

Fluid Overload in a Case of Severe Dengue Fever: An Insight to Add Diuretics

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Received September 30, 2020; Revised October 16, 2020; Accepted January 06, 2021

ABSTRACT

Dengue fever, the most common arthropod-borne viral infection in South East Asia. Being hypovolemic, fluid support is the common mode of resuscitation in a case of severe dengue fever. Often the heavy fluid support gets continued as a protocol in most cases of dengue at dose 5 ml per kg weight per hour basis, without giving a second thought about fluid overload. Treatment often gets in panicky vicious fluid resuscitation than judicious way, resulting in fluid overload. Published data suggest maintaining a negative fluid balance for improved outcomes in dengue with pulmonary edema. This case justifies judicious use of diuretics, caution before giving judicious intravenous fluids in dengue fever without just following a protocol. Our case of severe dengue fever with shock manifested low BP, poor pulses even on 8th day of illness but with signs of CCF and Pulmonary edema and anasarca and hepatomegaly, so at this point dengue will be out of critical phase, low BP, weak pulses here are probably secondary to late CCF and Pulmonary edema following fluid overload. This required fluid restriction and diuretics to clear off all fluid in 3rd space that was collected during critical phase. Timely suspecting an overload syndrome due to fluids instead of calling ARDS due to capillary leak will help one avoid this mistake. The dengue fluid resuscitation protocol should be modified to add a trajectory to look for objective evidence of hypovolemia like BUN or CVP and objective evidence of hypervolemia like chest x-ray and liver span to plan further course of fluids when a dengue case worsens.

Conclusion: Requirement based fluid therapy is to be followed in dengue fever than compulsory IV fluid for all dengue patients is to be followed to avoid unnecessary complications like CCF, pulmonary edema. Targeting hematocrit has no meaning if not correlated clinically. Furosemide can be considered in dengue in appropriate time if fluid overload is seen after critical phase gets over.

Keywords: Dengue shock syndrome, Fluid overload, Diuretics

INTRODUCTION

Dengue fever, the most common arthropod-borne viral infection in South East Asia, is increasing in prevalence due partially to increased awareness and better diagnostic methods. World Health Organization (WHO) estimates that between 50 and 100 million people are infected with the dengue virus each year, whereas 500,000 cases of severe dengue fever (DHF) require hospitalization, and ninety percent of mortalities occur in children less than 15 years of age [1,2]. Being hypovolemic, fluid support is the common mode of resuscitation in a case of dengue fever. Often the heavy fluid support gets continued as a protocol in most cases of dengue at dose 5 ml per kg weight per hour basis, without giving a second thought about fluid overload. Treatment often gets in panicky vicious fluid resuscitation than judicious way, resulting in fluid overload. The World Health Organization (WHO) guidelines [3] offer a useful approach to immediate fluid resuscitation in various stages of the disease. Kabra [4] and Soni [5] have described

difficulties in fluid management in children in the Indian context. Published data suggest maintaining a negative fluid balance for improved outcomes in dengue with pulmonary edema [6]. Studies have demonstrated lower extra-vascular lung water, lesser mechanical ventilation and better survival with fluid restriction in comparison to standard fluid protocols [7]. Data to support the role of diuretics in pediatric ARDS are scarce [8]. Recently, Ranjit [9] described successful management of complicated dengue infection with judicious fluid removal. This case justifies

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Citation: Kiran B, Santosh K & Surbhi R. (2021) Fluid Overload in a Case of Severe Dengue Fever: An Insight to Add Diuretics. J Nurs Occup Health, 2(2): 196-198.

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judicious use of diuretics, caution before giving judicious intravenous fluids in dengue fever without just following a protocol.

CASE HISTORY

A 10-year male child presented with history of 4 days of high-grade fever without chills with 2 episodes of vomiting with pain abdomen and malaise, lethargy but no back pain or retro orbital pain without any bleeding manifestations. His NS1, IgM for Dengue positive on day 4 of fever and he was diagnosed with dengue fever. On 6th day of illness (2nd day of admission) child developed drop in platelets from 122 to 63 thousand and hematocrit increased from 29 to 35 and hemoglobin from 9.6 to 12.7 and child developed Tachycardia, Falling BP to less than 5th centile, weak pulses, cold extremities and seen to have metabolic acidosis with pH: 7.16, bicarbonate of 12 and low urine output: 0.5 cc/kg/h, Bun:28, Creatinine:0.7, normal electrolytes and raise in INR, SGOT/PT increased from 84/47 to 5247/3546, shock worsened, child was given intravenous fluids according to WHO protocol, boluses were given & then IV fluids were given at 10 cc/kg/h, shock improved; Urine output: Improved, metabolic acidosis got corrected, but then maintenance IV fluids were continued with 3 ml/kg/day, On 8th day of illness again child developed drop in BP, weak pulses and respiratory distress with crepts on auscultation with sPO2 on Room air till 73%, liver: increasing span to 11 cm but with no metabolic acidosis and urine output maintained at 1.1 cc/kg/h, CXR showing bilateral diffuse fluffy shadows suggestive of pulmonary edema, with no evidence of fluid or blood loss from anywhere in the body, positive balance of fluids was set in. Often when dengue fever cases worsen, many Pediatricians are scared to diagnose hypervolemia and keep continuing high fluid therapy as a protocol which can become lethal. But this child was restricted fluids and furosemide was given in dose 2 mg/kg/dose thrice a day to treat pulmonary edema and continued three times a day for 5 days i.e., 6 mg/kg/day for next 4 days to clear the positive balance. Child started showing improvement in pulse volume and BP and decreasing anasarca, improvement in saturation decreasing liver span and clear chest, improved saturation to 99% in room air. Child was discharged in next three days.

DISCUSSION

This case of severe dengue fever with shock manifested low BP, poor pulses even on 8th day of illness but with signs of CCF and Pulmonary edema and anasarca and hepatomegaly, so at this point dengue will be out of critical phase, low BP, weak pulses in these cases were probably secondary to late CCF and Pulmonary edema following fluid overload. This required fluid restriction and diuretics to clear off all fluid in 3rd space that was collected during critical phase. Usually pediatricians prefer to start fluid therapy by 6 ml/kg/dose and increase every hour by rate 2 ml/kg/h, to maximum of rate 10 ml/kg/h and in worsening BP, many prefer to add

more fluids chasing the hematocrit getting more panicky with low BP readings which may be possible in cases of hypervolemic shocks too. Timely suspecting an overload syndrome due to fluids instead of calling ARDS due to capillary leak will help one avoid this mistake. An x-ray chest for CTR, BUN level, liver span and CVP shall usually help in confirming the fluid overload instead of just getting carried by protocol as to give more fluids when worsening. The dengue fluid resuscitation protocol should be modified to add a trajectory to look for objective evidence of hypovolemia like BUN or central venous pressure and objective evidence of hypervolemia like chest x-ray and liver span to plan further course of fluids when a dengue case worsens. This will help us judiciously separate iatrogenic fluid overload cases and manage them more effectively improving survival.

CONCLUSION

Requirement based fluid therapy is to be followed in dengue fever than compulsory IV fluid for all dengue patients is to be followed to avoid unnecessary complications like CCF, pulmonary edema. Targeting hematocrit has no meaning if not correlated clinically. Furosemide can be considered in dengue in appropriate time - if fluid overload is seen after critical phase gets over. Clinical evidence of fluid overload and hypovolemia is key in helping such decisions.

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