Intracranial hemorrhage from Dengue

- The clinical use of platelet transfusions: A systematic literature review and meta-analysis on behalf of the International Collaboration for Transfusion Medicine Guidelines
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Intracranial hemorrhage (ICH) is a severe and potentially life-threatening complication that can occur in individuals with severe dengue infection. Dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) are severe forms of dengue that can lead to various complications, including bleeding disorders and intracranial hemorrhage.

Here are some key points related to intracranial hemorrhage from dengue:

Pathophysiology:

In severe cases of dengue, the virus can cause increased vascular permeability, leading to plasma leakage. This leakage can result in a decrease in blood volume and can contribute to bleeding complications, including intracranial hemorrhage. Clinical Presentation:

Patients with intracranial hemorrhage from dengue may present with symptoms such as severe headache, altered mental status, neurological deficits, seizures, or signs of increased intracranial pressure. These symptoms warrant immediate medical attention. Risk Factors:

The risk of intracranial hemorrhage is higher in individuals with severe dengue, particularly those with Dengue Hemorrhagic Fever (DHF) or Dengue Shock Syndrome (DSS). Other risk factors may include a low platelet count (thrombocytopenia) and coagulation abnormalities. Diagnostic Evaluation:

Diagnosis of intracranial hemorrhage in dengue patients involves imaging studies such as computed tomography (CT) scans or magnetic resonance imaging (MRI) of the brain. These imaging techniques can help identify the presence and location of bleeding within the brain. Management:

The management of intracranial hemorrhage in the context of dengue involves supportive care and, if necessary, neurosurgical intervention. Maintaining hemodynamic stability, transfusion support (including platelets), and close monitoring are crucial aspects of the management strategy. Prevention:

Preventing severe dengue cases is key to reducing the risk of intracranial hemorrhage. Timely medical intervention, close monitoring of patients with severe dengue, and appropriate fluid

management can help prevent complications. Platelet Transfusions:

In some cases, platelet transfusions may be considered to manage thrombocytopenia. However, the decision to transfuse platelets should be based on clinical judgment, and the benefits and risks need to be carefully assessed. Prognosis:

The prognosis for individuals with intracranial hemorrhage from dengue depends on factors such as the extent of bleeding, timely medical intervention, and the overall severity of the dengue infection. Prompt and appropriate medical care is crucial for improving outcomes. It's important to note that while severe cases of dengue can lead to complications such as intracranial hemorrhage, the majority of dengue infections are mild and do not result in severe outcomes. Prevention, early detection, and appropriate medical care are essential components of managing dengue and its complications.

Complications

Severe forms of dengue, known as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), can cause life-threatening complications such as severe bleeding, organ damage, and circulatory failure.

A rare but possibly dangerous consequence of dengue illness is intracranial hemorrhage (ICH). Currently, the pathogenesis of ICH is unknown.

Treatment

There is no specific antiviral treatment for dengue fever, and management mainly involves supportive care to relieve symptoms and prevent complications. Rest, hydration, and over-the-counter pain relievers such as acetaminophen can help alleviate fever and pain. It is important to avoid medications like aspirin, ibuprofen, and naproxen, as they can increase the risk of bleeding.

Studies have reported the use of emergency surgery while monitoring thrombocytopenia in the therapy of dengue ICH [1].

Prevention

Prevention is crucial in controlling the spread of dengue. Measures include eliminating mosquito breeding sites by emptying standing water containers, using insect repellents, wearing protective clothing, and using mosquito nets or screens. In some high-risk areas, mosquito control programs may be implemented to reduce the mosquito population.

If you suspect you have dengue fever or are in an area with a dengue outbreak, it is advisable to seek medical attention for diagnosis and appropriate management.

Bangladesh reported the highest number of annual deaths (n = 281) related to dengue virus infection in 2022 since the virus reappeared in the country in 2000. Earlier studies showed that >92% of the annual cases occurred between the months of August and September. The 2022 outbreak is characterized by late onset of dengue cases with unusually higher deaths in colder months, that is, October-December. Haider et al. present possible hypotheses and explanations for this late resurgence of dengue cases. First, in 2022, the rainfall started late in the season. Compared to the monthly average rainfall for September and October between 2003 and 2021, there was 137 mm of additional monthly rainfall recorded in September and October 2022. Furthermore, the year 2022 was relatively warmer with a 0.71°C increased temperature than the mean annual temperature of the past 20 yr. Second, a new dengue virus serotype, DENV-4, had recently reintroduced/reappeared in 2022 and become the dominant serotype in the country for a large naïve population. Third, the post-pandemic return of normalcy after 2 yr of nonpharmaceutical social measures facilitates extra mosquito breeding habitats, especially in construction sites. Community engagement and regular monitoring and destruction of Aedes mosquitoes' habitats should be prioritized to control dengue virus outbreaks in Bangladesh [2)].

Case reports

A 65-year-old man who presented with dengue fever symptoms and developed altered consciousness and focal neurological deficits. The findings of the tests showed thrombocytopenia, increased AST and ALT, positive anti-dengue IgG, and subdural hematoma on brain imaging. The urgent operations were completed satisfactorily.

