AES Management Protocol at Public Health Facilities:

PHC/CHC/RH/SDH/DH

Health Department Govt. Of Bihar

Dedicated to Children Who Suffered with AES

Case 1.

A 1 year 6 months old baby girl named MUSKAN, brought by her mother and Sarpanch Sanjay at the PHC Mushahari, West Champaran at 4:30 am. The complains were continuous froths coming out of mouth since last one hour, not responding to any stimuli and multiple episodes of abnormal body movements. She had altered sensorium since last 2 hours.

O/E

Afebrile, CRT-4 sec, lethargy , GCS -7, AVPU score low(U) and RBS 25 mg.

Time to respond: Case-1

1. Mention the provisional diagnosis?
2. Prescribe the medications with its dose, route and frequency.
3. Mention the other examinations to r/o shock or grade of dehydration.
4. Mention the type of fluid given and calculate the rate and frequency.
5. What is the dose of the Paracetamol and its route?
6. What advice should be given to Pankaj EMT (Emergency Medical Technician) during transportation to higher centres?
7. What advices is to be given to the pharmacist Mr Jasveer who has joined the PHC just 2 days prior about positioning of the child?

Case 2

A four year male PRINCE KUMAR, came to Sakra referral hospital, Dholi, Muzaffarpur with an ASHA worker Anju Kumari around 8:30 am with complain of fever for last 4 days , headache and irritability for two days and recurrent convulsion for one day.

O/E–

Febrile(104℃), in active seizure, unconsciousness with low AVPU score.
RBS is 120 mg/dl.

Time to respond: Case-2

1. Mention the Provisional Diagnosis?
2. Prescribe the medications with its dose, route and frequency.
3. Mention the other examinations to r/o shock /grade of dehydration.
4. Mention the type of fluid given and calculate the rate of IVF to be given in drops /sec.
5. What is the dose of the Paracetamol and its route?
6. What advice should be given to Uday EMT during transportation to higher centres?
7. What advices to be given to the pharmacist Mr Jasveer who has joined the PHC just 2 days prior about positioning of the child?

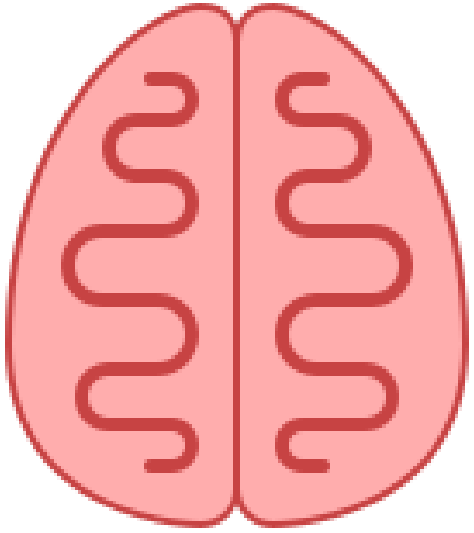
Acute Encephalitis Syndrome

- BACKGROUND
- DEFINITIONS
- CAUSATIVE AGENTS
- EVALUATION & MANAGEMENT

Learning Objectives

- Can be able to identify the emergency conditions like convulsion (status epilepticus), shock, severe dehydration, hypoxia and raised intracranial tension (ICP/ICT) as early as possible and able to initiate appropriate management till patient is stable or referred
- Can be able to stabilise the vitals of the patients
- Can be able to identify and treat specific conditions like hypoglycaemia, heat hyperpyrexia, dyselectrolytemia as early as possible
- Can be capable enough to refer the critical patients after stabilisation to appropriate facilities by reducing referral related delays

Acute Encephalitis Syndrome (AES)



