastolic murmur of AR, raised JVP, pedal edema

5. RS: basal creps

6. CNS: mental status changes, focal neurological deficits

Investigations:

CBC, S.Creat, S. electrolytes, urine- alb, micro for RBCs, casts.

Cardiac enzymes, CXR, ECG – ST_T changes, Q waves

The goal of therapy is:

1. stop progression of TOD

2. avoid organ hypoperfusion during treatment

Principles of management:

Antihypertensive medications to be started as soon as uncontrolled HTN is diagnosed.

In general, target a gradual reduction of BP over 24 hours with oral antihyertensives in Hypertensive urgency, and IV antihypertensives in hypertensive emergency.

The following conditions warrant a rapid control of BP:

- Acute aortic dissection
- Hemorrhagic stroke (target SBP of 140-160 mm Hg)

Hypertensive Emergency:

Reduce Mean BP by 20% within minutes to one hour., and a further 25% over the next 24 hrs.

Mean Arterial Pressure (MAP)= DBP + 1/3 (SBP-DBP)

Use IV short acting antihypertensives:

1. **Inj Nitroglycerin** 5-100 µg/min as IV infusion. Check BP every 10 min. titrate q 3-5 min upto 100µg/min.

2. Labetalol (alpha + beta blocker): 20mg IV bolus followed by 20-80mg IV bolus every 10 mins (maximum 300 mg). Avoid in HF and COPD.

3**. Sodium Nitroprusside**. Initial 0.25-0.50 µg/kg/min continuous infusion

Maint: upto 8-10µg/kg/min continuous infusion.

Sodium nitroprusside Is the preferred agent for most of the HTN emergencies. Avoid prolonged use for >24 hrs.

Switch over to oral medications while tapering IV medications:

Tab Amlodipine 10mg OD or

Tab Nifedipine R 20 mg BD or

Tab Metoprolol XL 25 mg BD or

Tab Losartan 50mg OD or

Tab Hydrochlorothiazide 25 mg od

Observe the pat for 12 hours.

Hypertensive Urgency:

BP lowering can be done with oral medications with BP monitoring every 2 hours.

Aim for 25-30% reduction in MAP or SBP <100mm Hg or DBP <100mm Hg over 24 hours.

In previously known and treated hypertensives:

Restart the prior medications.

Increase the dose or add another agent

Add a diuretic, and reinforce dietary socium restriction.

In Hypertensive diagnosed fpr the first time:

Tab Nifedipine R 20mg stat and BD, or

Tab Metoprolol 50 mg sta and OD or

Tab Losartan 50 mg stat and OD or

Tab Prazosin 1mg stat and q4 h or

Tab Hydrochlorothiazide 25 mg stat and od

Start one drug, check BP after 4 hours, add another if BP is still high

In patients with very high BP (>200/120 mm Hg) two drugs may be initiated at the same time.

NB: <u>avoid oral or sublingual agents as initial treatment for hypertensive emergency due to their variable effect with slower onset and longer half-life.</u>

PULMONARY EDEMA

Pulmonary edema is a common and potentially fatal causes of acute respiratory distress.

Causes:

- Cardiogenic: LVF, Mitral stenosis
- Noncardiogenic: Infections (Pneumonia), inhaled toxins, aspiration, acute radiation pneumonitis, hypoalbuminemia

Investigations:

CBC, electrolytes, create, TroponinT, ECG, CXR, ABG

Management:

- Sit the patient up in bed.
- Start O2 with 60-100% with face mask. Target SpO2 94-98%.
- Treat any hemodynamically unstable arrhythmia : urgent synchronised cardioversion may be required.
- Diuretics: Furosemide 40-120 mg IV stat. Administer only if SBP is >100 mm Hg.
- If the patient has arrhythmia or Acute coronary syndrome (ACS) start heparin/ antiplatelets. If SBP > 90 mm Hg give glyceryl trinitrate (GTN) (5 mg) sublingual or spray.
- Start GTN infusion at 5-10 µg/min and increase infusion rate every 15-20 min (target MAP around 70.
- If SBP < 90 mm Hg, treat as cardiogenic shock with Noradrenaline(0.1- 0.5 µg/Kg/min) dopamine 6-20 µg/Kg/min infusion.
- Consider Dialysis if known oliguric renal failure or no response to diuretics in 4 hours or with rising S. Creat.
- Start CPAP if severe Type 1 failure (start with Fi)2 of 100, PEEP at 5). Invasive ventilation may be needed if pt deteriorates clinically.

ACUTE CORONARY SYNDROME (ACS)

ACS refers to a spectrum of clinical presentations ranging from myocardial ischemia to infarction. There are 3 types of ACS:

- ST elevation (Q wave) MI (STEMI)
- Non ST elevation (non Q wave) MI (NSTEMI)
- Unstable Angina (UA)

Angina pectoris :

o substernal discomfort precipitated by exertion.

o Radiation to shoulder, jaw, or inner aspect of the arm.

o Relieved by rest or nitroglycerin in 10 min.

Unstable Angina:

o Rest angina, >20 min in duration

o New onset angina which limits physical activity

o Angina that is more frequent, longer in duration, or occurs with less exertion than previous angina

Angina equivalents:

Especially in diabetic patients include: breathlessness, epigastric pain with vomiting, presyncope and syncope**.**

Examination:

Look for features of hypoperfusion: cold extremities, sweating, hypotension, altered sensorium, thready pulse, focal deficits.

Look for features of cardiac failure.

ECG criteria for Diagnosis:

STEMI:

- ST elevation in two anatomically contiguous leads with the following diagnsostic cutoffs.
- >1mm elevation in all leads except V2 & V3.
- In V2 & V3 the following ST elevation limits are needed for diagnosis-

In women > 1.5 mm elevation

In men > 40 yrs >2 mm elevation

In men < 40 yrs, >2.5 mm elevation

NSTEMI/UA:

New horizontal or down sloping ST depression >0.5 mmin two anatomically contiguous leads

OR

T inversion 1 mm in two anatomically contiguous leads with prominent R wave or R/S ratio > 1.