Dengue-related intracerebral haemorrhage is still a complicated condition. Thrombocytopenia and leukopenia are the first symptoms that point to dengue. Some risk factors, such as thrombocytopenia and increased AST and ALT, have been identified as bleeding factors in dengue fever. For a possible intracerebral haemorrhage, radiological imaging should be performed. In an emergency neurosurgery setting, thrombocyte administration could be used to monitor thrombocytopenia.

Subdural hematoma is a possible dengue fever complication. If the patient's symptoms with thrombocytopenia and elevated liver enzymes indicate the possibility of intracranial haemorrhage, immediate radiological imaging should be performed [3)]

A 65-year-old male patient was admitted with high-grade febrile illness and diagnosed with dengue. The patient had no focal neurology and was managed adequately following the primary survey on admission but, then, developed severe thrombocytopenia and eventually the critical phase of dengue illness. On the 5th admission day, the patient collapsed. Glasgow Coma Score was 3/15 with bilaterally dilated, fixed pupils. Immediate computed tomography head revealed a large left SDH with a significant midline shift. SDH was emergently evacuated with two units of platelets transfused peroperatively and two additional units postoperatively. Thrombocytopenia resolved within 48 h, and interval scanning showed gradual resolution of SDH. The patient was discharged 18 days later. Five months later, on follow-up, the patient is well with mild left-sided weakness and an Extended Glasgow Outcome Score of 7.

Isolated SDH is a rare but life-threatening hemorrhagic complication of DHF. Even in the critical phase

of illness, with severe thrombocytopenia, surgical evacuation should be considered if the SDH is present in isolation, within an accessible area, and can be operated on immediately [4].

A 48-year-old Indian woman presented with fever and body aches followed by acute onset of paraplegia with bladder and bowel dysfunction and loss of sensations below the level of the umbilicus. She had severe thrombocytopenia and positive dengue serology. Magnetic resonance imaging of the spine showed compression of the spinal cord due to intradural hematoma at the D7-D8 vertebral level. The patient received symptomatic treatment for dengue fever and steroids. Emergency D7-D8 laminectomy with excision of the clot and dural repair was done after stabilizing the platelet count with multiple platelet transfusions. The constitutional symptoms responded well to the treatment. There was good improvement in sensory symptoms but negligible improvement in paraplegia with a change in muscle power from grade 0/5 to grade 1/5 in the postoperative period. The patient was discharged from the hospital in a stable condition, but paraplegia showed little improvement during follow-up of 1 year.

Spontaneous spinal cord hemorrhage can present as acute paraplegia in dengue fever. Failure to recognize this complication can delay initiating appropriate treatment with permanent loss of neurologic function [5].

A 18-year-old Pakistani male, presented with fever, colicky abdominal pain, vomiting, diarrhea, dark-colored urine, and oliguria.

Diagnoses: Dengue rapid NS-1 test came back positive. Along with myoglobinuria both serum creatine phosphokinase and creatine levels were abnormal. Hence, the patient was diagnosed with rhabdomyolysis-induced acute kidney injury. On physical examination, his right arm was painful and tender with restricted movement at the elbow. A Doppler ultrasound of the arm revealed thickening of the skin and underlying muscles, as well as edematous abnormalities affecting the entire right upper limb, both of which are indications of compartment syndrome.

Interventions and outcome: The management included rehydration, administration of dextrose and bicarbonate (bicarbonate infusion) prepared by adding 150 mEq sodium bicarbonate in 850 mL dextrose 5%, pain killers, along with platelet, and packed red cell transfusions. Additionally, right upper limb was kept elevated at 90° for 30 minutes every 2 hours to reduce edema and crept bandages were applied. The patient was discharged after 11 days and the follow-up was uneventful.

Lesson: Physicians should be aware that rhabdomyolysis-induced acute kidney damage and limb compartment syndrome are also possible DF consequences, and they should be on the lookout for any indications pointing to these complications in DF. A prompt diagnosis can prevent further complications and fatality [6].

Four patients referred for neurosurgical intervention as sequelae to dengue coagulopathy. Among them, three had intracranial bleeds and one had spinal cord hematoma along with intracranial hemorrhages. This small series includes the youngest reported case of dengue coagulopathy with intracranial bleed and only the second case of spontaneous intraspinal hematoma sequelae to dengue

hemorrhagic fever. The situations where patients contract dengue in a setting of neurosurgical intervention are grave. The margin of safety in the presence of dengue coagulopathy is narrow. The surgeon has to outweigh benefit against risk of surgery in each individual. A subdural and intramedullary spinal cord hematoma, which was summarized in the article “Burden of Dengue related neurosurgical emergencies during an epidemic- A tertiary care experience [7)]

A report of quadriparesis in dengue fever due to hematomyelia [8)].

The first report of intradural spinal hematoma secondary to dengue was reported by Kaur et al [9)].

A patient with dengue fever with symptoms suggestive of acute flaccid paralysis, and on subsequent investigation he was diagnosed as a case of hypokalaemic quadriparesis. Clinicians in the endemic area should be aware of such association of acute pure motor reversible quadriparesis with dengue fever [10)].

Dengue infection causing acute hypokalemic quadriparesis [11)].

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