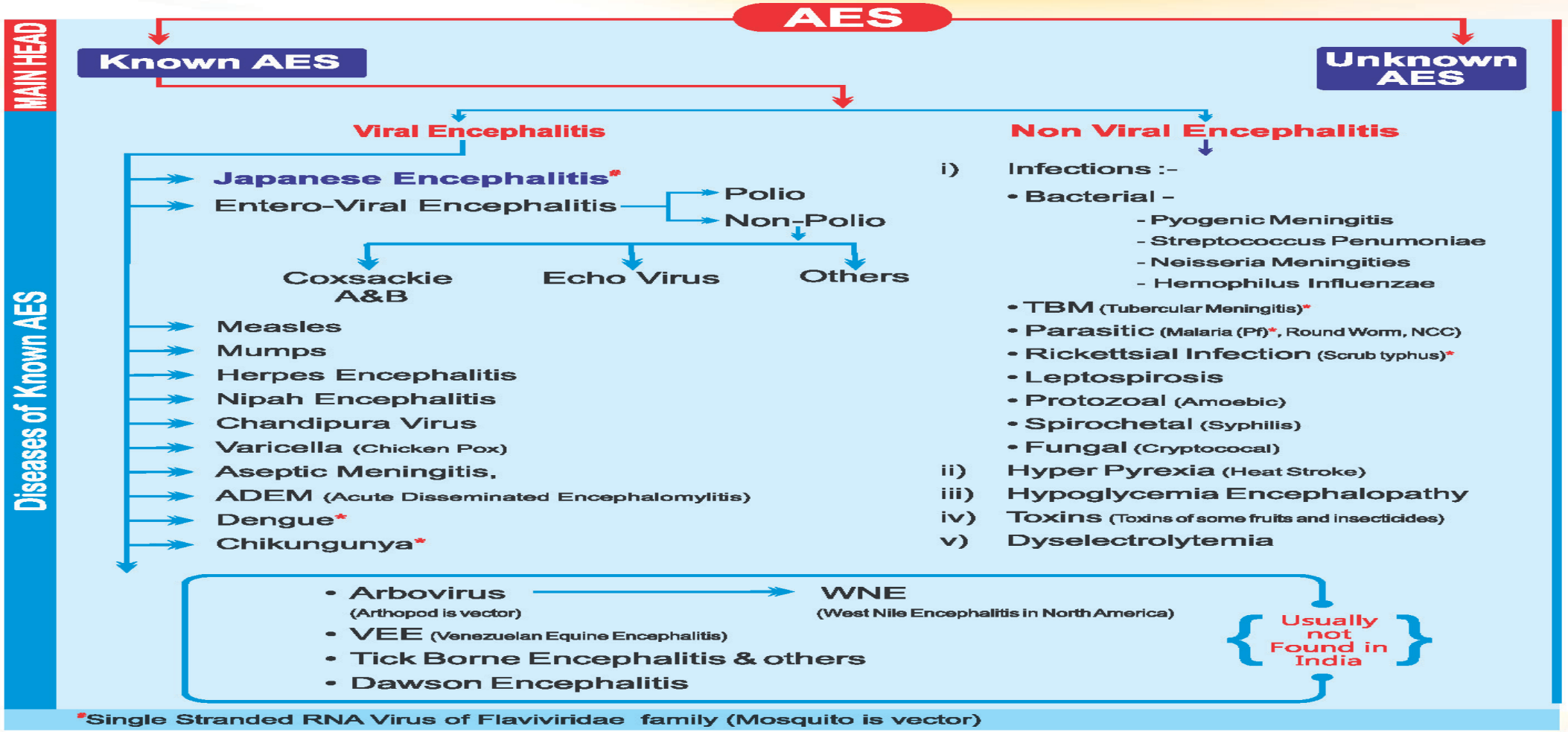
Case definition

Clinically, a case of acute encephalitis syndrome is defined as "a person of any age, at any time of year with the acute onset of **fever** and a change in **mental status** (including symptoms such as confusion, disorientation, coma, or inability to talk) AND/OR new onset of **seizures** (excluding simple febrile seizures)"

Note: In Bihar, a few cases of such encephalopathy / AES have been observed without fever too

Ref: Nelson Textbook of Pediatrics 21st Ed

CLASSIFICATION OF AES CASES



1.* At AES–TAG (Technical Advisory Group) meeting held at RMRI, Patna on 29th November, 2016 and chaired by Dr. Soumya Swaminathan, Secretary DHR & DG, ICMR, New Delhi in presence of Principal Secretary, Health, Govt. of Bihar, Dr. S. Venkatesh, Director NCDC, GoI, Delhi, Dr. P. K. Sen, Additional Director, NVBDCP, GoI, Delhi and others, the decision taken was as- ***"The cases diagnosed as Dengue, Malaria (Pf), Scrub Typhus and TB (TBM) should be removed from the AES pool to avoid unnecessary inflation in AES figure."***

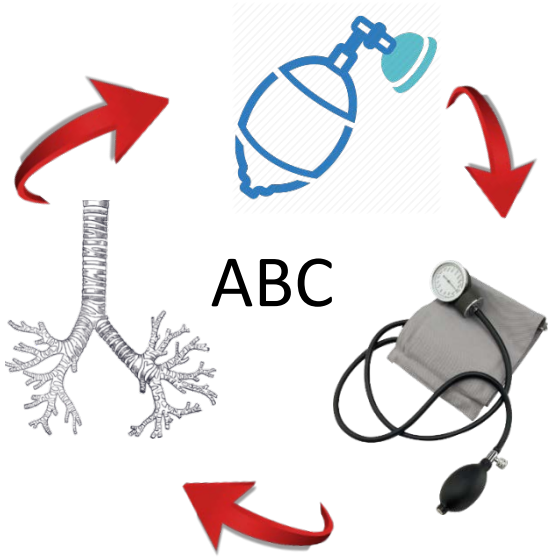
2. **As per above decision, Dengue, Malaria, Chikungunya, Scrub Typhus & Tuberculosis should be reported by concern technical division. These cases will not be reported as AES cases.**

Pathophysiological derangements in AES

- Seizures (Brain dysfunction)
- Altered consciousness (Brain dysfunction)
  - Hypoxemia due to respiratory failure or circulatory failure or combination of both
  - Hypoglycemia due to poor intake or excessive use in heat exhaustion/ seizure or combination
- Respiratory insufficiency
- Circulatory insufficiency
- Changes in blood biochemistry- hypo/hypernatremia, hypo/hyperkalemia, increased CPK, LDH ,lactate. Mild raised SGPT, blood urea etc….

