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RESEARCH ARTICLE

IMPROVING CLINICAL OUTCOMES THROUGH SETTING UP OF A SPECIALISED DENGUE TREATMENT UNIT.

Pradeep K de Silva^{1*}, Priyankara Jayawardena^{1*}, Umesh Jayarajah^{1*}, Shuaib Faizer², Lakshika Perera³,
 Vibhavee Kannangara³, Ishan M De Zoysa³, Suranjith L Seneviratne³.

1. Dengue Unit, National Hospital of Colombo, Sri Lanka.
2. Department of Forensic Medicine, Faculty of Medicine, University of Colombo, Sri Lanka.
3. Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka.

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Abstract

Dengue is a significant public health problem in Sri Lanka. This year has seen the largest dengue epidemic so far. Availability of well-trained medical staff and adequate facilities for intensive patient monitoring are important issues during large dengue epidemics. We report on the improvement of clinical outcomes following the setting up of a Specialised Dengue Treatment Unit (DTU) with high dependency facilities at the National Hospital of Sri Lanka.

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Introduction:-

Dengue Viral infection is the most important viral haemorrhagic fever worldwide. It is endemic or epidemic in virtually all tropical countries and causes a wide array of clinical manifestations (Gurugama et al., 2010; Seneviratne et al., 2006; Jayarajah et al., 2017a). It may be asymptomatic or cause undifferentiated fever, dengue fever (DF), dengue haemorrhagic fever (DHF), or dengue shock syndrome (DSS) (Gurugama et al., 2010). Epidemics of Dengue tend to occur regularly in Sri Lanka (Sirisena, 2013) and the current epidemic is by far the largest (Jayarajah et al., 2017b). For instance, during the first seven months of 2017, 110, 372 dengue fever cases were notified in Sri Lanka, with 301 dengue related deaths (Jayarajah et al., 2017b). There has been a 4.3 fold rise in the average number of dengue cases, compared to the preceding six years and Dengue virus serotype 2 (DENV-2) is the likely virus responsible (Tsuboi, 2017). Availability of well-trained medical staff and adequate facilities for intensive patient monitoring are often major issues during large dengue epidemics. Deficits in these areas may contribute to increased morbidity and mortality during an epidemic. With a view to reducing the high morbidity and mortality in the present dengue epidemic, a Specialised Dengue Treatment Unit (DTU) with high dependency facilities was established at the National Hospital of Sri Lanka.

Methods:-

Patients with suspected or confirmed dengue infections and a platelet count $< 130\,000 \times 10^6/\text{litre}$ or a platelet count $> 130\,000 \times 10^6/\text{litre}$ but with warning signs, were admitted to the DTU. At this unit, all patients received intensive monitoring based on the stage of their illness and facilities for intensive monitoring and equipment for inward PCV estimation were available. Investigations sent from the specialised unit were prioritised and urgent results provided. PCV was done 6 hourly in all patients in the febrile phase and 3 hourly in all patients in the critical phase. An inward ultrasonography machine was readily available and all patients with suspected leakage had ultrasound scans 12 hourly. Patients in the febrile phase received fluid at 1.5-2ml/kg/hr and those in critical phase received an

Corresponding Author:- Suranjith L Seneviratne.

Address:- Department of Surgery, Faculty of Medicine, University of Colombo Kynsey Road,
 Colombo 8, Sri Lanka.

individual fluid management based on their clinical and biochemical findings so as to maintain a urine output of $>0.5\text{ml/kg/hr}$. Those with a decreasing PCV or an inadequate rise in PCV during the critical phase, were given a blood transfusion. Strict discharge criteria were adhered to, including clinical improvement, fever free period of at least 48 hours, at least 24 hours after the critical phase and a platelet count showing a rising trend with a minimum count of $30,000 \times 10^9/\text{litre}$. We collected the demographic, clinical and investigative findings of patients admitted to the DTU. The WHO classification and case definitions were used to classify the disease as either DF or DHF (WHO, 2009). Ethical clearance was obtained from the ethical review committee of the National Hospital of Sri Lanka (ERC approval number AAJ/ETH/COM/2017-21).

Results:-

Two hundred and thirty five dengue patients were admitted to the DTU. Mean age was 30.09 (SD=13.4, range: 13-70) years and 150 (63.5%) got admitted on the 3rd and 4th days of their illness. Other common symptoms at presentation were: headache (n=144, 61.3%), body aches (n=95, 40.4%), abdominal pain (n=37, 15.7%) and vomiting (n=43, 18.3%). Around 21% (n=49) had abdominal tenderness in the right upper quadrant. Twenty patients (8.5%) were admitted during the critical phase with evidence of leakage. DF – 140 (59.6%), DHF grade 1 – 81 (34.5%), DHF grade 2 – 12 (5.1%) and DHF grade 3 – 2 (0.8%). Hundred and eighty five (78.7%) were managed with crystalloids, 13 (5.5%) needed colloids (boluses of dextran) and 12 (5.1%) needed blood transfusion for occult bleeding. Mild liver enzyme elevation was seen in 103 (43.8%) and 12 patients had an Alanine transaminase levels $> 200 \text{ U/L}$. Two patients had myocarditis, another had mild renal impairment and none had neurological manifestations. All patients made an uneventful recovery, mean duration of hospital stay was 4.2 (range: 1-10) days, and none required ICU admission. Right upper quadrant abdominal tenderness was significantly associated with DHF (DHF vs DF: 55.1% vs 36.6%, $p=0.019$) however it was not associated with elevation of liver enzymes. Organ impairment was significantly associated with DHF compared to DF (55.8% vs 36.4%, $p=0.003$).

Discussion:-

The recruitment of adequately trained staff and intensive patient monitoring are key in successful patient management during a large dengue epidemic. Having a specialised DTU allows individualised patient management plans to be put in place and this in-turn helps with the early identification of any patient entering the critical phase. During an epidemic, within a busy general medical ward doing regular PCV's on all patients admitted with suspected dengue is logistically difficult, and thus early identification of the critical phase, presence of occult bleeding and response to treatment may be affected. In such epidemic situations, immediate allocation of infrastructure and human resources could be difficult when detailed prior plans are not available. Having well thought out plans for setting up such specialised DTU's in different large hospitals could help reduce morbidity and mortality during future epidemics.

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