Old MI (in the absence of LVH/ LBBB):

- Q in V2 – V3 > 0.02 s or
- QS complex in any two contiguous leads
- Q >0.03 s and >1mm deep in any two contiguous leads or
- R > 0.04 s in V1-V2 and R/S >1 with a concordant positive T wave in the absence of conduction deficit.

Posterior wall MI:

Posterior wall MI usually occurs along with Inf wall or lateral wall MI and is associated with higher risk of LV dysfunction and death. Isolated posterior MI is an indication for emergency coronary reperfusion.

ECG criteria:

Presence of ST elevation and Q in posterior leads (V7 – V9).

ST elevation of only 0.5 mm is required to confirm the diagnosis.

(V7- left posterior axillary line, V8- tip of left scapula, V9- left paraspinal region)

Horizontal ST depression

Tall broad R waves

Upright T waves

Dominant R waves

Diagnosis of STEMI in the presence of LBBB:

- ST elevation >1mm in a lead with a positive QRS complex (5 points)
- ST depression of >1mm in lead V1, V2 or V3 (3 points)
- ST elevation of > 5mm in a lead with a negative QRS complex (2 points)

(3 points -90% specificity and 36% sensitivity for STEMI)

Wellens' syndrome:

Deeply inverted or biphasic T wave in V2-V3. (indicative of LAD artery.)

- Patient may be pain free when ECG is taken.
- Cardiac enzyme elevation
- They are at very high risk for extensive anterior wall MI within the next few days or weeks.

REPERFUSION FOR STEMI:

1. PCI- if pt presents in 12-24 hours

2. Thrombolysis: If the patient presents within 12 hours of onset of symptoms and PCI facility not available , and ECG changes and chest pain persists)

STREPTOKINASE 1.5 million units IV infusion (diluted in 100 ml NS over 60 mins.

Management of NSTEMI:

1. Assess ABC, administer O2 only if SpO2 is < 94%. (target SpO2 94-98%)
2. Relieve pain

a) Sublingual Nitroglycerine 0.4 mg every 5 min upto 3 doses

b) If pain is persistent, start GTN infusion 5 µg/min and titrate as per symptoms while closely monitoring BP. (contraindication- Inf wall MI). stop is SBP <90mm Hg.

c) Morphine 3-5 mg IV stat to control pain and anxiety. Persistent pain means persistent ischemia. Rpt dose of 3-5 mg can be given after 30 min.

3. Give anti platelets, statins and beta blockers.

a) Aspirin 325 mg nonenteric coated tab to chew.

b) Clopidogrel 100mg loading PO if pt is <75 yrs old, 75 mg PO if >75 yrs old.

c) Atorvastatin 80mg tablet PO stat

d) Beta blocker. Tab Metoprolol 25 mg PO if no contraindication (avoid in heart failure, COPD)

4. Anticoagulate all patients with UA/ NSTEMI

Unfractionated Heparin 5000 u. IV stat and q 6 h

OR

Enoxaparin 1 mg SC stat and q 12 h.

5. DO NOT THROMBOLYSE PATIENTS WITH NSTEMI

6. Determine risk in UA/NSTEMI to determine early/ late reperfusion based on TIMI score.

NB: if there is high clinical suspicion of ACS with no ECG changes or elevated enzymes, monitor the patient for at least 12 hours with repeat ECG.

SEPTIC SHOCK

Shock is a state of hypoperfusion that causes cellular and tissue hypoxia. This may be due to decreased oxygen delivery to the tissues or increased oxygen consumption.

Sepsis is a potentially life threatening clinical condition chatacterised by systemic inflammation due to an infectious etiology. Systemic inflammatory response syndrome (SIRS) is an inflammatory response that may be elicited by an infectious or noninfectious etiology. SIRS associated with a suspected infection causes sepsis.

Septic shock is defined as patients with sepsis in whom circulatory, cellular and metabolic abnormalities are severe enough to significantly increase mortality.

Patients with septic shock have:

Persisting hypotension requiring vasopressor support to maintain mean arterial pressure (MAP) >65mmh Hg and have a serum Lactate level >18mg/dl despite adequate volume resuscitation.

Quick SOFA (qSOFA) criteria for diagnosis:

- Respiratory rate >22/min
- Altered sensooorium
- Systolic BP <100mmHg

Management:

A. **Fluid resuscitation:**

1. Give crystalloids (NS/RL) at a dose of 10-20 ml/kg in the first one hour.

2. In patients with ARDS or Sepsis, a restrictive approach to IV fluids.

3. Vasopressor use: Noradrenalin is the vasopressor of choice in septic shock. 5 μg/min is the initial dose. Increase to 35-100 μg/min in refractory cases.

4. Inotrope: Can add Dopamine 5 μg/min can be added (if cardiac contractility is very poor) as second line agent to achieve the target of MAP 65mm Hg.

5. Glucocorticoid therapy: In refractory shock not responding to fluids and vasopressors, In Hydrocortisone 100mg IV q6H to be started.

B. **Antibiotic therapy:**

Broad spectrum antimicrobial therapy should be started within 2 hours of admission (after collecting two blood cultures from two different sites.)

c**. Control of septic focus**:

the probable focus of sepsis (eg diabetic foot, abscess, perforation etc) should be removed.

d**. Temperature control:**

Fever control with external cooling and antipyretics.

e. **Other measures and monitoring:**

- management of hyperglycemia
- Blood transfusion if Hb <7gm/dl
- Lactate clearance (initial lactate-lactate >2hrs later)/initial lactatex100. This is considered as a reliable marker of improvement.

HYPOGLYCEMIA

Patient may present with any of the following:

- Unconscious
- Convulsions
- Abnormal behavior
- Severe weakness
- Sweating
- Patient may have h/o diabetes taking oral hypoglycemic agents.

- Immediately check RBS with glucometer.
- If RBS is < 60 or showing Low or very low in glucometer, then patient is in hypoglycemia.
- Start treatment immediately.