EVALUATION AND MANAGEMENT

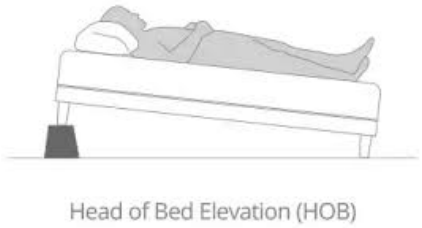
Rapid assessment and stabilization



GCS < 8, impending herniation, Apnea, Inability to maintain airway

Normoventilation:
PaO_2 80-120 mmHg
$PaCO_2$ 35-40mmHg

Normovolemia:
CVP 7-11 mmHg



Head end elevation to 15-30 degree

Maintain Blood Glucose 80-120mg/dl

Rapid assessment and stabilization

O_2

SpO_2 >95%,

Normal BP for age and sex

SAMPLES

Na+

Serum sodium 145-155 mEq/L
Serum Osmolality <320 mOsm/kg
(No hypovolemic fluid to be given)

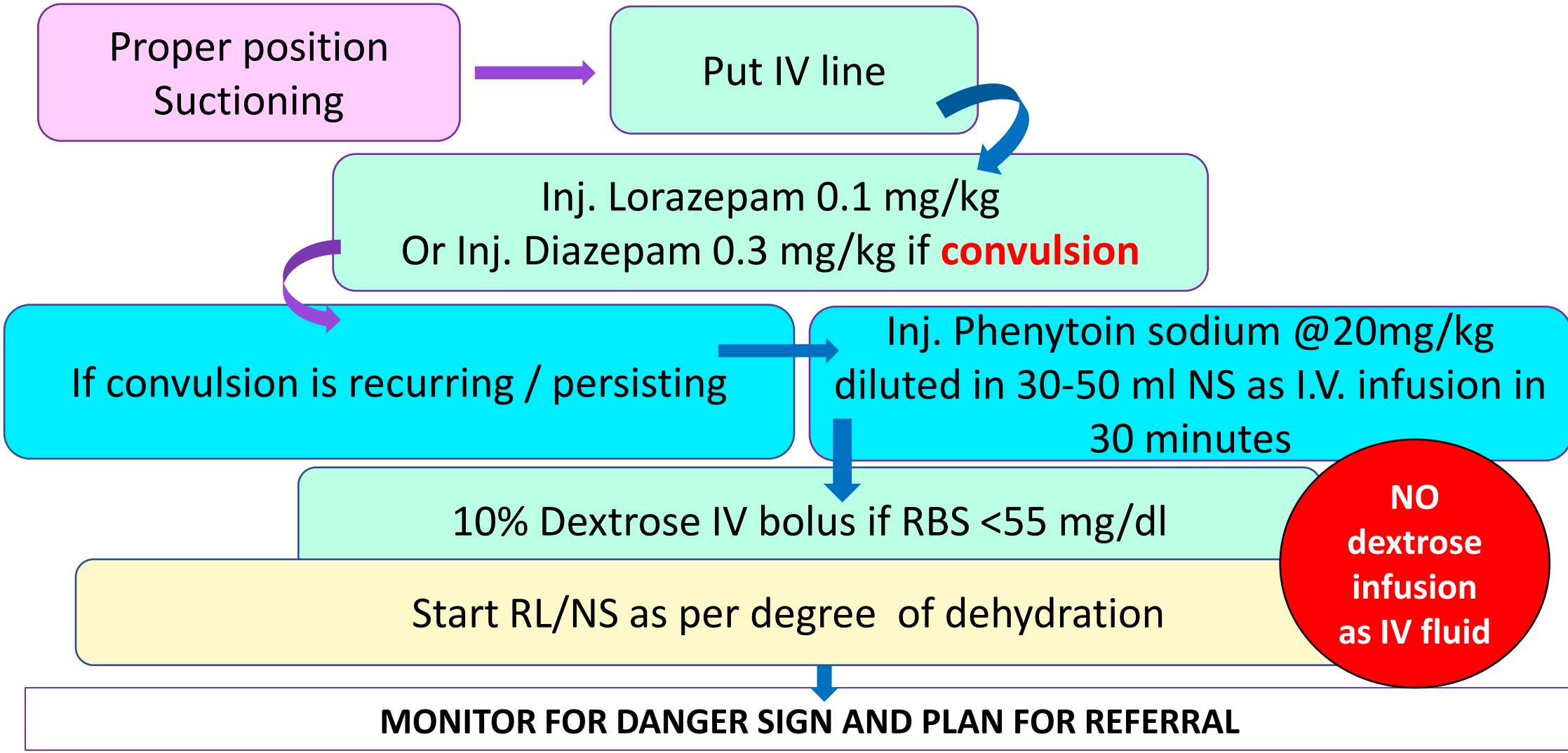
Temp < 38 degree Celsius

Adequate sedation and analgesia

Avoid noxious stimuli

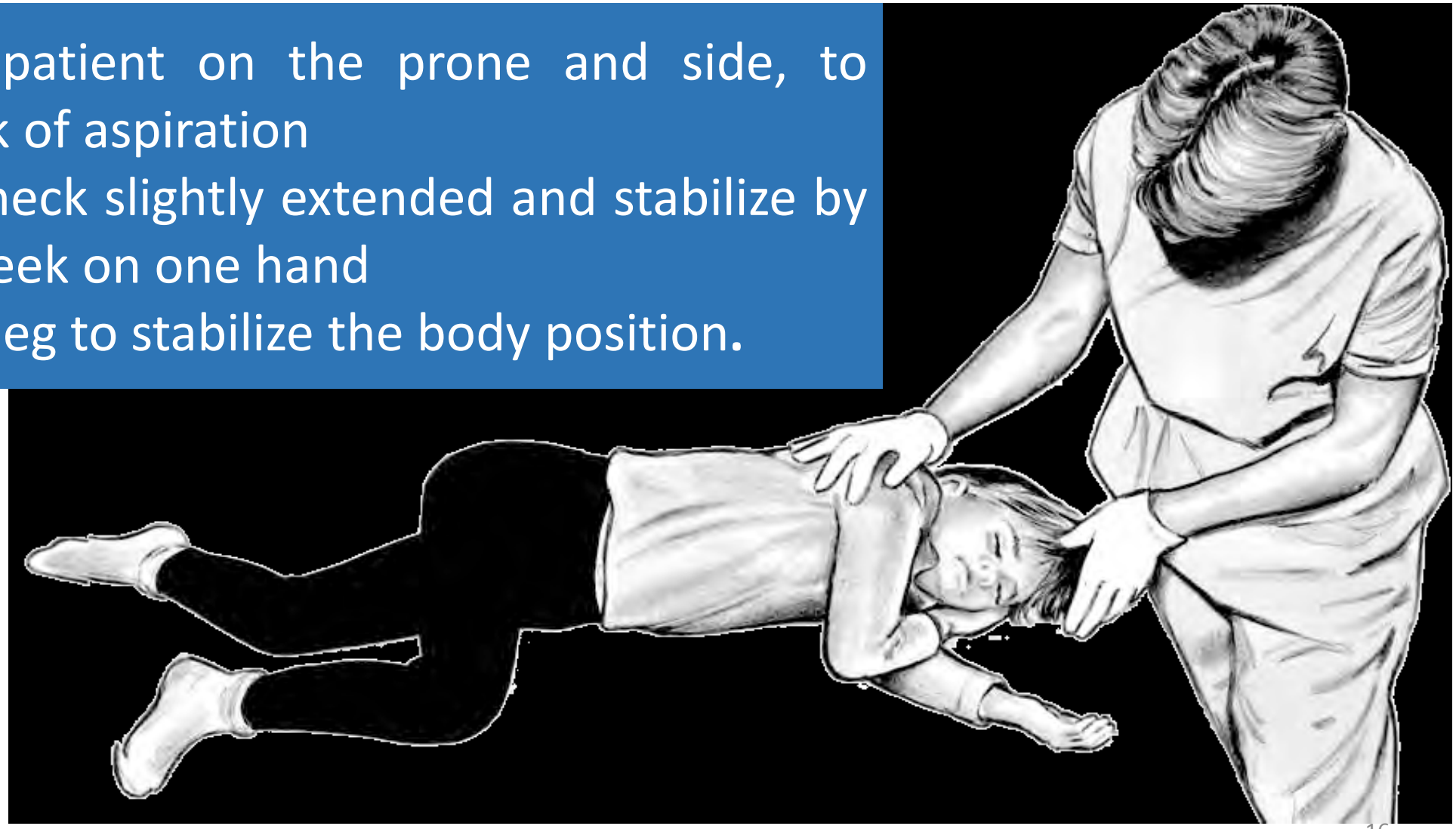
PRACTICAL ASPECTS OF INITIAL MANAGEMENT

Case: Patient with altered sensorium and acute onset fever



Position of the Patient

- Turn the patient on the prone and side, to reduce risk of aspiration
- Keep the neck slightly extended and stabilize by placing cheek on one hand
- Bend one leg to stabilize the body position.



Syndromic Management of Febrile Encephalopathy/Encephalitis at PHC/CHC/RH/SDH/DH level

Predominant signs & symptoms

- Fever
- Unconsciousness (multiple etiology:- hypoglycemia, dyselectrolytemia)
- Dehydration
- Seizure
- Shock
- Raised ICT

