

Units 9 & 10 Labs—Case Study Problems

Case Study #1 Due 11/9/15

Case Studies #2-5 Due 11/16/15 (at kdflifescience.wordpress.com)

1. Read the case study. Underline the significant facts.
2. Research the case by using your notes, textbook, and the Internet resources that are included with case studies. Additional medical resources should also be documented.
3. Write out the answers in complete sentences. Format: typed, single space, 1" margins
4. The answers should reflect scientific and medical accuracy. Answers should be thoughtful and reflect comprehension of the type of bacterial infection.
5. Names of bacteria should be correctly written– in italics with Genus capitalized & species lower case. Example: *Staphylococcus aureus* OR Staphylococcus aureus
6. Grades will be based upon the criteria stated.

Case Study One: Conjunctivitis in the Classroom

Mrs. Allen, a teacher at Cherokee High School, noticed that one of the girls in the front row of her first period Biology class seemed to have red and teary eyes. Initially when she approached the student, Jennie, she believed her to be crying and upset. When she questioned Jennie, she found that her eyes were red and appeared to be very irritated. She referred her to the nurse. Upon closer examination, the nurse, Mrs. Livingston, found the student's right eye to be blood shot. The lower lid was swollen and bright red. A thick discharge was found in the corner of the eye. Jennie complained that her eye throbbed. Mrs. Livingston told Jennie not to touch her eye. She called the parents and suggested that Jennie see a physician immediately for the correct diagnosis and treatment. Jennie remained in the nurse's office until her parents came to take her to the doctor.

Case Study Questions

1. What is the most likely diagnosis for this condition? What is the etiology (cause) of this infection?
2. What sign(s) lead one to suspect that the infection is bacterial in origin?
3. What is the treatment for this condition? (Specific antibiotics, please)
4. Is the condition contagious? Please explain.
5. What are some natural defenses of the eyes that assist in the prevention of infections?

LINKS

Kid's Health - <http://www.kidshealth.org/parent/infections/eye/conjunctivitis.html>

Mayo Clinic - <http://www.mayoclinic.com/health/pink-eye/DS00258>

American Family Physician - <http://www.aafp.org/afp/980215ap/morrow.html>

eMedicine - <http://www.emedicine.com/EMERG/topic110.htm>

Case Study Two: The Case of the Grazed Gardener

A 62 year old botanist and horticulturist was admiring her garden of lilies when she spotted a weed in the midst of her flowers. She had left her gloves in the house, but decided to remove it anyway. Unfortunately when she went to remove the offensive weed, the tiny thorny base gashed her hand. She immediately went into the house and washed the wound and added some topical antibiotic just in case. However, within a day she noticed a puffy red swelling around the gash. By the second day she became concerned when she awoke to find that when she tried to get up out of bed, she found walking difficult. She immediately called her son who came to take her to the ER of the local Virtua Hospital immediately. By the time she reached the hospital, she began to experience difficulty with speech and muscle spasms. The doctor inspected the wound site and noted the now severe swelling. He was more concerned by his patient's growing respiratory distress and acute muscle spasms.

The physician contacted the woman's primary care doctor. He found that she had not received a Tetanus booster in more than ten years. Troubled by this information, he immediately intubated his patient and administered counter measures.

Case Study Questions

1. What is the immunization the patient should have received? What is the recommended period for booster shots?
2. The causative agent for this disease is _____.
3. What are the identifying characteristics of this organism?
4. How did the organisms enter the hand of the gardener?
5. What causes the paralysis?
6. What other organisms belong to this Genus that are medically significant? Describe at least three.