1. Make the patient lie down.
2. Put in IV cannula
3. 50% Glucose IV 25 ml for a patient who is awake/ 50ml for patient who is unconscious
4. Re-check RBS after 20 mins.
5. If RBS < 60mg/dl, repeat 50% glucose 25 ml.
6. If RBS 60-90mg/dl, give 10% Dextrose 500ml over 4 hours.
7. If Blood glucose >90mg/dl, give 10% Dextrose over 6-8 hrs.

DIABETIC KETOACIDOSIS

Treatment requires reversal of hyperglycemia by insulin, and replacing the blood volume & electrolyte deficits.

1. IV Fluids:

NS for immediate volume replacement, 1 Lit 0.9% NS over 30-60 min. Repeat NS 1-2 lit every 30-60 min until hemodynamically stable and urine output increases.

This is followed by ½ N (0.45%saline) 150-500ml/hr.

When BG is <250mg/dl, change to 5% D 100-200 ml/hr.

2. Insulin: Bolus 0.1-0.15 U/kg regular insulin IV/ IM stat.

Then start continuous IV insulin infusion via infusion pump. 100 U. regular human insulin in 100 ml 0.9% NS. Start at 0.1 U /kg/hr.

NB: where an infusion monitor is not available, 0.1u/kg can be given hourly IM.

Blood glucose monitoring: Check initial BG q 1 hr. Goal is to decrease in BG 50-75mg/dl/hr.

Once stable (3 consecutive readings decreased in target range), change BG monitoring to q 2 h.

Change IV fluids to 5% D when BG <250mg/dl.

Goal is BG 150-200 mg/dl

Switch over to SC Insulin when pt is able to eat.

3. **Treatment of precipitating cause:**

Look for infections like pneumonia, sepsis, urinary tract infections, URTI, MI, pregnancy.

ALCOHOL WITHDRAWAL/ DELIRIUM TREMENS

The term delirium tremens is used to describe severe alcohol withdrawal syndrome characterised by both delirium (agitation and visual hallucinations) and physiological hyper-arousal (tremor, sweating and tachycardia). Symptoms become maximal usually 2-3 days after the last drink and patient may have convulsions. DT has significant mortality and morbidity.

Management:

Inj Diazepam 10-20mg IV 6 hourly. Taper off gradually in 6-7 days.

Inj Thiamine 200mg IV 8 hrly for 48 hours, followed by 100mg oral TID. This is to prevent Wernicke-korsakoff syndrome.

Disulfiram 200-400 mg daily for deaddiction can be tried in patients after settling down and who are motivated to stop drinking.

Supportive psychotherapy.

UPPER GI BLEED

Common causes:
Peptic ulcer disease (gastric ulcers, duodenal ulcers, gastritis)
Oesophageal varices
Stress ulcers
Mallory-weiss tear

Management:

- Establish two large-bore Iv lines or central line
- Obtain blood for grouping, typing, CBC, PTT
- Infuse NS, RL or 5% Dextrose
- Oxygen by nasal canula

Factors propagating bleeding:

1. discontinue anticoagulants, aspirin etc.
2.Correct prolonged PT/INR with Vit K injection

Level of bleeding:

-Hematemesis, coffee ground vomitus indicate upper GI Bleed.
-Melena indicates upper GI bleed, but can originate more distally.'
-Red blood in the stool indicates lower GI bleed.
-Any bleeding in the presence of hemodynamic compromise can be of upper GI in origin.

Initial resuscitation of variceal bleeding:

- Oesophageal balloon tamponade (using sengstaken Blakemore tube).
- BP tends to be low in Cirrhosis patients. Be cautious about overhydration and fluid overload.
- Pharmacologic therapy:
- Octreotide bolus and infusion.
- Vasopressin infusion is alternative (but more side effects).
- Antibiotics to prevent SBP
- Refer for endoscopic therapy.
- Nonvariceal Bleeding:
- Initial resuscitation
- IV Pantoprazole 40 mg Iv bolus followed by infusion 8mg/hr.

SPONTANEOUS BACTERIAL PERITONITIS

SBP refers to ascitic fluid infection as a result of bacteremic seeding without an obvious surgically treatable abdominal focus of infection. It almost always occur in patients with cirrhosis and ascites.

Diagnosis:

- Positive ascitic fluid bacterial culture
- Elevated ascitic fluid absolute neutrophil count (>250 cells/ cmm)
- Exclusion of secondary causes of bacterial peritonitis

Clinical features:
Fever, diffuse abd pain/tenderness, altered mental status, diarrhea, paralytic ileus, hypotension.
Renal failure develops in 30-40% cases with SBP and is a major cause of death.

Pathogen:
Gut bacteria such as E.Coli, Klebseilla.

Investigations:
Diagnostic ascitic tap. Send fluid for TC, DC, C& S.
Complete blood count (CBC), electrolytes, creat, blood C&S.

Management:

- Stabilize airway, breathing, and circulation.
- Start broad spectrum antibiotcs – Ceftriaxone 1gm IV BD.
- INj Meropenum 1 gm in 100ml NS IV stat if pt is in shock. 5 days course of antibiotics.

Hepato-Renal Syndrome:
Potentially fatal complication in patients with cirrhosis and ascites. Worsening uremia with oliguria and sodium retention I the absence of identifiable cause of renal failure.
Diagnosis: urine spot sodium <5mmol/L.

HEPATIC ENCEPHALOPATHY

Reversible neuropsychiatric dysfunction associated with imapaired hepatic function. It is a recurring complication of cirrhosis liver and may be acute & reversible, or chronic & progressive.

Clinical features:
Vary in severity from mild cognitive dysfunction, irritability, confusion or profound coma.
On examination:
Asterixis, other features of cirrhosis, fetor hepaticus

Investigations:
CBC, Electrolytes (look for hypokalemia), Create, LFT, RBS
Diagnostic ascitic tap. Send fluid for TC, DC, Culture (to r/o SBP)

Management:
1. Identification and correction of predisposing causes. These include:
   - GI Bleed -------→ blood transfusion, endoscopy
   - Infections, ---→treat SBP or other infections
   - Hypokalemia and/or metabolic alkalosis---→ KCL supplementation
   - Hypoxia ------→ O2
   - Sedatives
   - Hypoglycemia ----→ I V glucose
   - Constipation-----→Syr Lactulose

2. Measures to lower Blood ammonia
a. Syr Lactulose 30 ml stat and 4 hrly till two to three stools are daily
b. Oral antibiotics:Ampicillin 500 mg BD
c. Bowel wash.