SYNDROMIC APPROACH I: Predominant symptom, Fever

Fever:-

Body temperature 100°F(Mouth/Axila/Rectum,varies 1-2 degree)

Treatment: Drug(dose & route of administration)

- Paracetamol-15mg/kg body weight/dose 3-4times per day
- Syp./Tab/IM/IV and repeat accordingly
- Tepid sponging (lukewarm water)-repeatedly from head to toe
- Keep the child at well ventilated area
- Combine all three

SYNDROMIC APPROACH I : High Fever

Heat Hyperpyrexia:-

- H/o sudden onset and dry skin
- During hot sunny day
- Temperature 105°F
- Not subsided by Paracetamol
- Repeated cold saline lavage through NG Tube
- Keep the patient in air conditioner room
- Cold sponging(repeated)

SYNDROMIC APPROACH 2: Predominant symptoms

Unconsciousness

Possible Common causes:

- Hypoglycemia
- Dyselectrolytemia
- Post Ictal state
- Raised ICT
- Others

SYNDROMIC APPROACH 2
Unconsciousness: Hypoglycemia

- Assumption, check RBS in any unconsciousness child
- Operational cut-off <70 mg/dl
- Treat with 10% dextrose @ 5 ml/kg as rapid bolus & start maintenance iv fluid (5% DNS in age appropriate quantity)
- Recheck RBS after 30 min (till 2 consecutive value normal)
- If low, then repeat bolus & give 10% DNS as maintenance IVF
- Make it by adding 10 ml of 50% dextrose for every 100 ml DNS

