Salmonella

Key Points:
• Distinguishing between typhoidal and non-typhoidal Salmonella is key, as typhoidal Salmonella typically causes much more severe disease
• Immunocompromised patients are at higher risk both for acquiring Salmonella and for having more severe disease manifestations of Salmonella and should be treated regardless of serotype
• Patients with advanced HIV or other immunosuppression should be treated with a longer course of meds

I. Epidemiology:
   a. S. typhi and paratyphi: cause typhoid fever; colonize and infect humans only
      • Transmission primarily fecal-oral
      • Primarily seen now in the U.S. in travelers (72%)
   b. Non-typhoidal Salmonella: increasing in incidence in U.S.
      • Primarily food-borne (eggs, meat, poultry; less commonly fruit/vegetables)
      • Also associated with exotic pets (esp. reptiles) and domestic animals

II. Pathogenesis:
• Survival within phagocytes is key
• After traversing gut endothelium, reside within Peyer’s patches and attract lots of inflammatory cells, which causes the perforation seen late in typhoid fever and the “pseudoappendicitis” in non-typhi Salmonella

III. Clinical Manifestations:
   a. Typhoid fever (a.k.a. “enteric fever”): Fever, abdominal pain, diarrhea and/or constipation, non-specific flu-like symptoms; also may have altered mental status (“muttering delirium”).
      • Classically, temperature-pulse dissociation (relative bradycardia) and rose spots
      • 50% have hepatosplenomegaly; “moderately” elevated LFTs are fairly common
      • If untreated, may result in perforation
      • Endovascular infection in 10-25% of those over 50 years old who are bacteremic, most commonly infecting aneurysms or atherosclerotic plaques
      • Chronic carrier state: 1-4% of patients in endemic settings that carry Salmonella in stool or sometimes urine for > 1 yr; increased risk in women and pts with gallstones that may act as a nidus for the disease
      • Blood cultures positive in 50-70%, bone marrow in 90%; stool is frequently positive as well
   b. Non-typhoidal Salmonella: most commonly presents like any other infectious diarrhea with acute onset of nausea, vomiting, and non-bloody diarrhea; also may have fevers, abdominal pain, flu-like symptoms
      • Duration usually self-limited, although may persist in stool for 4-6 weeks
   c. Immunocompromised individuals (HIV+ in particular) have a 20- to 100-fold increased risk for Salmonella (both types) over immunocompetent patients; sickle-cell pts also classically at increased risk

IV. Treatment:
   a. Typhoid fever: Usually 7-10 days of a fluoroquinolone or a high dose 3rd generation cephalosporin; beware of increasing rates of drug resistance
      • Chronic carriers: one month of fluoroquinolone
   b. Non-typhoidal Salmonella: For self-limited, mild-moderate gastroenteritis in otherwise healthy adults, treatment not recommended based on several trials showing minimal to no benefit
      • Treatment is recommended for immunocompromised patients and patients with particularly high fevers, large volume of stools (>9-10/day), or a need for hospitalization
      • Choice is usually fluoroquinolone or 3rd generation cephalosporin
      • Patients with advanced HIV may need significantly prolonged course of antibiotics and potentially lifelong suppressive therapy
**Bonus: Ecstasy**

Ecstasy is 3,4-methylenedioxymethamphetamine (MDMA), a synthetic amphetamine analogue. It acts as an indirect sympathomimetic on some adrenergic and dopamine receptors but primarily inhibits serotonin reuptake. It is typically taken in pill form and the pills often have other drugs such as amphetamines, PCP, ketamine, caffeine, and dextromethorphan. Ecstasy causes mild euphoria, distorts perception, causes illusions, and is know as the “hug drug” or “love drug” as it seems to promote affectionate behavior. Common adverse side effects include nausea, trismus and bruxism (the reason “ravers” often suck on lollipops), tremor, tics, and occasional ataxia. Oddly, it decreases libido and can cause sexual dysfunction. More severe and life-threatening side effects include malignant hyperthermia, DIC, stroke, idiosyncratic liver failure, hyponatremia, and diffuse cerebral edema. Treatment is supportive.

**References**
