

Case Studies:

Tidbits on Infections in the ED

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This short article offers a few case-based pearls related to infectious syndromes that one may encounter in the emergency department.

Michael's cough

Michael, 27, presents to the emergency department looking sick, with a cough producing green sputum, mild fever, and a clear chest on auscultation.

Do I X-ray?

Definitely X-ray. About 25% of young people with pneumonia will have no abnormalities detected on clinical examination of the chest.¹ Patients with normal vital signs are very unlikely to have pneumonia.

Do I run blood tests?

No. Blood tests are not indicated in the absence of risk factors for poor outcome.²

Do I take cultures of blood or sputum?

No. Very low yield, and results are unreliable.³

What is the significance of green sputum?

Although green sputum has about double the chance of growing bacteria (84% versus 38%), 40% of patients reporting green sputum will not have it on objective examination of the sputum.⁴

Michael's X-ray is clear (Figure 1).

Does Michael have bronchitis?

He probably does. There is no clear definition of acute bronchitis concerning fever, type of sputum, or duration of cough.⁵ X-rays will not always pick up pneumonia, so, if you are concerned clinically, it would be reasonable to repeat the X-ray in 24 to 48 hours.⁶

What is the role of antibiotics?

Antibiotics won't benefit the vast majority of patients with bronchitis, and they are as likely to cause as much harm

as good in patients without chronic obstructive pulmonary disease.⁷ Antibiotics may be beneficial if the symptoms are prolonged (> 2 weeks) or in smokers over 55 (in which case, broad spectrum antibiotics should be avoided). Antibiotics have not been found to prevent progression of pneumonia, and may actually select for resistant organisms.

What can we do?

Salbutamol may help some patients. In one study of patients with acute cough, persistent cough occurred in 61% given salbutamol versus 92% given placebo.⁸

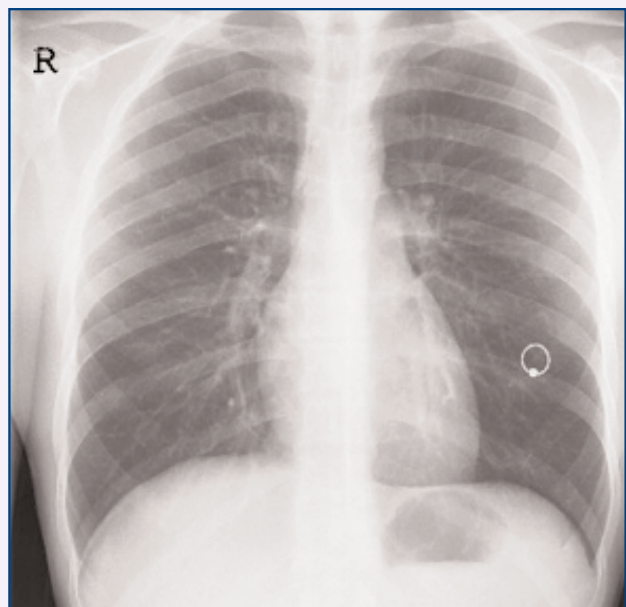


Figure 1. Michael's X-ray.

Infections in the ED

Andrea's bite

Andrea, 40, presents with an infected cat bite. After two days of cephalexin, she is getting worse.

What infection is she likely to have?

Andrea probably has *pasteurella multocida*. This organism is found in the normal oral flora of 50% of dogs and 65% of cats. It accounts for 80% of cat bite infections, and usually comes on within 24 hours. It is resistant to first generation cephalosporins and erythromycin, which are poor choices for treatment of infected bite wounds. Drugs of choice include amoxicillin/clavulinate, penicillin, or a second generation cephalosporin.⁹

Alex's sore tooth

Alex, 23, has a dental abscess and has been on penicillin for two days. He feels as if he is getting worse.

Should we change drugs?