Syndromic Management 2: Predominant symptoms
Unconsciousness, possible cause - Dyselectrolytemia

- If facility available check for Sodium level
- If < 120 mg/dl, treat with 3% saline @ 5 ml/kg over 1 hour

* Refer to higher centres/DH for further management if not corrected or suspecting SIADH

Never use hypotonic fluid infusion (e.g. 5% or 10% dextrose, or ½ or ¼ DNS) during treatment, it will lead to cerebral edema

Syndromic Management II: Predominant symptoms
Unconsciousness, possible cause - Post-ictal state

- No specific treatment
- Wait and watch
- Vitals monitoring
- Keep in recovery position for airway patency & prevention of aspiration

Syndromic Management 2 : Predominant symptoms

Unconsciousness : possible cause- Raised ICT

ON EXAMINATION

Increased OFC

Bulging AF

Setting sun sign

Change in BP and Pulse

Early : blurred disc margins

Late : papilledema

Abnormal respirations

Bradycardia

Hypertension

Cushing's triad

Late sign of herniation

Management of Raised ICT

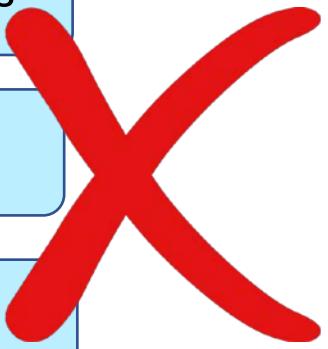
Positioning

Reverse Trendelenburg position preferred

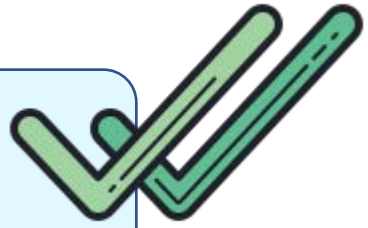
Acceptable

Supine position preferred in raised ICP with shock

- Sharp head angulations
- Tight neck garments
- Taping over head



- Euvolemia



Head end elevation to 15-30 degree

- Refer to Medical college after advising EMT/Parents - about raised head end of the patient during transportation

Management of Raised ICT contd…..

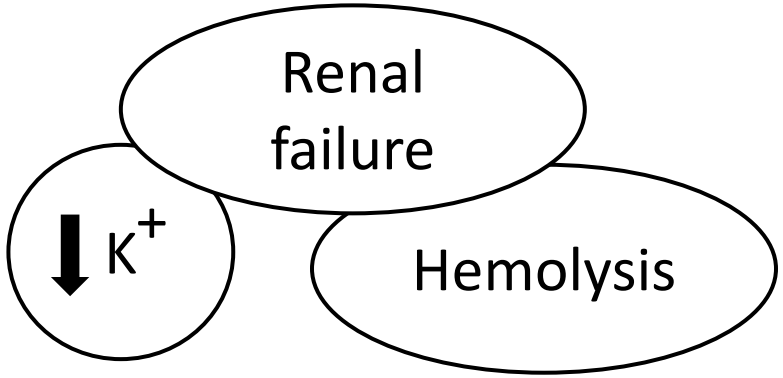
OSMOTHERAPY

MANNITOL

Bolus 0.25–1 g/kg followed by 0.25–0.5 g/kg repeated every 2–6 h

Hypovolemia and shock

"Rebound" rises in ICP.



Side effects

Management of Raised ICT contd….

