

The Usual Suspects: Common microorganisms causing infections on the skin or in the eyes

Bacteria

Gram-positive

Propionibacterium species

Pseudomonas aeruginosa

Staphylococcus aureus

Streptococcus pyogenes

Gram-negative

Borrelia burgdorferi

Chlamydia trachomatis

Haemophilus aegyptius

Mycobacterium leprae

Neisseria gonorrhoeae

Fungi

Candida albicans

Epidermophyton

Microsporum

Sporothrix schenckii

Tricophyton

Viruses

Adenovirus

Coxsackievirus

Echovirus

Herpes simplex virus

Measles virus

Papillomavirus

Human parvovirus B19

Rubella virus

Vancella-Zoster virus

Protozoa

Leishmonia species

Loa loa

Onchocerca volvulus

Case 1.1.

Kate, your sister-in-law, is about to undergo fertility treatments. Her doctor insists that she receive the rubella vaccination and then wait several weeks before beginning the actual fertility regimen. Kate calls you and wants to know why she has to do this. You ask her if she is able to produce evidence of vaccination for rubella (also known as German measles). She says no; her family had a house fire a few years ago and all those records were lost.

"But I had German measles when I was in second grade!" she says. "I remember that I was really sick and missed almost a month of school."

You suggest that she follow her doctor's advice and get the immunization.

1. Why would a fertility specialist recommend the rubella vaccine? Why does he suggest a waiting period after vaccination and before conceiving?
2. When do most children in the United States receive their rubella immunization?
3. Kate suggests that she had rubella in second grade, but the disease she described doesn't sound like rubella to you. Why not?
4. Kate says the doctor gave her the option of having her blood checked for antibodies to the virus, to test her immune status. Would this test be checking for immunoglobulin M or G (IgM or IgG)? Explain your answer.
5. If a physician was checking for a current rubella infection and only had available a test for IgG, how could he or she be certain the infection was a new one?

Case 1.2

In late September a woman brings her 14-year old daughter, Maria, to the family physician. Maria shows the doctor the back of her thigh where there are pale red, non-raised discolorations. The rash covers a wide area of the thigh and seems to be roughly circular. The center of the circular area appears normal. Maria has no other symptoms, but her mother brought her in because the rash has been present for over three weeks and it seems to be growing.

The doctor questions Maria about possible-exposures. Has she worn any new pants lately? Has she been in the woods? Do her joints hurt? Maria reports that she spent the month of August at summer camp in Vermont. She's been wearing mostly shorts and bathing suits for the past two months, none of them new. She doesn't remember any insect bites on her thigh.

1. On the basis of Maria's **oral history**, what is the most likely diagnosis? What would the causative microorganism look like in a Gram stain?
2. How did she most likely acquire her infection?
3. Would the diagnosis be any different if Maria had attended camp in Arizona? Explain.
4. Why does the doctor ask Maria if her joints hurt?

5. How is this infection treated?
6. Maria's mom, upon hearing the **presumptive diagnosis**, declares that Maria will not return to the camp, which she loves and had planned to attend next summer. The doctor suggests that Maria need only take some precautions. How can she protect herself from getting this infection again?

Case 1.3

You have a possible infectious condition that you are embarrassed to discuss with the physician with whom you work. You have worn artificial nails for several months now and noticed that the one on your left ring finger falls off regularly. The real nail underneath has become white and chalky, and the skin around the nail is beginning to have little white lines in it and look a bit chalky, as well.

1. What disease do you suspect? Explain why.
2. What would you suggest be done for a more definitive diagnosis?
3. Can you treat this yourself with an over-the-counter drug, or do you need to see a physician?
4. You see cures for this condition mentioned on TV and on the internet -do you think they work?
5. What other conditions are caused by **dermatophytes** (*Microsporum*, *Trichophyton*, and *Epidermophyton*)? What is special about them that makes them capable of thriving in their anatomical **niche** on their hosts?

Case 1.4.

You are the school nurse at Santa Rosa Elementary. This morning Ms. Matthews, one of the first-grade teachers, brings a little girl named Rosita to your office. Her right eye is swollen and bloodshot. The lining of the lower lid is bright red. There is a thick yellow discharge in the corner of the eye.

1. What is the most likely diagnosis, and what is the **etiology**?
2. What sign leads you to believe that the infection is bacterial in origin?
3. What is the treatment for this condition? Elaborate. Is this condition **communicable**?
4. What are some of the eye's natural defenses that help to prevent infections?
5. Are there steps the teacher should take to prevent the spread of this infection in the classroom? If so, discuss them.