Adding metronidazole or substituting clindamycin is appropriate for non-responders, or late infections. Odontogenic infections usually result from a synergistic interaction among several bacterial species. Early infections (< 3 days of symptoms) are associated with a predominance of facultative oral streptococci, and usually respond to penicillin. These streptococci, especially of the *streptococcus milleri* group, appear to prepare an environment that is conducive to the subsequent growth of anaerobic bacteria. Later infections, thus, have a higher incidence of penicillin resistant anaerobic infections. Erythromycin is now considered obsolete for dental infections, due to high levels of resistance.¹²

Stephanie's bite

Stephanie presents with an uninfected mammal bite that occurred two hours earlier. You have performed meticulous wound care. What else is important?

Wound closure?

Suture human or cat bites only if they are on the face or to approximate large, gaping wounds. Dog bites may be closed loosely after thorough debridement and irrigation, avoiding deep sutures. For ear bites, debride the margins of the cartilage and bring them back for delayed primary closure. For hand wounds, remember to examine the wound in the full range of motion in order to identify joint or tendon sheath involvement. For cat bites, consider an X-ray which will help in looking for tooth fragments.¹⁰

Should Stephanie get antibiotic prophylaxis?

All cat bites should be treated with antibiotics. Antibiotics are only indicated in complicated human bites or dog bites (*i.e.*, not routinely). Empiric antibiotic choices include:

- Amoxicillin/clavulinate 875 mg twice a day,
- Doxycycline, or
- Ceftriaxone or cefuroxime if intravenous needed.

Remember to consider rabies and tetanus prophylaxis.⁹

What question should always be asked of a patient with a mammal bite?

"Do you have a functioning spleen?"

Splenectomized patients should always receive prophylactic antibiotics and close followups. *Capnocytophaga canimorsus* (formerly known as DF2) colonizes 24% of dogs and 17% of cats. Although usually harmless, it is an important cause of overwhelming post-splenectomy infection, with a 60-80% mortality rate. Patients with Hodgkin's lymphoma, idiopathic thrombocytopenic purpura (ITP), steroids, or alcohol addictions are also at risk.¹¹

Beth's Bell's palsy

Beth, 47, has had eight hours of Bell's palsy.

Is this really an infectious syndrome? What should I do?

Although there is good evidence that varicella-zoster virus (VZV) can cause Bell's palsy, increased VZV titres without cutaneous abnormality are rare. Evidence regarding herpes simplex as a cause is even more shaky. However, a combination of placebo and acyclovir in Bell's palsy has shown a very moderate, but statistically significant improvement versus prednisone alone. So, if other causes for the clinical/neurologic syndrome of peripheral facial palsy have been excluded, a combination therapy with an anti-herpes agent (acyclovir) plus prednisone seems to be indicated in a patient with Bell's palsy.¹⁶ Because benefit is likely to be small, contraindications for either drug would indicate expectant therapy alone. Remember that peripheral (lower motor neurone) lesions will affect the eyebrows and forehead. Therefore, if a patient with facial palsy can close both eyes equally tight, there is probably a central cause. Don't forget to consider *Borrelia burgdorferi* (the agent responsible for Lyme disease), if it is a problem in your area.



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Eric's pneumonia

Eric, 47, has pneumonia. You are advised not to use a fluoroquinolone, as he is epileptic. He tells you he is allergic to penicillin.