OSMOTHERAPY

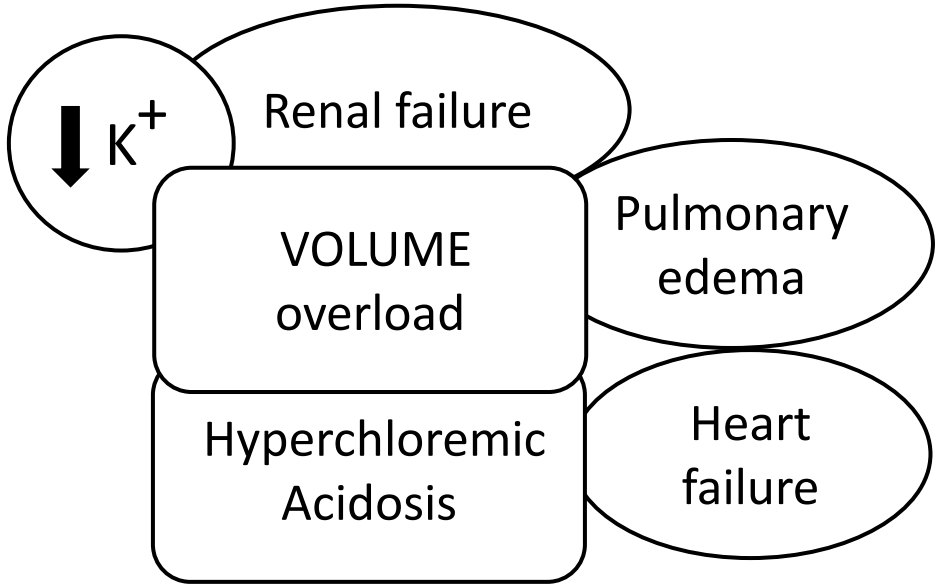
Hypertonic Saline
3%NaCl

0.1 to 1.0 mL/kg/hr infusion

Hypovolemia and shock
Renal failure

MONITOR
Serum Na^+

"Rebound" rises in ICP with Abrupt STOPPAGE



Side effects

***3% NS can safely be given till serum sodium 155 mEq/L**

Syndromic Management III : Predominant feature- Dehydration

Classification:-	No, some, and severe dehydration
Management:-	Don't give oral fluid in unconscious child
Choice of IV fluid:-	RL/NS, depending on availability
Quantity of IVF:-	According to degree of dehydration for some dehydration:- 75 ml/kg over 4 hrs. for severe dehydration:- 100ml (30+70) per kg age up to 1 year- 6hr (1hr+5hrs) age more then 1 year- 3hrs (30 mins + 2.5 hrs)

(1 ml=16 drops (adult IV set), 1ml= 60 micro drip set)

Management of dehydration

Continued....

- Always check for ongoing loss, replace it with appropriate fluid (NS/RL)
- Start maintenance IVF at same time, calculate according to weight of patient, always use **5% DNS** as maintenance IVF

1 – 10 kg:- 100 ml per kg

11 – 20 kg:- 1000 ml + 50 ml per kg

21 kg onwards:- 1500 ml + 20 ml per kg

Syndromic Management IV: Predominant feature Shock

Assessment:- BP / CFT (press over bony surface & check for refill)
Normal- less than 3 sec,
Abnormal- more than 3 sec.
2 to 3 sec considered as borderline, need repetition.

If shock present:- check for dehydration, need correction first (hypovolemic shock only need dehydration correction)

Syndromic Management IV: Predominant feature Shock conti….

- Many types, hypovolemia is common (caution cardiogenic shock)
- Treatment:-

a) NS 40 ml/kg (10-20 ml/kg per bolus) in first hour in the presence of hypotension
b) In case of no hypotension, No bolus is to be given, start maintenance IVF directly
c) Inotropes:- Adrenaline @0.1-1 microgram per kg per minute, Dopamine @10 microgram per kg per minute can be used as second line drug when adrenaline is not present.

Weiss SL, Peters MJ, Alhazzani W, Agus MS, Flori HR, Inwald DP, et al. Surviving Sepsis Campaign International Guidelines for the Management of Septic Shock and Sepsis-associated Organ Dysfunction in Children. Intensive Care Med. 2020;46:10-67.

Syndromic Management V : Predominant feature - Seizure

Initial stabilization

- Maintain airway, advanced airway
- Breathing: O_2, BMV
- Establish IV access - IO, ECG
- RBS: correct hypoglycemia
- Temperature

Give first dose or repeat dose of IV FIRST LINE THERAPY

- IV Lorazepam: 0.05-0.1 mg/kg/dose (4 mg)
- IV Midazolam: 0.2 mg/kg/dose (10 mg)

SECOND-LINE THERAPY

(Similar efficacy for all)

- IV phenytoin/fosphenytoin
- IV Levetiracetam
- IV Phenobarbital (preferably for < 1 year)
- IV Valproate (if liver function is normal)
- Consider pyridoxine 100 mg IV in infants

SECOND-LINE THERAPY

AED	LOADING DOSE	MAINTANANCE DOSE	ADVERSE EFFECT	REMARKS
Phenytoin Fosphenytoin	20 mg/kg/dose 30 mg/kg/dose	5-8 mg/kg/day 7.5-12 mg/kg/day	Thrombophlebitis, Hypotension, Cardiac Arrhythmia	Dilute in NS, give over 20 min
Levetiracetam	30-60 mg/kg/dose	30-60 mg/kg/day		Neuroprotective
Phenobarbital	20 mg/kg/dose	3-5 mg/kg/day	Sedation, Reparatory Depression with Apnea	Preferably used in infants, dilute in NS and give over 20 min
Valproate	20-40 mg/kg/dose	20-60 mg/kg/day	Hepatotoxicity, Hyperammonemia,Encephalopathy	Avoid valproate if hepatic involvement is suspected

Syndromic Management VI : Infective cause

EMPERICAL TREATMENT

- When possibility of infectious aetiology
- Empirical treatment to cover all possible pathogen

Antibiotic: Inj Ceftriaxone-100 mg /kg body wt. followed by divided doses in every 12hrly

Antimalarial:- Inj. Artesunate 2.4 mg /kg body wt stat, followed by after 12 hr and 24 hrs, then OD for 7 days.

Antiviral:-Inj. Acyclovir 3 months to 12 year -20mg/kg wt, 8 hrly, IV slowly over 2 hours for 14-21 days, >12 years-10 mg/kg body wt, 8 hrly for 14 to 21 days

Start the empirical dose and then refer to higher centre

Criteria to refer to Sadar Hospital

Fever with any one of the following :

- Lethargy
- Unconsciousness
- Convulsions
- Other findings eg. Paralysis, rash
- Unequal Pupil
- Hepato-splenomegaly
- Irregular respiration
- Abnormal Posture
  - decerebrate rigidity
  - decorticate rigidity

Criteria to refer to nearest Medical College Hospital

- Shock/low BP/rapid & thready pulse
- GCS <7
- Need of ventilator-poor respiratory efforts
- Cyanosis not managed by oxygen
- Uncontrolled convulsion

* To avoid unnecessary delay in treatment due to multiple referral i.e. PHC/CHC/RH/SDH to DH and then DH to Medical college.