Case 1.5.

A woman is brought to the emergency department where you are **working triage**. She has an extremely swollen right lower leg. You see what appears to be an old surgical wound in the mid-calf, with rough scar tissue surrounded by purplish-red skin. She is in a lot of pain and her husband speaks for her. He tells you that three weeks ago she had a group of moles removed from that area. It had appeared to heal initially, but three days ago the incision area started looking bigger rather than smaller. She did not return to the physician, hoping the condition would resolve itself, in the past three days the area has begun to swell and become very hot.

You call the attending physician immediately because you know that this is a serious condition.

The patient is sent straight to surgery where the wound is **debrided**. Gram-positive cocci growing in chains are recovered from the wound. She is transferred to intensive care and put on high-dose intravenous antibiotics for the next 18 hours, but the next evening her leg is amputated below the knee. She remains in the hospital for two months following surgery and, requires long-term antibiotic therapy and multiple skin grafts on her upper-leg.

1. What condition did this patient have? What features suggest that it is not *Clostridium perfringens* gangrene?
2. Why was amputation the best solution for her infection this case?
3. How is the bacterium transmitted?
4. It seems like we've heard a lot more about this condition in the past few years. Is this just media hype or are more cases occurring? Explain.

Case 1.6

In the late winter of 1988, pediatricians in big cities around the country started reporting large increases in the numbers of patients they saw with diffuse red rashes and high fevers (greater than 101°F). The rash, usually extending downward from the hairline to the rest of the body, began after a two-week incubation period. The spots were often so close together that the entire involved area appeared red. Sometimes the skin in such an area peeled after a few days. The rash lasted five to six days. Many of the children also suffered from diarrhea.

The age group most affected was preschoolers. This was a change in **epidemiology** for this infection, as previously the disease most often struck school-age children. A vaccine had been introduced for this disease in 1963, and since then only 5000-6000 cases a year had been reported in the United States. In 1989, 18,193 cases were reported. In 1990 the **epidemic** peaked with almost 28,000 cases reported in the United States. Since then the incidence in this country has fallen rapidly and is again in the range of 5000-6000 cases a year

1. What was this resurgent infection?
2. What are some possible reasons for the epidemic in 1989-1991?

3. What is **herd immunity**? Discuss it in relation to this outbreak.
4. What is the schedule for vaccination for this infection in the United States?
5. Are serious sequelae associated with this infection? If so, what are they?

Case 1.7

A woman brings her 6-month-old son to the pediatrician. You are following, the doctor as part of your physician's assistant training. Before you enter the examining room the physician pulls the chart off the door and hands it to you. The nurse has written on the chart that the chief complaint is a group of lesions on the child's back.

You enter the room and greet the mother. A toddler girl is leaning over to play with the baby in his carrier on the floor. The baby is giggling and appears healthy. You notice on the chart that the baby was breast-fed from birth through his fourth month. Mom explains that the spots on the baby's back just popped up two days ago and that the baby hasn't had a fever and seems well. She lifts the baby up and you examine the lesions ---a group of about seven to eight blister like lesions **localized** to the left of the baby's spine. They have clear fluid in them. The Physician says the lesions are diagnostic.

1. What are the lesions diagnostic of? Explain how you decided.
2. Although this particular condition is somewhat unusual in babies, the lesions indicate that the child must have experienced a common childhood illness earlier. Which one?
3. The mother says that, to her knowledge, the baby has not had this common childhood illness, but that his 3-year old sister had it four months ago, when the baby was 2 months old. Explain the link between the girl's illness and the baby's condition.
4. What factors probably influenced the fact that the baby did not have symptomatic illness when his sister was experiencing it? And what factors led to the eruption of lesions now?
5. Is this a dangerous condition? Why or why not?

Case 1.8

Your stepbrother John is 5 years old. One day he comes to the breakfast table with a bright red face, almost as if he had been slapped. When you look more closely you can see thousands of tiny red bumps on the skin. He has a milder rash on his arms and legs and just a few red bumps on his trunk. He isn't acting sick and doesn't have a fever. He had chicken pox when he was 3 and his immunization schedule is up to date. He sticks his tongue out at you while you're examining his skin and that reminds you to check his throat, which looks normal, no redness. He says his throat hasn't felt sore. Your mom mentions that he has had a runny nose for the last few days, but he hasn't felt ill.

1. Your diagnosis? Why was his throat checked?

2. Can John go to kindergarten today? Why or why not?
3. Is this infection rare? Explain.
4. Are any **sequelae** associated with this infection? If so, name them.