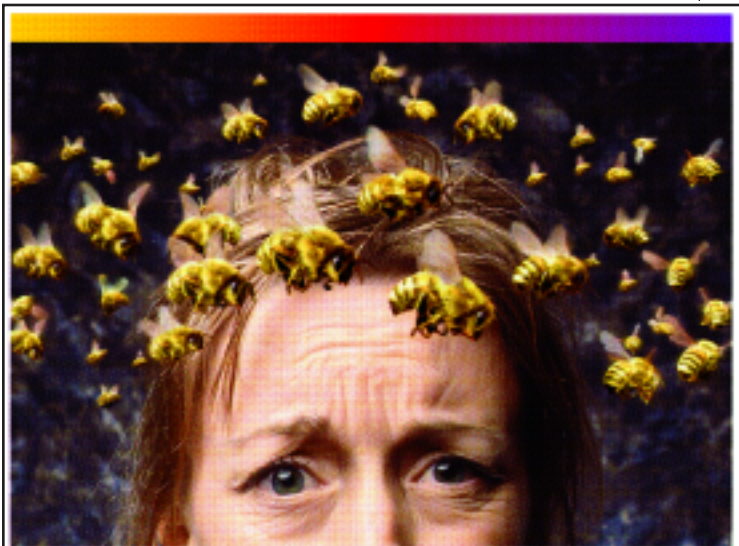
Eric has some trimethoprim-sulfamethoxazole (TMP-SMX) at home and wants to know if he can use it.

Resistance of *streptococcus pneumoniae* to TMP-SMX in Canada has recently been reported at 19%. It is probably no longer a good choice for treating illnesses likely to involve this bacterium.¹³

You decide to use cefuroxime and erythromycin.

Is cefuroxime safe if Eric is allergic to penicillin?

Absolutely. Although the incidence of cephalosporin cross reactivity with penicillin has been reported to be 1% to 10%, the vast majority of reactions involve benign transient cutaneous manifestations with the use of first generation cephalosporins (early varieties of which contained trace amounts of penicillin). Second and third generation cephalosporins have not reported any increased risk.¹⁴



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Infections in the ED

Sandra's fever

Sandra, 27, has a fever, flank pain, and dysuria. She has vomited twice. You diagnose pyelonephritis.

Does Sandra need to be admitted?

Probably not. Contrary to traditional teaching, studies show the majority of patients with pyelonephritis and no other illness (even if they are vomiting) can be improved with intravenous fluids and antiemetics sufficient to return home with close followup.

What if Sandra is 12 weeks pregnant?

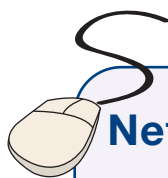
Even pregnant patients, although at increased risk of preterm labour, can often be managed as outpatients.¹⁷

What antibiotics would you suggest?

If Sandra was not vomiting, she might manage with an oral agent. In her case, an initial dose of ampicillin 1 g and gentamycin 6 mg/kg intravenously would be a reasonable choice. She could be discharged on cotrimoxazole. If she were pregnant, a second generation cephalosporin either intravenously or orally would be a good choice.

Should Sandra have blood cultures?

No she shouldn't. Blood cultures are positive less often than urine cultures, never grow anything different, and do not change management.¹⁸



Net Readings

1. Family Practice notebook.com:
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Vanessa's dysuria

Vanessa, 18, presents complaining of four days of severe dysuria. Examination reveals painful inguinal lymphadenopathy and numerous crops of exquisitely tender, small vesicles on a red base. Her boyfriend has a cold sore on his lip. You diagnose herpes genitalis.

What investigations should you order?

Viral culture and typing (best if taken from vesicle fluid, but most painful for the patient).

What are the treatment options?

Oral antivirals have shown to shorten the clinical course of first-episode genital herpes simplex virus, as well as recurrent episodes, although this has only been shown where treatment has been started within 72 hours. The initial treatment does not decrease the chance of a relapse.¹⁹ The evidence-based answer would be no

treatment. Vanessa is four days into the syndrome, and these are expensive drugs. Having said that, they are very safe, so are unlikely to do any harm. I might err on the side of over-prescribing in this very distressing situation. Topical antivirals are of no use at all, and will not help the boyfriend either.

What else is there to bear in mind?

Herpes genitalis has been associated with severe psychosocial consequences. In a survey of 3,000 patients, 83% reported depression, 75% a fear of rejection, and 69% a sense of isolation following diagnosis. Counselling should begin in the emergency department.²⁰

Roger's swollen foot

Roger, a plumber, presents with a swollen, throbbing foot (Figure 2).