Management of AES Cases in Adult

Presented by-

Dr.(Prof.) Ravikriti
Professor in General Medicine
AIIMS,Patna

Clinical Assessment

- History – Duration; Any headache, vomiting, ear or respiratory symptoms; Comorbidities, drug history, addiction
- General and systemic examination
- Neurological examination – GCS, plantar reflex, any neurological deficits, pupils, neck rigidity

Investigations

- CBC, KFT, LFT, Dengue serology, Malaria (blood film or antigen)
- CXR – if respiratory symptoms
- CT Brain (if indicated)
- LP (Contraindicated if SOL, cerebral oedema or haemorrhage on CT)

Indications for CT prior to LP

- Seizures
- Focal neurological deficit
- Altered mental status
- Papilloedema
- HIV positive status
- Known SOL or focal infection in the CNS

Interpretation of CSF analysis

	Normal	Bacterial Meningitis	TBM	Viral Meningitis
Appearance	Clear	May be turbid	'Cob web' formation when allowed to stand	Usually clear
Cells **When traumatic tap is suspected, 1 WBC may be subtracted for every 1000 RBCs to get the corrected WBC count.**	0-5 (All Lymphocytes	Raised – typicall > 1000 x 10^9/L Predominantly Neutrophils Caution: Cells may be predominantly lymphocytes in partially treated bacterial meningitis.	Raised – typicall 100 to 500 x 10^9/L Predominantly Lymphocytes	10 to 1000 (usually < 500) x 10^9/L Predominantly Lymphocytes
Protein	20 - 40 mg/dl	Raised – usually > 150 mg/dl	Raised – 100 to 500 mg/dl	Modestly raised - < 100 mg/dl
Glucose	> 0.6 of plasma glucose	< ½ of plasma glucose or < 40 mg/dl	< ½ of plasma glucose or < 45 mg/dl	> ½ of plasma glucose
Microbiology	No microorganisms seen or grown	Bacteria may be identified on gram stain and culture	Acid fast bacilli may be seen; Culture for TB may be positive.	Normal microscopy and culture. PCR for HSV and enteroviruses, if available, should be done in suspected cases.

Further Investigations

If CSF suggestive of viral aetiology:

- Send leptospira and scrub typhus serology
- Consider tests for different viral aetiologies

Viral causes of AES in Bihar

- Japanese Encephalitis
- Herpes simplex
- Measles virus
- Mumps virus
- Varicella
- Chandipora virus
- Nipah virus
- West Nile virus

Specific treatment

- Bacterial Meningitis – Ceftriaxone 2g IV BID for 10 to 14 days (start with suspicion); Add dexamethasone 8 mg IV TID for 2 to 4 days (first dose just before the first dose of antibiotic)
- Leptospirosis – Doxycycline 100 mg BID for 7 to 10 days
- Scrub typhus – Doxycycline 200 mg daily for 3 days
- TB Meningitis – ATT for a minimum of 9 months; Add dexamethasone (0.3 to 0.4 mg/Kg in divided doses) tapered over 4-8 weeks
- Viral meningitis - Acyclovir 10 mg/Kg IV TID for 2 to 3 weeks is effective for HSV and Herpes Zoster
- Malaria and dengue – follow disease specific guidelines

Supportive measures

- Prevent aspiration and bed sore
- IV Fluids
- Monitor electrolytes
- IV PPI (specially if on steroids)
- Mannitol for raised ICP
- Indications for ICU - GCS of 8 or below, recurrent seizures, inability to maintain a secure airway or a saturation above 92% in spite of supplemental oxygen and haemodynamic instability

Management considerations in AES with SAM

- **Step 1 -** Diagnosis of AES and its protocol-based management
- **Step 2-** Anthropometric measurement (height, weight) to find out Z-score and to classify as SAM or non-SAM
- **Step 3-** Management in the line of AES (Stabilization & with necessary steps to identify the causative agent/ diagnosis) with Fluid restriction-rate of administration of IVF will be less in comparison to normal child

Discharge of Under 5 Years AES Patient with SAM from AES ward

All under-5 Years AES children with SAM should be admitted in concerned NRC after post treatment discharge from AES ward (PHC/CHC/DH/RH/SDH/Medical Collage)

Note:- Please refer to SAM criteria for under-5 children

i. WHO Z -score less than -3 SD for weight agents height and /or
ii. Bilateral pedal oedema and /or
iii. MUAC < 11.5cm

Management at NRC after discharge from AES ward

- Initiation of proper management of SAM, according to SAM guidelines
- Continue the treatment as per directions from Specialists from Medical College/District Hospital
- Child and mother should get free diet as per NRC protocol.
- Availability of all required drugs (eg. adrenaline, noradrenaline) should be insured by NRC/DH/DHS (Including drugs prescribed at the time of discharge from AES ward
- Discharge for home care as per NRC Criteria