BURN INJURY

Immediate Steps:

1. REMOVE ALL THE CLOTHES
2. Pour clean, cold water over the body for 10 mins if burns occurred within one hour.
3. If patient is in severe pain, give Inj TRAMADOL 0.5mg/kg SLOW IV or IM stat. If there is not much pain, give Tab. PCM stat and SOS.
4. Check BP, Pulse, RR, SpO2.
5. If SpO2 <90%, start O2.
6. If BP is below 90/60mmHg, put IV cannula and start NS or RL.
7. If patient is **NOT CONSCIOUS**, then lie down on one side .
8. If patient is **NOT CONSCIOUS** do **ABC**.

Airway- clear secretions from mouth with suction pump.
Breathing- start oxygen at 2 lits/ min.
Circulation- Start NS/RL

ASSESS the % of Burns by using rule of Nines:
Head – 9%, each upper limb- 9%, anterior chest & abdomen- 18%, posterior chest & back- 18%,
Each lower limb 18% each, and perineum 1%.
For children : head is 18%, lower limbs are 13.5% each.

DRESSING:
a. Remove dirt from wound and clean with warm water and cotton pad.
b. Puncture blisters with sterile needle and remove skin gently.
c. Apply silver sulfa cream on wound and apply cotton pad dressing/ or Vaseline gauze

9. Give Inj. Tetanus Toxoid 0.5ml IM stat.
10. Give Inj Amoxclav 1.2 gm IV 8 hrly
11. REFER patient if Burn area is large and deep and patient unconscious.

EXTENSIVE BURNS

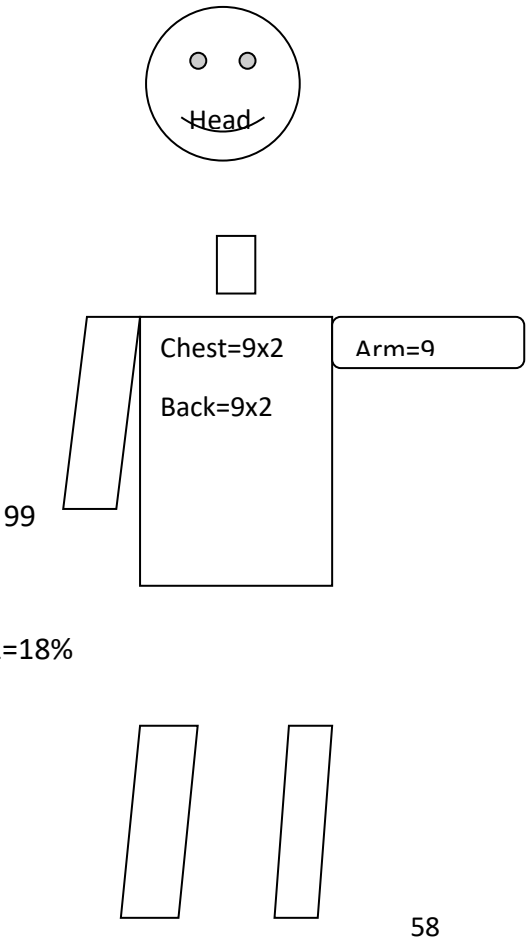
1. Is the airway burnt? Look in to the person's mouth and nose if they have breathing trouble. If there are burns in the mouth or nose, the airway or breathing tubes could be burnt. These people need immediate referral to a hospital with oxygen for the trip. They may develop severe breathing problems *(adult respiratory syndrome*) or swelling and

blockage of the airway from smoke inhalation. Steroids will not help in this condition. *Doctors may need to intubate these patients.*

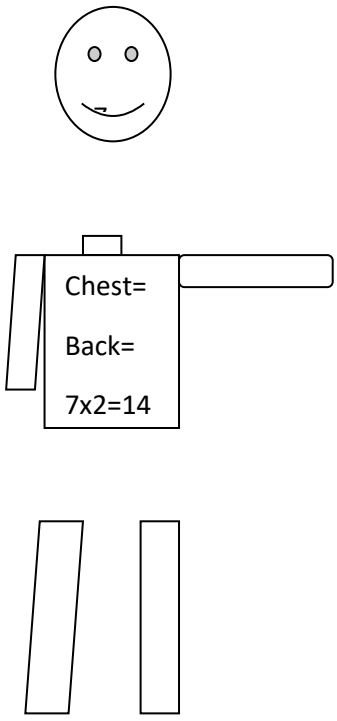
2. If the burn occurred within 1 hour, cool the skin by running water at room temperature over it for at least 10 minutes or longer if you can. Do not use ice because ice causes more tissue damage.
3. How much of the body is burnt? Remove clothes but keep them warm! In adults, use the rule of 9s and in children, use the rule of 7s to work out the percentage of area burnt. (See diagram)
4.

	Adult	Child under 5
Chest and Abdomen	9 x 2=18	7 x2 =14
Back	9 x 2 =18	7 x 2=14
Each Arm	9 (Both arms= 18)	7
Head	9	7 x 3= 21
Each Leg	9 x 2= 18 (Both legs= 36)	7 x 2=14

Adult or older child



Child <3 years



5. Work out if they need extra fluids. In general, adults with more than 20% burns and children with more than 10% burns need extra fluids.
6. How much fluid? To find out how much fluids use this formula:

- Adults- 4mls x Weight in kilograms x %of area burnt
- Child- 3mls x Weight in kilograms x % of area burnt

This is the amount of fluid you need to give in 24 hours. Give half this amount in 8 hours and the rest in 16 hours. If the person is shocked already give 20ml/kg fast.

Estimate (guess carefully) the weight of the person if you cannot weigh them. For example, a man weighs 70kg, has 30% burns. Then he needs 4 x 30 x 70 = 8400mls in 24 hours. 4200 must be given in 8 hours and the remaining 4200 in 16 hours. Warming the solution to body temperature will help if you need lots of fluids.

