College of Anaesthesiologists & Intensivists of Sri Lanka

Consensus Recommendations and Suggestions for Management of Dengue Patients in the Intensive Care Unit

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Recommendations for Early Resuscitation for Dengue Patients in ICU

Introduction

The recent catastrophic dengue epidemic brought into focus, that in this condition, particularly in the patients admitted to the ICU with shock and multiple organ failure there are many areas where individualized decisions have to be made. These patients have progressed beyond the classic severe dengue shock syndrome. The expert consensus meeting on dengue in Latin America in 2008 stated "that dengue is one disease entity with different clinical presentations and often with unpredictable progress and outcome" This probably is our experience too.

The College of Anaesthesiologists and Intensivists of Sri Lanka, whose members managed the most critically ill patients during this epidemic, decided to pool their experiences and arrive at consensus suggestions and recommendations, which would be helpful in the future. The lack of data, and therefore evidence is a huge problem facing us in the management of these patients.

The faculty of critical care medicine of the college of anaesthesiologists and intensivists have developed a data base for the collection of information on these patients. This would be a worthy effort as it would lend strength for future modifications and improvements of these consensus suggestions based on experience. With sufficient data it would even be possible for the College to formulate a guideline in the future. It is recommended that all units collect data on these patients.

A case of severe dengue can be defined as a diagnosed dengue patient with one or more of the following

(i) severe plasma leakage that leads to shock (dengue shock) and/or fluid accumulation with respiratory distress

(ii) severe bleeding

(iii) severe organ impairment

However, Dengue patients in shock present to Intensive care units with a multitude of problems.
**Common Presentations of Dengue Patients to Intensive Care**

- Very low blood pressure/normal blood pressure, tachycardia, severe vasoconstriction
- Persistent severe leakage
- Multi organ failure
- Secondary bacterial sepsis
- Respiratory distress
- Fluid overload
- Acute liver failure
- Myocarditis
- Encephalopathy
- Coagulopathy

Management should be planned considering the above.

**Admission Criteria**

We recommend alerting the intensive care team if the MEWS > 5 or if additional features are present after initial resuscitation in the ward.

**Early warning score to be monitored in the wards**

- Mental Status (GCS ≤ 14/15) or AVPU
- SBP < 90 mmHg
- RR > 20 breaths /min
- UOP < 0.5 ml /Kg/Hr
- SpO2 < 90%
- HR >120
**Additional risk factors**

- Raised AST/ALT > 400 IU/L
- Lactate > 2 mmol/L

Any special indication such as pregnancy, CKD, immunocompromised, oliguria may have to be admitted to the ICU for monitoring.

**Initial Assessment on Admission to ICU**

In addition to routine assessment in ICU, emphasis should be made on the following:

- Septic screen
- Veno – arterial PCO2 gap
- Lung ultrasound
- Lactate levels
- AST/AST – to be done in a diluted sample
- S. ionised Calcium levels
- Trans thoracic echo (TTE)/ TOE – Re-assessment of cardiac filling and fluid responsiveness
- Cardiac output monitoring
- Bladder pressure – particularly cavities
- Thromboelastography
- CT if unconscious

Looking for:

- Organ hypoperfusion
- Free fluid
- Low cardiac index
➢ Pulmonary oedema
➢ Liver failure
➢ Intra abdominal hypertension
➢ Bleeding into lungs
➢ Myocarditis

**Initial Fluid Resuscitation**

Critical phase is best managed by physicians according to existing guidelines

*If the patient admitted in the post critical phase*

Use an individualized approach

➢ Give fluids to maintain the cardiac output (Crystalloids/colloids)

➢ Consider 20% Albumin 20 CC boluses if excessive crystalloids are required / cardiac compromised state while monitoring response with TTE/TOE, IVC collapse/ SVC collapse, SVV, lung ultrasound for B lines and extra vascular lung water

➢ Measure Serum Ionized Calcium levels

➢ Consider IV Calcium gluconate slow boluses as an inotrope in severe cardiac compromised state

➢ PCV to be maintained 35-40

➢ Use an individualized approach to decide on end point of fluid resuscitation. Ideally CI- 3, SVV<12, Non-collapsibility of vena cava, EVLW or B lines and other clinical parameters

➢ Once adequately resuscitated, consider oral/ NG fluids for maintenance
**Intubation and Ventilation**

Have a low threshold for intubation

**Indications for Intubation**

- Altered mental state
- Tachypnoea
- Acute respiratory failure
- ARDS
- Severe cardiovascular instability
- Severe metabolic derangement – Raised Lactate > 10

**Consider drainage of pleural fluids if**

- Respiratory compromise
- Raised intra-abdominal pressure

**NOTE:** *We recommend a chest drain inserted by ultra sound guided seldinger technique –These should be purchased*

**Monitoring**

In addition to basic recommended monitoring, we recommend the following

- Early insertion of a radial arterial line
- Oesophageal doppler in severe shock state (where pulse is absent or not palpable and unable to insert arterial line) – patient should be intubated for this
- Avoid femoral arterial cannulation
- If platelet count less than 60 or other evidence of coagulopathy is present, correction should be done, before invasive line insertion or other invasive procedures
➢ TEG is useful

**Management of Coagulopathy**

**Probably should be Thromboelastometry Guided**

➢ Platelet transfusions for pleural fluid drainage and invasive procedures.
➢ Consider Tranexamic acid in severe coagulopathy.
➢ Actively look for concealed haemorrhages (Eg: lung, peritoneum, muscle, bowel wall)
➢ Target Hb – 9 mg/dl.

**Renal Replacement**

Consider early RRT in

➢ Fluid overload
➢ Rising S. Creatinine
➢ Low UOP
➢ Metabolic acidosis

**Infection Control**

➢ Full septic screen on admission to ICU
➢ Consider antibiotics to cover hospital acquired infections
Liver failure regimen for ALI

In majority of the cases, liver failure is a result of a secondary insults such as persistent shock or hypoxia. Routine use of lactulose is not recommended in ALI. Main goals of liver supports include

- Early intubation and ventilator support (Hep enceph grade ≥ 3)
- Brain protective ventilator support
  - Head up 30 degree
  - Maintain normoxia, normocapnoea, normotension, normoglycaemia and normothermia
  - Frequent monitoring of pupils and if indicated osmotherapy with 3% saline (aim S. Osmolarity ≤ 320, S. Na 145-150))
- CRRT
- Broad spectrum (non- hepatotoxic) antibiotics
- Liver failure regimen where appropriate
**Intra-abdominal hypertension (IAH)**

Many have IAH with the ascites and some will have IAHS with bladder pressures over 20.

- Monitor bladder pressure
- Ventilation
- Fluid management - optimal not liberal
- Drainage - if IAP>20, Difficulty in ventilating and weaning, Renal impairment

IVC collapsibility is not accurate in the presence of IAH

**Vasopressors**

- To maintain MAP at 65

**Inotropes**

Dobutamine, Calcium should be used in following circumstances

- Evidence of myocardial dysfunction
- Persistent acidosis, high lactate, low UOP despite having MAP >65
- Veno–arterial pCO2 >6 mmHg

**Data Collection**

All ICUs to collect data on dengue patients treated by them