Unusual Case of Thrombotic Thrombocytopenic Purpura (TTP) in Capnocytophaga Canimorsus Bacteremia

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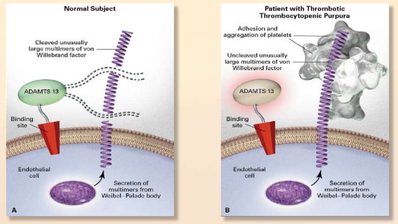
Introduction: *Thrombotic Thrombocytopenic Purpura (TTP)*

- Pentad: fever, thrombocytopenia, micro-angiopathic hemolytic anemia, transient neurologic deficits, renal failure
- If not treated, mortality >90%. Plasmapheresis decreases mortality <50%.
- Causes:
  - Protease ADAMTS 13 deficiency – when ADAMTS 13 level is less than 10%. A special enzyme ADAMTS 13, aka. vWF metalloprotease, normally degrades very high molecular weight multimers of von Willebrand factor



  - Idiopathic (37%); drug-induced (13%) – cyclosporine, tacrolimus, gemcitabine, bleomycin, cisplatin, clopidogrel, ticlopidine, quinine; autoimmune disease (13%) – SLE, scleroderma, APAS; infection (9%) – HIV, streptococcus; pregnancy (7%); bloody diarrhea prodrome (6%) – shiga toxin, E. coli O157:H7; hematopoietic stem cell transplant (4%)
- **Treatment:** plasmapheresis until platelet count remains normal persistently
- DIC is frequently in the differential with TTP

TTP vs DIC	TTP	DIC
Coagulation (INR)	Normal	High
Fibrinogen	Normal	Low
Fibrin split product	Minimal or normal	High

History:

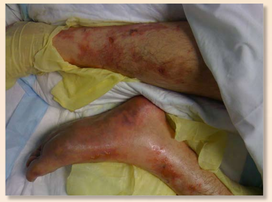
52 year-old Caucasian male, employed for a waste removal company, worked in a landfill on the day of developing the acute illness

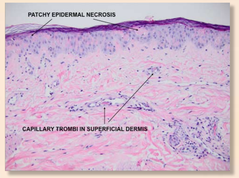
- **Chief complaint:** worsening bloody diarrhea, 3 days of flu-like symptoms, sudden onset of headache, fever and extensive ecchymoses
- **PMHx:** hypertension on ARB, hyperlipidemia on statin
- **Satellite ER:** labs showed acute renal failure, severe thrombocytopenia, with elevated WBC. Blood cultures drawn, CT abd/pelvis with contrast (WNL). Treatment: broad-spectrum antibiotic, transfer for advanced care.

Hospital Course:

LVHN MICU Day 1-2:

- **Physical exam:** declining Glasgow Coma Scale, puerperal fulminates, red wine colored diarrhea with micro-clots

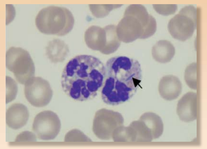




- **Differential diagnoses:** disseminated intravascular coagulation (DIC), hemolytic uremic syndrome/ thrombotic thrombocytopenic purpura (HUS/TTP), polyarteritis nodosum (PAN), Henoch Schönlein Purpura (HSP), ANCA-positive vasculitis, antiphospholipid antibody syndrome
- **Working diagnosis:** DIC with severe sepsis of unknown source, possible HUS
- **Treatment plan:**
  - DIC → reversed with fresh frozen plasma
  - Severe thrombocytopenia → platelet transfusions
  - Progressive thrombotic vasculopathy of bilateral lower extremities → rheumatologic work up for vasculitis
  - Systemic inflammatory response syndrome (SIRS) with hemodynamic instability → IV antibiotics, volume resuscitation
  - Anuric ARF → continuous veno-venous hemodialysis (CVVHD)
  - Altered mental status due to severe sepsis → ventilator dependent respiratory failure (VDRF)

LVHN MICU Day 3:

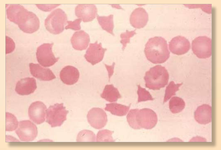
- **Diagnosis:** TTP secondary to severe sepsis of unknown source
- **Treatment plan:** MHA/TTP → plasmapheresis
- **Day 10:** Platelet count returned to normal after 6 days of plasmapheresis, which was then discontinued. Platelet count remained steady since.
- **Day 11:** Switched from CVVHD to intermittent hemodialysis
- **Day 12:** Positive blood culture for Capnocytophaga canimorsus, antibiotics adjusted.
- **Day 22:** Multi-metatarsal amputation for gangrene
- **Day 44:** Discharged to nursing home facility for rehabilitation



Wright-Giemsa stain, x100 oil immersion, showing intracellular elongated rod (arrow).

Pertinent Labs and Peripheral Smear

ER→ MICU	ER	Day 1	Day 3	Day 10
WBC	19.1	21	14.8	16.8
Bands	-	38%	12%	
Hgb	17.7	11.3	9.3	8.2
Platelet	22	19	26	160
Schistocytes	None	None	Moderate	None
Creatinine	4.15	5.8	2.7	5.0
INR	2.33	2.5	1.0	1.2
LDH	-	1767	3437	223
Fibrinogen	-	237	463	-



Outcome:

Six months from acute illness, he was discharged from nursing home facility back to home. Hemodialysis was discontinued, renal function returned to normal with serum creatinine at 1.4. Acute illness resolved with no renal or hematologic long-term sequelae.

Discussion: *Capnocytophaga canimorsus (DF-2)*

- A gram-negative bacillus, facultative aerobe. Particularly slow growth, difficult to grow by ordinary culture medium, need Wright-Giemsa stain
- Highly susceptible to ß-lactam antibiotics, erythromycin, clindamycin, tetracycline. Resistant to aminoglycosides
- Associated with dog and cat bites or saliva exposure
- Reported to cause bacteremia, sepsis, hypotension, renal failure, purpura fulminans, DIC and TTP/HUS; mortality as high as 30%, worse if immunocompromised or aslpenia
- Two documented successful cases of *Capnocytophaga canimorsus* infection treated with plasma exchange as the diagnosis of thrombotic thrombocytopenic purpura was reached.

Conclusion:

In cases of a TTP-like syndrome associated with sepsis and a history of dog or cat exposures or bites, consider Capnocytophaga canimorsus bacteremia even without evidence of a dog bite. Further investigation is needed to evaluate the benefit of plasma exchange in purpura fulminans and dog bite-related sepsis.

Learning Point:

Continual reassessment is imperative in critically ill patients with unclear diagnosis as refined diagnosis and treatment plan can potentially be life-saving.

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3. Lusia Yi, D.O. Department of Dermatology, LVHN

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