7. I V fluids: Use normal saline. However, ORS is also very effective and will reduce costs if the person can drink (has no burns inside the mouth). Use a NG tube if you need to. ORS alone is enough in 20-30% burns and can be given with IV fluids in those with more burns to reduce the amount of IV fluids needed.
8. Pain relief: use tramodol and/or ketorolac IV/IM.
9. *For doctors: Those with deep burns that involve the whole of an arm or leg (circumferential burns) may need early treatment. Deeply burnt skin that surrounds the limb may be unable to expand causing high pressures within the underlying tissues in the arm or leg. This high pressure can cause muscle death by preventing blood flow. (Compartment syndrome)- do an escharotomy longitudinaly in the heath center if the signs of ischemia are obvious and there will be a long delay in reaching the hospital. Escharotomy is done longitudinally on the anterolateral side. Only incise deep enough to penetrate the eschar and no need to enter deep fascia.)*
10. Care of burnt area. If there are blisters, do not break them unless they are infected and have pus. Remove dead skin of blisters that have already burst. Silver sulphasalazine (SSD) has been normally used for burns everywhere but there is no clear evidence to support its use. Use it to cover burnt areas if you have it; otherwise use betadine ointment (or if you have no ointment use betadine solution first, then a thin layer of Vaseline over it). Wrap clingfilm over the burnt area while you transport the patient.
11. Keep the person warm. Use sterile green sheets to cover them.
12. Give tetanus toxoid.
13. Antibiotics: There is no need to start antibiotics routinely unless the person came late with obviously infected wounds. Some doctors might disagree, but taking strict measures to prevent infection (see below) and waiting for signs of infection and then treating with antibiotics has nothing wrong as a policy.

DROWNING

Drowning (both deep and shallow water) leads to obstruction of airways by either aspiration of fluid or laryngeal spasm. This leads to ineffective circulation to vital organs, including brain. Brain death happens when hypoxia persists for more than 5 mins.

Clinical presentations:

- Semiconscious or unconscious.
- Restlessness
- Cyanosis
- Pink frothy sputum
- Hypothermia
- Cardiac arrest

Management:

- CPR
- Do not attempt to drain water from the victim's lungs. Only sub-diaphragmatic pressure could be advocated if any foreign body is suspected inside respiratory tract.
- O2 inhalation -high flow , even in conscious patient.
- Nasogastric intubation to remove swallowed water.
- IV fluids (isotonic)
- Correction of metabolic acidosis- sodium bicarbonate 1µg/kg IV
- Management of pulmonary edema – IV Frusemide (Lasix).
- Antibiotics
- Management of hypothermia
- Management of Cardiac arrhythmia

SNAKE BITE

Poisonous snakes seen here are: Viper, Cobra , & Krait

Ask the type of snake, and the time of the bite.

Clinical manifestation of viper bite:

- Swelling and local pain with or without erythema and discoloration at the site of bite.
- Tender enlargement of local lymph nodes
- Haemorrhagic manifestations due to coagulation failure.
- Vomiting

Clinical manifestations of Cobra bite:

- Swelling and local pain with or without erythema and discoloration at the bite site
- Local necrosis and/or blistering/bullae
- Neurotoxic effects: Descending paralysis,
- Problems of vision, breathing and speech.
- Paralysis of jaw and tongue may lead to upper airway obstruction and aspiration.
- Numbness around lips and mouth
- Krait bites often present in early morning with paralysis.

Snakes: clinical aspects and therapeutic response

Feature	Cobras	Kraits	Vipers
Local pain/tissue damage	YES	NO	YES
Ptosis/neurological signs	YES	YES	YES
Haemorrhagic manifestations	NO	NO	YES
Renal complication	NO	NO	YES
Response to Neostigmine	YES	NO?	NO?
Response to ASV	YES	YES	YES

Investigation:

20-minute whole blood clotting time (20WBCT)

This is the most reliable test. Can be done at the bedside.

How to the 20 min WBCT?

Requirement: Dry glass test tube, 2ml disposable syringe, gloves

- Procedure: collect 2 ml of blood from the peripheral vein of the unaffected limb.
- Remove the needle and pour the blood along the walls of the test tube.
- Keep the test tube untouched and unshaken in a safe place near the patient's bedside for 20 minutes.
- Note the time.
- After 20 mins the test tube is gently tilted and if the blood is still liquid then the patient has uncoagulable blood.

If the 20WBCT is normal in a suspected case of poisonous snakebite, Repeat the test every 30 mins from admission for 3 hours and then Hourly after that. If blood clotting happens, then 6 hourly tests to be done to test for requirement of repeat doses of ASV.

Also check the following:

Lab tests: Hb, PCV, Platelet count, peripheral smear, blood grouping & typing

Urine for proteinuria, RBC, hemoglobinuria.

S. creatinine, electrolytes.

Treatment:

- Reassure the patient.
- Immobilise the limb in the same way as a fractured limb.
- Admit all victims of snakebite and keep them under observation for 24-48 hrs.
- Assess the status of envenomation.

- *Assess the following quickly:*
  - *Airway, Breathing, Circulation*
  - *Vitals*
  - *Chest expansion, ability to put out the tongue, ability to count the numbers in one breath.*
  - *Site of the bite and regional lymph nodes*

Act swiftly:

- Support A,B,C
- Start IV line

- Medications: Inj Tetanus Toxoid IM, Inj Pheniramine maleate (Avil) 10mg IV (for children 0.5mg/kg), Inj Dexamethasone 8mg (for children 0.1-0.4mg/kg) IV.
- Administer ASV.

ANTI SNAKE VENOM (ASV) Administration:

8 vials of ASV in 500 ml Normal saline/5% Dextrose as infusion over 1 hour. (for children volume of fluid for dilution is 10ml/kg b. wt)

No dose adjustment for children.

Closely monitor the patient for 2 hours for any reactions to ASV.