Role and responsibility of Staff Nurse / MO in AES ward

- AES is a very critical condition and relapse can't be ruled out
- Treating physicians of NRC shall visit twice per day with proper notes in case sheet
- Nursing staff shall take vitals 6 hourly and inform the treating physicians accordingly
- New staff-nurses or ANMs shall be given proper training/orientation related to dose calculation, drip calculation, positioning along with proper handover and takeover during shift or referral of AES patients
- Treating doctors shall reassess the patient/child to rule out any post AES sequalae with the help of DEIC of the DH
- Inform the higher centres about the AES patients referral with properly filled Referral slips

*Relapse may occur even if patient is taking medication as per direction of specialists, mostly during first 10 days after discharge from Medical college

* Posting of untrained staff in AES shall be avoided otherwise mortality will be very high

Annexure - N

PICU में स्टॉफ नर्स द्वारा किए जाने वाले कार्यों का चेकलिस्ट

1.	क्या स्टॉफ नर्स का 24x7 रोस्टर ड्युटी बनाया गया है?	(हाँ/नही)
2.	क्या Case Investigation Form (CIF) संधारित है?	(हाँ/नही)
3.	क्या Laboratory Request Form (LRF) संधारित है?	(हाँ/नही)
4.	क्या SOP- 2024 की प्रति संधारित है?	(हाँ/नही)
5.	क्या Emergency Medical Technician (EMT) द्वारा एम्बुलेंस में AES के प्रबंधन हेतु प्रपत्र संधारित है?	(हाँ/नही)
6.	क्या आशा द्वारा AES मरीजों के प्रबंधन का विहित प्रपत्र संधारित है?	(हाँ/नही)
7.	क्या SOP- 2024 में वर्णित दवाएँ उपलब्ध है?	(हाँ/नही)
8.	क्या SOP- 2024 में वर्णित उपकरण उपलब्ध है?	(हाँ/नही)
9.	क्या तिथिवाद दवाओं को हटा दिया गया है?	(हाँ/नही)
10.	क्या CIF एवं LRF को BHT के साथ संलग्न कर दिया गया है?	(हाँ/नही)
11.	क्या CIF पर मरीज के बीमारी का नाम स्पष्ट अंकित है?	(हाँ/नही)
12.	क्या CIF पर चिकित्सा पदाधिकारी का नाम एवं हस्ताक्षर ले लिया गया है?	(हाँ/नही)
13.	क्या Treatment Protocol PICU/ICU में प्रदर्शित है?	(हाँ/नही)
14.	क्या आवश्यकतानुसार कुपोषित बच्चों को Discharge के समय NRC में रेफर किया गया है?	(हाँ/नही/लागू नही)
15.	क्या स्टॉफ नर्स द्वारा मरीजों को दी जानेवाली दवाओं का चार्ट तैयार किया गया है?	(हाँ/नही)
16.	क्या मरीज को Discharge करने के पूर्व सारे कागजातों की छायाप्रति को संधारित कर लिया गया है?	(हाँ/नही)
17.	क्या मरीज को रेफरल स्लीप दिया गया है?	(हाँ/नही)
18.	क्या मरीज की Reporting विहित प्रपत्र में की गई है?	(हाँ/नही)
19.	क्या Death Certificate में बीमारी का स्पष्ट उल्लेख किया गया है?	(हाँ/नही)

सक्षम प्राधिकार का नाम एवं हस्ताक्षर

Summary

- Respiratory/hemodynamic/systemic support
- Prompt, goal-directed, time-bound management
- Timely referral if status epilepticus identified
- Check RBS in **EVERY** sick child
- Prompt management of hypoglycemia, maintenance IVF and regular monitoring of glucose

चमकी को धमकी

शपथ पत्र

मस्तिष्क ज्वर

(ए.ई.एस./जापानी इंसेफलाइटिस/दिमागी बुखार/चमकी बुखार)

- **मस्तिष्क ज्वर :—** एक गंभीर बीमारी है। अधिकतर 1 से 15 वर्ष तक के बच्चे इस बीमारी से ज्यादा प्रभावित होते हैं।

- **लक्षण :—**
  1. चमकी के साथ तेज बुखार
  2. सरदर्द
  3. अर्द्ध या पूर्ण बेहोशी

- **ये तीन धमकियाँ याद रखें :—**
  1. **खिलायें—** बच्चों को रात में सोने से पहले भरपेट खाना जरूर खिलायें। यदि संभव हो तो कुछ मीठा भी खिलायें।
  2. **जगायें—** रात के बीच में एवं सुबह उठते ही देखें कि बच्चा कहीं बेहोश या उसे चमकी तो नहीं।
  3. **अस्पताल ले जायें—** बेहोशी या चमकी दिखते ही आशा दीदी को सूचित करते हुए तुरंत निः शुल्क 102 एम्बुलेंस या उपलब्ध वाहन से नजदीकी स्वास्थ्य केन्द्र ले जायें।

- **सावधानियाँ :—**
  1. तेज धूप में जाने से बचें।
  2. दिन में दो बार नहायें।
  3. रात में पूरा भोजन करके सुलायें।
  4. लक्षण दिखते ही ओ0आर0एस0 का घोल या चीनी और नमक का घोल पिलायें।

HOPE- We can achieve zero mortality one day!!!!

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Thank You!