What workup and treatment is indicated for cellulitis?

Blood tests are of no value in uncomplicated cellulitis, unless indicated for the investigation of comorbid conditions. If there is suspicion of undiagnosed diabetes, a Chemstrip is a sufficient screening tool. Diagnostic aspiration or imaging may be appropriate if there is crepitus, or suspicion of abscess. Consider X-rays if there is suspicion of osteitis, septic arthritis, gas or a foreign body.

When symptoms and signs are restricted to superficial swelling, erythema, warmth, mild lymphadenopathy, and mild pain in the absence of systemic symptoms, and if there are no risk factors for poor outcome (e.g., peripheral vascular disease or immunocompromise), oral antibiotics are usually sufficient. Good choices include cloxacillin or cephalexin, although in cases of infected wounds sustained in natural water, or from animal bites, other drugs are appropriate.¹⁰

How do I know Roger isn't developing necrotizing fasciitis?

You can never be completely sure, as early necrotizing

infections may masquerade as simple cellulitis. This is why close followup and good patient instructions are critically important features of cellulitis treatment. Necrotizing infections are rare in healthy individuals, and are more likely in diabetic patients, the malnourished, burn patients, or other forms of compromise. However, previous good health does not rule out this diagnosis. Necrotizing fasciitis (NF) progresses rapidly, and is always more complicated and serious than superficial cellulitis. Tissue necrosis and lack of response to antimicrobial prescription differentiate it from cellulitis. As necrosis extends beyond the cutaneous layers, nerves are damaged and the site becomes numb.

What does necrotizing fasciitis look like?

The typical clinical picture of NF is of a patient acutely ill with painful erythema that may contain scattered, patchy, gangrenous skin changes, or skin vesicles or anesthesia. Systemic symptoms tend to be severe and out of proportion to skin findings. "Dishwater pus" is typical. A poor response to antibiotics should trigger suspicion. Lymphangitis and lymphadenitis, commonly associated with non-necrotizing cellulitis, are usually absent.¹⁰



Figure 2. Swollen, throbbing foot.

Infections in the ED

Terry's rash

Terry, 72, has a vesicular rash that occurred following a few days of severe pain in his left side. It looks like shingles.

What about antivirals for Terry?

Antivirals administered systemically within the appropriate time-window (72 hours) may relieve the pain of acute shingles and prevent scarring. The often cited evidence that they prevent the subsequent development of post-herpetic neuralgia (PHN), however, is poor.²¹ Patients with PHN whose acute shingles were treated with acyclovir, however, obtain pain relief with antidepressants in half the time required by patients not treated as such.²²

Can we prevent PHN?

If patients with acute shingles are given low-dose amitriptyline from the onset, only half as many will be in pain at six months compared to a group not so treated, irrespective of the antiviral treatments given.²²

What other options exist?

Again, evidence is weak. A small study comparing carbamazepine and prednisolone found the incidence and duration of post-herpetic neuralgia to be considerably reduced in the prednisolone treated group (13/20 versus 3/20).²³

What do we give patients presenting with established PHN?

A recent review suggests that gabapentin is the first-line agent for treating PHN.²⁴ Less effective options include tricyclic antidepressants, the lidocaine patch, capsaicin, and narcotic analgesics.^{21,24}

Andrew's swollen eye

Andrew, just a child, presents with a hot, red periorbital swelling.

What are the issues?

Cellulitis around the eye demands a distinction between preseptal or periorbital cellulitis (anterior to the orbital septum), which can be treated with antibiotics and close observation, and orbital (postseptal) cellulitis. Orbital cellulitis is an ocular emergency, which is most commonly related to ethmoidal or maxillary sinusitis, and demands early computed tomography, and possibly, surgical exploration (in addition to immediate antibiotic administration). Orbital cellulitis typically presents with proptosis, orbital pain, and restricted eye movements. If there is any doubt, start antibiotics and get an immediate referral.¹⁵

CME

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