Repeat 20WBCT after 6 hours. If blood is not clotted, repeat ASV 4 -8 vials again in NS infusion as earlier;

ASV Reactions:

Itching (usually over scalp), urticarial, nausea, vomiting, abdominal pain, diarrhoea, tachycardia (PR >120/min), fall in BP, low volume pulse, dry cough, bronchospasm, stridor, angioedema of lips, fever, shaking chills, sweating, cold clammy skin, central cyanosis, febrile convulsions (in children).

Treatment of ASV Reactions:

DISCONTINUE ASV.

Maintain IV line

Inj Adrenaline 0.5ml **IM** (for adults). For children 0.1ml/kg body wt of 1:10,000 **IM**.

Repeat the dose after 10-15 min if no improvement happens.

Additional measures:

Salbutamol nebulization

Inj Avil

Inj Hydrocortisone

Once the patient has recovered, restart ASV slowly for 10-15 mins keeping the patient under close observation. Then the normal drip rate can be resumed.

Monitor vitals and provide supportive measures

SCORPION STING

Poison is stored in the tail of scorpion. Sting not bite of the scorpion leads to envenomation.

Scorpion venom is essentially acidic. It contains neurotoxins, cardiotoxins, coagulases, proteases, phospholipase A, amylase and serotonin (causes pain).

Action of venom: complex effects on sodium channels- opens them, preventing inactivation- spontaneous depolarisation, prolonged action potential- excessive firing of neurons.

Clinical features: The venom stimulates sustained release of Ach and catecholamines resulting in cholinergic and later adrenergic symptoms.

Pt presents with excruciating local pain. Slight local edema may be noticed. Local lymphadenopathy is characteristic. Frank gangrene can occur in rare cases.

Early manifestations of envenomation:

malaise, restlessness, lacrimation, rhinorrhoeas, salivation, profuse sweating, cold clammy skin, abdominal colic, nausea, vomiting, loss of sphincter control. All the symptoms are more in children as the toxin per Kg body wt is more in them. More toxicity in younger children- called 'autonomic storm'.

Severe, life-threatening manifestations:

- CVS- cardiogenic shock
- RS: Noncardiogenic Pulmonary Edema (ARDS)
- CNS: Encephalopathy

Investigations:

CXR if clinical signs of pulmonary edema present, ECG

Management:

General:

1. ABC- Airway, breathing, circulation, monitor urine output
2. O2
3. Local infiltration with 2% Xylocaine/ Lignocaine as a ring block.(Do not give LA with Adrenaline if the site of the bite is the digits).
4. Tetanus Toxoid deep IM (if immunised) + Tet Immunoglobulin (if unimmunised)
5. Antibiotics if gangrenous, infected wound.

Specific therapy:

1. Relieve pain: Inj Diclofenac/ Tramadol/ Pentazocin. Can be repeated if needed.

2. Diazepam/ Phenobarbitone for seizure control

3. Tab. Prazosin (alpha blocker). 0.5 mg (i/2 of 1 mg tab) 3-6 hourly in adults as vasodilator therapy till extremities are warm, dry and periph veins are visible. Not to exceed 5 mg/ day.

In children the prazosin dose is 30 mic gm/Kg body wt.

Prazosin can be given irrespective of BP, provided there is no hypovolemia.

Avoid Prazosin when there is no cardiovascular symptoms and signs and only painis present.

4. Midazolam drip/ infusion in case of uncontrolled restlessness.

Dose: Initial bolus 0.05-0.1 mg/Kg followed by continuous infusion of 0.1 mg/Kg/Hr for maintenance of light sleep. Continuos cardiac monitoring is required.

5. I.V. Calcium gluconate to alleviate twitching- 0.6-1gm (>6yrs) and 0.3-0.6 gm (<6yrs).

6. I.V.Atropine 0.5-1.0mg (>6yrs) in life-threatening bradycardia only

7. If the pt is in cardiogenic shock - Dobutamine 5mic gm/Kg/min infusion, Nitroglycerine 5micgm-10micgm /min infusion.

8. ARDS/ noncardiogenic pulmonary edema: Pt requires mechanical ventilation

When to refer?

In case of severe complications – cardiogenic shock, Pulmonary edema

DOG BITE

Anti-Rabies Treatment:

As rabies is 100% fatal, anti-rabies treatment following dog bite is life saving and provides great relief to bite victims. 4 components of treatment:

- Wound care and treatment
- Administration of vaccine
- Administration of Rabies Immunoglobulins (RIGs)/ Anti-Rabies Serum
- Counselling of patients and attendants.

1. **Wound care:**

Wash all wounds under running water for at least 10-15 mins.

Gently clean all wounds with a detergent or any soap available.

Apply any antiseptic like Dettol/savlon/povidone iodine.

DO NOT bandage or dress the wound.

DO NOT suture the wound.

2. **Vaccine**

Route of administration – Intradermal (ID)

Either 8 site / 2 site regimen should be used , as recommended by the manufacturer.

8 site- ID regimen:

On Day 0: 0.1 ml given ID – 1 in each upper arm,

1 in each lateral thigh

1 on each side of the suprascapular region

1 on each side of lower quadrant region of abdomen.

On Day 7 1 inj in each upper arm

1 inj in each lateral thigh

On Day 30: 1 inj in one upper arm

On Day 90: 1 inj on one upper arm

2 site- ID regimen:

1 inj of 0.1 ml ID at 2 sites on Day 0, Day 3, Day 7 & Day 28.

NB: Never inject the vaccine in the gluteal region as vaccine may get deposited in the fat tissue leading to vaccine failure.

3. **RABIES IMMUNOGLOBULIN/ ANTI RABIES SERUM (RIG/ ARS)**

This provide passive immunity and offer immediate protection.

Even the best of the modern vaccines take 10-14 days to elicit a protective antibody titre.

ARS of Equine Rabies Immunoglobulin – 300 IU/ml dose: 40 IU/Kg Body wt

Human Rabies Immunoglobulin (HRIG) – 150IU/ml -dose: 20 IU/Kg Body wt

Instill the immunoglobulin using 26G needle into the depth of all wounds and also infiltrate around all wounds if anatomically feasible.

All wounds should be carefully treated without fail with least traumatization.

Any balance RIGs should be injected IM into thigh region in a single dose.

4. **Counselling:**

Patients are very worried and anxious. So reassure them, alleviate their anxiety and fears.

