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Thrombotic Thrombocytopenic Purpura or Disseminated Intravascular Coagulation? Diagnostic Dilemma in the ICU

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DIC and TTP are two causes of thrombocytopenia that require timely diagnosis and different treatments. Both conditions can be difficult to recognize as clinical presentations vary and current diagnostic criteria lack specificity. DIC is a complex thrombo-hemorrhagic condition that is always secondary to an underlying disorder, the most common causes being sepsis or trauma. It is primarily a clinical diagnosis that must be confirmed by laboratory data (see figure 2). There is, however, no single laboratory test that can establish or exclude the diagnosis. TTP is a rare condition characterized by systemic microvascular thrombosis, with an incidence of 4 to 11 cases per million people. Like DIC, TTP has no specific diagnostic test and it shares many of the clinical and laboratory features of DIC that can make the two diagnoses difficult to differentiate. Prompt recognition of TTP is warranted as it responds well to plasmapheresis, and without treatment it is associated with a high mortality rate.

**Hospital Course**

This is the case of a 77 year old female with PMH of spinal degeneration s/p multiple spinal surgeries, hypertension, and hyperlipidemia, who presented to the surgical ICU s/p T9-ileum posterior fusion transverse osteotomy, L1-L2 transectional lumbar interbody fusion, and T11-T12 posterior laminectomy. Her operative course was prolonged due to an incidental durotomy. She required a phenylephrine infusion for the majority of the 11-hour case and fluid resuscitation of 3 units of PRBCs, 7710 ml of crystalloid, and 789 ml of cell saver. Blood loss was estimated at 1500 ml and urine output was 1150 ml Postoperatively she went to the ICU hemodynamically and stabilized. By POD 2, her renal function had worsened and she developed thrombocytopenia (figure 1). A FENa done at the time was consistent with intrinsic renal damage. On POD 3 she developed thrombocytopenia (figure 1). A FENa done at the time was consistent with intrinsic renal damage. On POD 3 she developed thrombocytopenia and was noted to have oozing from an antecubital IV site. A DIC panel done on POD 4 was inconclusive, having revealed an elevated FDP and D-dimer with a low APTT but an elevated fibrinogen and marginally elevated PT and PTT. TTP was still being considered in the setting of renal failure which was likely acute tubular necrosis. On POD 6 the patient developed uricemia and dysphagia and she required dialysis. After the patient's platelets dropped to 21, plasma exchange was scheduled for POD 7, but before initiating this treatment her platelets began to rise and she was transferred to the floor on POD 8 with a diagnosis of DIC and AKI, likely due to an intra-operative event.

**Discussion**

The clinical differentiation between DIC and TTP can be a diagnostic challenge. In our patient, the inconclusive DIC panel in addition to renal failure made TTP the most concerning alternative diagnosis. As mentioned previously, the literature shows that there is no conclusive diagnostic test for either condition, and diagnosis is based on clinical suspicion in conjunction with laboratory results. Our patient had symptoms and laboratory values that were consistent with both DIC and TTP, and both diagnoses were considered for the majority of her hospital course (figure 3). It was ultimately the spontaneous recovery of her platelet count that ruled out TTP as the etiology. The initial DIC panel on HD 4 was considered "inconclusive" because of the elevated fibrinogen and marginally elevated clotting times, but the literature shows that in the acute phase response there is shortening of activated partial thromboplastin time and increased fibrinogen concentrations. Therefore a normal value for these measurements can not rule out DIC. As previously mentioned, the patient's acute renal failure was another reason TTP was strongly considered. Literature shows, however, that acute renal failure occurs infrequently in TTP. Our patient's renal failure was likely coincidental, secondary to an intraoperative insult. Critical care patients often have anemia and thrombocytopenia and the etiology is unlikely to be TTP even if MAHA is present. Our case demonstrates the difficulties in confirming a diagnosis with sensitive but nonspecific criteria. DIC and TTP share similar characteristics, but missing a timely diagnosis of TTP can prove fatal for the patient without treatment.

**References**


**Abbreviations**

- DIC: Disseminated Intravascular Coagulation
- TTP: Thrombotic Thrombocytopenic Purpura
- AKI: Acute Kidney Injury
- APTT: Activated Partial Thromboplastin Time
- PT: Prothrombin Time