

Location: Emergency room

Vital signs: Pulse: 130/min; BP: 80/40 mmHg, Temperature: 39.4 C (103 F), RR: 22/min.

HPI: A healthy 22-year-old Caucasian woman is brought to the emergency department. She says that she has been having fever, chills, myalgias, and headache for the past 36 hours. For the past 12 hours, she has been nauseous, had two episodes of vomiting and complaining of abdominal pain and diarrhea. She has also developed a diffuse skin rash. She has no other medical problems. She does not use tobacco, alcohol, or drugs. Family history is not significant. She takes no medication. She has never been pregnant. Her menstrual cycles are always regular. This is her fifth day of menstruation. She is sexually active with her boyfriend and uses condoms. She has no known drug allergies.

How would you approach this patient?

You have a 22-year-old healthy female presenting with a febrile illness complicated by hypotension. The definitive diagnosis is extensive at this stage. She is hemodynamically unstable at this time. Resuscitation (ABC) is the first priority.

Order:

Pulse oximetry, stat
IV access, stat
Cardiac monitor, stat
Continuous blood pressure monitoring, stat
Normal saline, 0.9% NaCl, continuous

Results:

Pulse oximetry is 97% on room air

Exam:

Order complete physical exam, except breast, lymph nodes, and neuro/psych (i.e., General, Skin, HEENT/Neck, Lungs, Heart, Abdomen, Genitalia, Rectal, and Extremities).

Physical exam results:

Patient appears very sick and anxious. Lungs, heart, abdomen, and rectal is normal. Diffuse, blanching, macular, erythematous rash is present all over the body. Hyperemia of the vulva and vagina as well as tenderness of the external genitalia and adnexa is present. A vaginal tampon is noted.

Order review:

Tampon removal, stat
Tampon C and S, stat (optional)
CBC with diff, stat
CMP, stat (CMP consists of both basic metabolic panel and liver function tests)
PT/INR, stat
Portable CXR, AP, stat
EKG, stat (12 lead)
UA, stat
Urine C & S, stat
Blood cultures, stat
IV clindamycin, continuous

Here are the results:

CBC shows a WBC of 24,000/cmm with 30% bands, Hb of 11g/dL and platelet count of 120,000/cmm.
CMP shows BUN of 32, Cr of 1.8, elevated AST, ALT, and total bilirubin.
EKG shows sinus tachycardia; CXR and PT/INR are within normal limits.
UA and Urine C and S are pending.

*Evaluate patient by ordering a brief history and check vital signs.

Results:

Patient's BP is still 80/60 after fluid bolus and continuous IV NS
Patient is still feeling nauseated

Order review:

IV Dopamine, continuous
IV Phenergan (Promethazine), stat, one dose (for nausea/vomiting)

*Transfer the patient to ICU

Order review (ICU orders):

NPO
Bed rest, complete
Foley catheter
Urine output
Acetaminophen (Tylenol) therapy, oral, continuous (for fever)
CBC with diff, next day
CMP, next day

*Evaluate the patient by ordering a brief history and check vital signs.

Results:

Patient's BP is 100/70 after fluids and dopamine
Patient is feeling better

*Call me with the next set of vitals.

If you can do this much, the case will end automatically; however, if it continues, follow this:

Once the patient is feeling better, discontinue (D/C) all the IV substances. Double click with the mouse on the orders, and it will ask you, "Do you want to cancel this order?"

Discontinue dopamine, IV fluids, IV antibiotics, IV Phenergan, cardiac monitor, and Foley catheter.

Shift the patient to ward
Start oral clindamycin, continuous
Contraception counseling
Safe sex counseling
Smoking cessation (if present)
Limit alcohol intake
No illegal drug use
Seat belt use
Reassure the patient

Discharge the patient to home with 1-week follow-up appointment

Final diagnosis:

Toxic shock syndrome secondary to vaginal tampon use

Discussion:

Upto 98% of menstrual TSS cases are due to *S. aureus*. Most patients present with a prodrome of fever, chills, and myalgias that progress to the systemic syndrome; however, some patients may become abruptly ill within hours, resulting in hypotension and shock. TSS should be suspected in any young female who presents with a fever of $\geq 38.9^{\circ}\text{C}$ (102°F), tachycardia, hypotension (SBP < 90 mmHg), and rash. The rash is typically a nonpruritic, diffuse, blanching, macular erythroderma. Desquamation starts after 1-2 weeks. Since TSS can involve any organ, patients may present with GI symptoms (nausea, vomiting, abdominal pain), hepatomegaly, intense headache, and altered mental status, etc.

Potential complications include ARDS, shock, DIC, and renal failure; less commonly rhabdomyolysis, seizures, and pancreatitis may be seen.

Labs:

1. CBC shows either leukocytosis or leukopenia, but a marked bandemia (up to 50%) is often present. Anemia and thrombocytopenia are also common.
2. Elevated BUN and creatinine suggests renal failure.
3. Hypoalbuminemia and life-threatening hypocalcemia can be seen.
4. Hyperbilirubinemia and elevated transaminase levels (ALT, AST) suggest liver injury.

DD: (These are important for Step-3 MCQS as well)

Kawasaki disease: Seen predominantly in children, rarely cause shock, and does not have systemic involvement.

Staphylococcal scalded-skin syndrome: Desquamation starts early, whereas, in TSS, desquamation occurs in the convalescent phase. Also, it rarely causes shock and does not have systemic involvement.

Stevens-Johnson syndrome: Usually history of drug administration and characteristic mucus membrane involvement is present, but lacks desquamation.

Rocky Mountain spotted fever: History of a tick bite is present, rash starts peripherally, and is associated with a severe headache, without an altered mental status.

Management:

Therapy is mainly supportive. Removal of the focus of infection and use of antibiotics should be done as soon as possible. The patient should be admitted in ICU, and hemodynamic monitoring and vasopressors may be necessary. They may need up to 10-20 liters of IV fluids (0.9% NS). Clindamycin has become the drug of choice because of its potent suppressor effect on bacterial toxin synthesis. The use of corticosteroids is controversial.

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