Other advices to follow during vaccination period:

- Avoid alcohol, smoking
- Avoid strenuous physical and mental work
- No specific dietary restrictions
- Take Tet Toxoid, analgesics
- Observe the dog or cat daily for 10 days.

ACUTE ABDOMEN

I**. MEDICAL CAUSES PRESENTING AS ACUTE ABDOMEN:**

Disease condition	inv.
1.Sickle cell disease	hematocrit, peripheral blood smear
2.Addisonian crisis	Na high, K low, Glucose low.
3. spontaneous Bacterial Peritonitis	USG, paracentesis with gram stain
4. Diabetic Ketoacidosis	Glucose, Na, K levels.
5. gastroenteritis/Enterocolitis	WBC, stool for ova & parasites
6. Hepatitis	LFT
7. Nephrolithiasis, acute Pyelonephritis	urine micro, USG
8. Myocardial infarction	ECG, Troponins
9. Pneumonia	CXR, TC,DC
10. Gynaecologic problems-PID,	PV & PS, USG

II. **MEDICAL & SURGICAL**

1. Diverticulitis, IBD	WBC,
2. Pancreatitis,	Amylase, Lipase, USG
3. Intra-abdominal abscess	WBC, USG
4.Intestinal obstruction	Plain Xray abdomen, WBC, Lactate
5. choledocholithiasis	LFT, RUQ USG

III**. SURGICAL**

1. Acute Cholecystitis	WBC, LFT, USG
2. Perforated peptic/duodenal ulcer	Plain film Xray
3. Acute Appendicitis	WBC, USG
4. Mesenteric ischemia and necrotic bowel	WBC, lactate, CT

Inv: Xray erect abdomen. IV fluids, Ryles tube aspiration, NPO, IV antibiotics, Refer.

ADRENAL CRISIS

Clinical manifestations are: severe hypotension, postural hypotension, general weakness

Examples of Clinical settings:

- very low BMI TB patient on ATT developing hypotension and hypoglycemia
- patient who is on steroid therapy for some other medical condition, on developing acute infection like pneumonia, diarrhoea etc presenting with hypotension
- patient who was taking steroid tabs from Kabiraj/ medical shop for long time and had stopped, now coming with severe general weakness and hypotension.

Management:

Inv: RBS, S. Na^+, K^+

1. **Correct volume depletion:**

IV NS as required to normalise BP and pulse

2**. Replace glucocorticoids:**

Inj Hydrocortisone 100mg IV stat, and 100mg IV Q6H for first 12-24 hrs.

Continue Hydrocortisone 50-100mg IM Q6H until patient is well enough for reliable oral therapy.

3. **Correct other metabolic abnormalities**

10% D for hypoglycemia

Hyperkalemia will respond to volume replacement.

4**. Identify and treat underlying cause:**

Consider acute precipitant such as infection.

Management of COMPLICATED SAM CHILD

SAM is diagnosed when any of the three features is present:

- Weight for height (length) <70% or < -3SD
- Edema of both feet
- MUAC < 11.5 cm.

Complicated SAM is a SAM child with any infections/ medical or surgical problems which worsens the nutrition status.

Open SAM Child Case Record (pink card) and SAM monitoring card in the ward.

Initial assessment of SAM child: Document the following:

HISTORY:

- Appetite test- Take the history of Recent intake of food or fluids
- Usual diet history.
- Breastfeeding history.
- Look for the DangerSigns (lethargy, unconsciousness, convulsions, severe vomiting, not able to suck breastmilk)
- Details of cough, diarrhea, fever, ear infection (as per Underfive symptom analysis card)
- Loss of appetite
- Family circumstances
- Contact with TB in the family or neighbourhood
- Recent history of Measles
- Known or suspected HIV infection

EXAMINATION:

- Signs of dehydration
- Shock
- Temperature- Fever (>99.5 F) or Hypothermia (<95.9 F)
- Eye signs of Vit A deficiency (dry conjunctiva or cornea, Bitot's spots, corneal ulceration, keratomalacia). Child with vit A deficiency is likely to be photophobic.
- Mouth ulcers
- Scalp hair- sparce/discoloured/ flag sign
- Severe palmar pallor
- Pedal edema

- Localizing signs of infection (including ear and throat infections, skin infections, chest infection, pneumonia)
- Skin changes of kwashiorkor (hypo or pyper pigmentation, desquamation, ulceration spreading over limbs, thighs genitalia, groin and behind the ears, exudative lesions resembling severe burns often with secondary infection)

INVESTIGATIONS:

- Hb, RBS, PS for MP/ RDT, TC, DC
- Mantoux (Mx) test,
- Gastric aspirate for Truenat PCR,
- Chest Xray

MANAGEMENT of COMPLICATED SAM

Correct the following at the earliest:

1. Correct Hypoglycemia –	Day 1
2. Correct Hypothermia –	Day 1
3. Correct Dehydration	Day 1-2
4.Correct Electrolytes	Day 1- 15 d.
5. Treat Infection	Day 1-6
6. Supply of Micronutrients	Day 1-6 (no iron)
7. Initiate feeding	Day 1 onwards
8.Catch up growth	Day 6 –
9. Sensory stimulation	Day 3 –
10. Prepare for follow up –	Day 6 –

1. ***Hypoglycemia***:

Blood sugar < 54mg/dl.

Give immediately F-75 (**HCCM- using sooji/ Ragi**) as quickly as possible and continue 2-3 hourly feeds.

2-3 hourly feeds day and night .

If the child is unconscious, treat with 10% Dextrose IV - 5 ml/Kg.

If the Blood glucose was low and started treatment with IV or oral glucose, repeat it after 30 mins. If it is still low, repeat 10% glucose or sugar solution.

*2. **Hypothermia:***

Axillary temp <95 F or does not register on a normal thermometer, assume hypothermia. Then using Rectal thermometer, check rectal temp. (< 35.5 C or < 95. 5 F) to confirm hypothermia.

Check for Hypoglycemia whenever Hypothermia is found.

Change wet nappies, clothes and bedding to be kept dry.

