ICU
MANAGEMENT & PRACTICE

Algorithm for early diagnosis and treatment of thrombocytopaenia in ICU

Patients in the intensive care unit (ICU) have a range of clinical problems, including multi-organ failure, sepsis, and shock, and early diagnosis and management are crucial to optimise outcomes. A report in the journal Critical Care proposes a new algorithm to help intensivists make a rapid diagnosis so that they can initiate early appropriate management for ICU patients with thrombocytopaenia.

The report says thrombocytopaenia in the ICU is caused by various factors, including, among others, sepsis, drugs, and the use of extracorporeal devices. Some patients with thrombocytopaenia also have microangiopathic haemolytic anaemia (MAHA), accompanied by elevated serum lactate dehydrogenase levels and schistocytes on the blood film. This combination of thrombocytopaenia and MAHA, in which thrombi form in the microvasculature and schistocytes develop from red cell destruction as they pass over these thrombi, occurs in patients with disseminated intravascular coagulation (DIC), but also in those with thrombotic microangiopathies (TMAs), including thrombotic thrombocytopaenic purpura (TTP) and haemolytic uremic syndrome (HUS).

The proposed diagnostic algorithm adds to the current literature available to the intensivist, with a focus on differentiating TTP and HUS from DIC. Several diagnostic algorithms for TMA have been published. However, as the report notes, currently the only available guidance specific to the ICU are the recently published expert statements of Azoulay and colleagues. This publication provides an excellent guide for the differential diagnosis of TMAs but only briefly mentions DIC.

DIC is relatively common, developing in 9–19 percent of ICU patients, usually as a result of sepsis, with an incidence of 18/100,000 in the overall population. By contrast, TTP and Shiga-toxin producing Escherichia coli (STEC)-associated HUS have estimated incidences of six and up to 29 cases per million, respectively, and atypical HUS (aHUS) a prevalence of 0.2–0.4 cases per million, making these conditions far rarer than DIC.

Although TTP is described as a pentad of fever, thrombocytopenia, MAHA, renal dysfunction, and neurological impairment, often some of these features are not present. Accordingly, TTP may be confused with HUS, which is most commonly characterised by the triad of thrombocytopenia, MAHA, and renal dysfunction.

"These clinical similarities of DIC, TTP, and HUS are a major concern because they pose a risk of misdiagnosis as intensivists are more likely to consider a diagnosis of DIC than of the rarer TTP or HUS, thus delaying potentially lifesaving treatment," the report authors explain.

In the development of the new algorithm, the authors took note of the most important distinguishing factor between DIC and TMAs -- the patient's coagulation profile. The authors explain that patients with DIC have altered coagulation. Additionally, blood pressure should be considered as HUS often presents with severe hypertension and DIC with hypotension.

"Once DIC has been excluded, confirming the cause of the TMA is paramount for appropriate management," the authors point out.

TTP is diagnosed by identification of low ADAMTS13 activity (< 5-10%) and treated urgently with plasma exchange initially; HUS is associated with normal ADAMTS13 activity (> 5–10%) and the type of HUS elucidated by performing a Shiga-toxin producing Escherichia coli (STEC) stool culture or polymerase chain reaction (PCR) assay.

"Positive STEC strongly suggests STEC-HUS; negative STEC strongly suggests aHUS, with or without an associated complement-activating condition (e.g., infection, malignant hypertension, the post-partum period, kidney transplantation, drugs, or malignancy)," the authors write. "Rapid detection and management of any associated complement-activating condition and consideration of eculizumab are required."

It should also be noted that some of the tests required in the differential diagnosis (e.g., ADAMTS13 activity assay) are not available at all institutions. If rapid ADAMTS13 testing is not possible, the PLASMIC score, a seven-component prediction tool that can accurately and reliably predict the probability of severe ADAMTS13 deficiency, can be used, according to the authors.

Source: Critical Care
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