Livedoid Vasculopathy in the Setting of Disseminated Intravascular Coagulation Diagnosed as Thrombotic Thrombocytopenic Purpura

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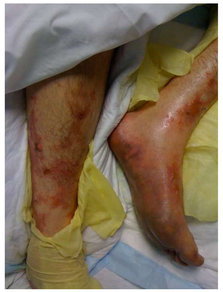

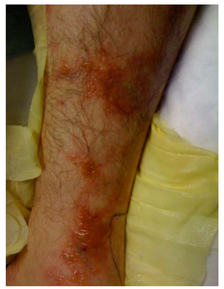

Figure 1: Purple dusky papules and patches, with blistering and ulceration, in a livedoid pattern on the lower extremities.

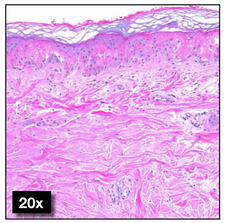

Figure 2: H&E Punch biopsy showing varying degrees of patchy epidermal necrosis.

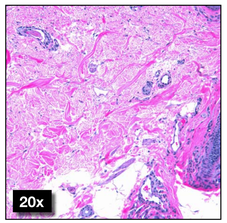

Figure 3: H&E Punch biopsy showing vascular thrombi identified within the papillary dermal capillary vessels and small arterioles of the mid-dermis.

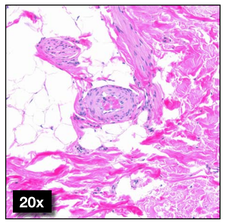

Figure 4: H&E Punch biopsy showing no evidence of vasculitis, cholesterol emboli, or calcification of small vessels.

Case Presentation:

Patient: D.F. is a 52 y.o. Caucasian male.

History of Present Illness: Patient presented to the emergency department with skin mottling of the lower extremities, burning, and numbness of the feet, all of which were present for several days. The skin lesions were preceded by sudden onset of headache, chills, abdominal pain, and bloody diarrhea. Within 24 hours of the hospital admission, the patient developed neurologic changes and required intubation. Dermatology was consulted to identify a causal process for the skin lesions.

Medical History: Hypertension, hyperlipidemia

Family History: None

Medications/Interventions: Fresh frozen plasma, plasma exchange, metronidazole, ciprofloxacin, piperacillin/tazobactam

Physical Examination: Mottled purple dusky papules and patches in a reticulated pattern on the face, chest, abdomen, arms, and legs. Blistering and ulceration is present on the dependent areas; primarily the legs and feet.

Laboratory Data: CBC: Hgb 17.7 (wnl), Hct 42.7 (wnl), + schistocytes, WBC 21.0 (4.5-11 thou/cm2), platelets 19 (150-400 thou/cm2), INR 2.5 (≤ 1.0), PTT 45.6 (21.6-35.6), D-dimer>20 (<0.50 ug/ml), fibrinogen 237 (wnl), BUN 55 (10-26 mg/dl), creatinine 4.2 (0.7-1.5 mg/dl), AST 260 (7-40 U/L), ALT 179 (7-40 U/L), LDH 1767 (<190), blood culture positive for Capnocytophaga species.

Studies: CT of the abdomen/pelvis showed no contrast in the ureters on delayed images.

Biopsy:
Health Network Laboratories (S11-8503, 04/02/2011) Left medial and lateral knee: "Subtle and relatively rare scattered vascular thrombi identified within the papillary dermal capillary vessels and small arterioles of the mid-dermis. There are also varying degrees of associated overlying patchy epidermal necrosis identified. There is no evidence of vasculitis, cholesterol emboli, or calcification of small vessels noted."

Reason for Presentation: Interest

Discussion:

Thrombotic Thrombocytopenic Purpura (TTP) is a vaso-occlusive process, and has been described as a cause of livedoid vasculopathy. The acronym PURPLE (painful purpuric ulcers with reticular pattern of the lower extremities) has been used to describe characteristic skin lesions. The lesions are primarily seen first in dependent areas, but may be diffuse. Reduction in blood flow can be a gradual process and culminate in complete occlusion of the arteriole. Hemorrhagic infarcts follow the occlusion and extensive areas of necrosis and ulceration follow, which ultimately many progress to gangrene.

Classically, a pentad of symptoms was proposed for TTP: thrombocytopenia, microangiopathic hemolytic anemia, neurological symptoms, renal dysfunction, and fever. Since the advent of therapeutic plasma exchange in the 1970's, survival was seen to increase to 78%. With this significant decrease in mortality, diagnostic criteria became less stringent, and are now classified as only microangiopathic hemolytic anemia and thrombocytopenia with no apparent alternative etiology. The reclassification of criteria for TTP resulted in an eightfold increase in the number of patients treated early with plasma exchange.

The ultimate cause of TTP is unknown. However, in recent years a deficiency of von Willebrand factor-cleaving protease, termed "ADAMTS 13" (acronym for a disintegrin and metalloprotease with thrombospondin-1-like domains) has been identified. The function of ADAMTS 13 is to cleave large von Willebrand factor multimers that are synthesized and secreted by endothelial cells. When ADAMTS 13 is absent, the large von Willebrand factor multimers in plasma can react with platelets, and cause the aggregation of platelet thrombi that is characteristic of TTP. The value of measurements of ADAMTS 13 activity and inhibitors remains unclear due to discrepancies among assay techniques and correlation with in vivo activity, but may be of value in predicting risk of recurrence.

Early diagnosis and treatment of TTP is essential in the survival of affected patients. Our patient continued to exhibit microangiopathic hemolytic anemia and thrombocytopenia with no apparent alternative etiology, after adequate intervention for disseminated intravascular coagulation (DIC) caused by a gram negative blood stream infection. Biopsy was helpful in determining a vaso-occlusive process early, and identified the need to initiate plasma exchange. In the setting of a dropping platelet count with normalization of the coagulation panel, TTP should be suspected, even in the setting of overlapping DIC. Although our patient ultimately required bilateral chopart amputations of his lower extremities, his renal function was preserved and he has recovered.

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