Clothe the child with warm clothing, give Kangaroo care,

Feed the child immediately (correct hypoglycemia)

Give appropriate antibiotics.

Check rectal temp 2 hourly until it rises to > 36.5 C.

*3. **Dehydration**:*

Dehydration can be overdiagnosed and severity overestimated in SAM child.

Assume that all SAM children with watery diarrhoea may have some dehydration.

Do not use IV route for rehydration, except in case of shock. Use ReSoMal orally (special rehydration solution for malnutrition) **instead of usual WHO-ORS.**

ReSoMal has lower sodium and higher potassium than ORS

ReSoMal (Rehydration Solution for Malnutrition) each sachet contains 84gm.

Dissolve one sachet in 2 litres clean, boiled and cooled water. (once prepared, use it within 24 hrs)

Administration of ReSoMal in complicated SAM :

5 ml/kg every 30 mins for 2 hours (orally or though NGT)

Followed by, 5-10ml/kg for the next 4-10 hrs.

Contraindications for ReSoMal : Uncomplicated SAM, Cholera**.**

Monitoring of child during rehydration every 30 mins:

-Respiration rate, pulse rate, urine output, -Look for return of tears, moist mouth, less sunken eyes and fontanelle, improved skin turgor

Thereafter monitor progress of Rehydration:

- Half-hourly for 2 hours, then hourly for the next 4-10 hrs.
- Check RR, Pulse rate, urine frequency
- Be alert for signs of OVERHYDRATION which is dangerous. STOP ReSoMal.

Continue breastfeeding.

After

4. ***Electrolyte imbalance:***

All SAM children have Potassium and Magnesium deficiency which may take two weeks or more to get corrected.

(Give extra potassium 3-4 mml/kg/day and extra magnesium (0.4-0.6 mmlo/kg/d) orally)

5. Infection:

In SAM child, usual signs of infection such as fever are often absent.

So start antibiotics from Day 1.

Hypoglycemia and hyporthermia are signs of infection.

Inj Ampicillin 50mg/kg Iv 6 hourly for days (Then switch over oral amoxycillin).

+ Inj Gentamicin 7.mg/kg od x 7 days.

If there is evidence of worm infestation, give albendazole.

6. Micronutrient deficiencies:

All SAM children have vitamin and mineral deficiencies.

Though anemia is present, DO NOT GIVE IRON.

- Give multivit preparation, folic acid 5 mg on day 1, then 1mg daily, Zinc 2mg/kg/day,
- Vit A for <6 months 50,000 U, 6-12 months- 100,000 u, for older children 200,000 u stat.

After weight gain starts, add iron (3mg/kg/day).

7. ***Refeeding:***

100 Cal/kg/day with protein 1-1.5gm/kg/day, liquid 130ml/kg/day

F-75 is the Starter formula. It provides 75 Clas/ 100ml and 0.9 gm protein/100 ml.

Instead of the RUTF F-75, we prepare HCCM (High calore cereal milk) with Suji or Ragi along with milk, sugar and ghee.

HIGH CALORIE CEREAL MILK (HCCM) preparation:

- MILK 100ml (in 100ml water 2 full scoopful milkpowder)
- Suji/ Ragi 2 tsp
- Sugar 2 tsp
- Ghee 1 tsp

100 ml gives 180 Cals and 4 gm proteins

Quantity to be fed 100ml/kg/day in divided doses.

Continue breast feeding.

8. ***Catch up growth:***

F-100 formula is the Catch up formula. It provides 100 Cals/100ml and 2.9 gm Protein per 100ml.

Make a gradual transition from F 75 to F.100 formula.

Instead of RUTF F-100 formula, we start with rice-dhal- ghee kichdi, sprouted mung, ground nut soaked and seasoned, egg, fruits, ragi porridge, normal rice meal with additional oil/ ghee. Start normal diet . Increase each feed by 10ml.

Child should get **: 150-220Cla/kg/day**

And, 4-6 gm protein /kg/day.

Daily weight monitoring.

9. ***Sensory stimulation:***

Tender loving care of the baby.

Cheerful stimulating environment

Play therapy, colourful toys.

Physical activity as soon as the child is well enough

10. ***Counselling and training the mother to prepare the food and feed the baby***.

Follow up of the child in the village, and review after one month in the hospital.

CHOICE OF IV FLUIDS

1. **Normal Saline/ NS**- use in patients with trauma, dehydration, for Iron sucrose injection

2. **Ringer Lactate/ RL** – use in pts with acute gastroenteritis

3. **Dextrose Normal saline/DNS**- use when RBS is low, or patient is not eating anything.

4. **25%/50% Dextrose**- use for maintenance of sugars in blood in patients like severe malaria, hypoglycemia

DROP RATES FOR DRIPS			
ml/ hour	**Equal to**	**Drops/minute (20drops/ml)**	**Microdrops/minute** **60 drops/ml**
1000ml	For adults in shock	300 (as Fast as possible)	Do not use microdrip set for adults
500		160 (fast)	
250	500ml in 2 hours	80	
125	500ml in 4 hours	40	
83	500ml in 6 hours	27	
62	500ml in 8 hours	20	
42	500ml in 12 hours	13	
26	Maintenance to keep cannula open	7	
5ml/hr	120ml/24 hours (1st day fluids for 2kg baby)	1.6 drops – TOO SLOW use microdrop set	5 (use burette)
8ml/hr	180ml/24 hours (1st day fluids 3kg baby)	Use microdrop set	8 (use burette)
10ml/hr	240ml/24 hr (3rd day fluid 2 kg baby)	Use microdrop set	10 (use burette)
13ml/hr	300ml/24hr (5th day fluids 2kg baby)	4 (use microdrop set)	13

19ml/hr	450ml/24hr (5^{th} day fluid for 3kg baby)	7	19

NB:

Useful rule for microdrops: The number of microdrops/minute equals the number of mls/ hour. Useful rule for ordinary drop giving set: the number of drops per minute equals mls/hour divided by 3

ET Tube size			(age + 16)/4 = ET tube size. Distance inserted Guide (age/2) +12cm adult 22cm at incisor but check air entry	7-9