LINKS

Med info - <http://medinfo.ufl.edu/year2/mmid/bms5300/bugs/clostet.html>

eMedicine - <http://www.emedicine.com/med/topic2254.htm>

DocKaiser's Microbiology Page-

<http://student.ccbcmd.edu/courses/bio141/lecguide/unit1/prostruct/diseases/ctetani/ctetani.html>

CDC – Tetanus immunization -

http://www.cdc.gov/ncidod/diseases/submenus/sub_tetanus.htm

CDC- General Information - http://www.cdc.gov/ncidod/diseases/submenus/sub_tetanus.htm

CDC- Botulism - http://www.cdc.gov/ncidod/dbmd/diseaseinfo/botulism_g.htm

Mayo Clinic - <http://www.mayoclinic.com/health/gangrene/HQ00737>

Health link - <http://healthlink.mcw.edu/article/954992292.html>

Case Study Three: Rapid Strep

At Childrens Hospital(CHOP) the ER and Clinics are always busy. A 5-year old white male child in good general health and physical condition was presented at the Saturday walk-in clinic by his mother. He was brought in because he had a fever, was cranky and had complained of a sore throat for about 24 hours. On physical examination by the attending resident, the patient had a fever of 39 ° C. He had considerable swelling and drainage of the pharynx and in the conjunctivae. His tonsils were enlarged and coated with a white patchy exudate. He had a red throat and swollen anterior cervical lymph nodes. His ears were clear. His chest sounded clear and he had no additional remarkable findings on routine examination. A rapid Strep test run ASAP by the lab was positive. Bacteria grown from a throat swab taken at the time of examination indicated gram positive Beta hemolytic bacteria.

1. What would be your presumptive diagnosis for this child? Why?
2. What diagnostic testing would be indicated to follow this exam?
3. What is the most likely treatment for this illness? Why is it important?
4. What factors of this case allowed you to make a presumptive diagnosis?
5. What serious consequences can result if treatment for this infectious agent had not occurred in a timely manner?

LINKS

Sore throat reference - <http://www.cheshire-med.com/services/bugs/strept.html>

Streptococcus - group A -

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

Streptococcus - group B http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupbstrep_g.htm

More Links

http://www.kidshealth.org/parent/infections/lung/strep_throat.html

<http://www.mayoclinic.com/health/strep-throat/DS00260>

http://www.emedicinehealth.com/strep_throat/article_em.htm

<http://textbookofbacteriology.net/streptococcus.html>

http://www.abbottdiagnostics.com/Your_Health/Respiratory_Infections/Strep.cfm

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

<http://www.webmd.com/a-to-z-guides/Rapid-strep-test-for-strep-throat>

Case Study Four: Staphylococcus and a Simple Scratch

An eighteen year old student in an automotive technology class at the local high school complained of a pain in his hand and he wanted to stay home from school. His mother was concerned because he was feverish and lethargic. The young man reluctantly admitted to his mother that he had cut his hand during his automotive class while working on a car engine. He had washed his hand with soap and water immediately at the faucet in the classroom. He had also covered the gash with a band aid. Although his teacher had given him a pass to the school nurse to a follow up, the student conveniently forgot when the bell rang and he had to get to his next class on time.

When questioned by his mother, the young man admitted to having diarrhea and vomiting the previous day. His mother immediately made an appointment with the doctor. The doctor noticed that the boy's arm was sensitive to touch. When examined, the boy's hand had an open sore with pus. The area around the injury was edematous. The physician immediately noticed that he also had purplish, red streaks running up his arm from the site of the injury. The doctor confirmed his suspicions when he also observed enlarged lymph nodes under the arm with the open wound. The skin on the arm felt very warm and dry.

Case Study Questions

1. What errors in the initial treatment of the student's injury occurred? What would you do to avoid this type of infection? How could it be avoided?
2. What are the likely infectious agents for this type of infection?
3. What symptoms are indicative of an infection caused by this organism?
4. What are treatments of this serious type of infection? What tests should be done in the clinical laboratory at the hospital to determine the antibiotic to be used?
5. If untreated, what additional measures would need to be administered to prevent a widely disseminated infection?

LINKs

<http://textbookofbacteriology.net/staph.html> - Todar On Line Microbiology

<http://www.cfsan.fda.gov/~mow/chap3.html> - Bad Bug Book

http://www.kidshealth.org/parent/infections/bacterial_viral/staphylococcus.html - Kid's Health

<http://www.emedicine.com/PED/topic2704.htm> - eMedicine

http://www.cdc.gov/Ncidod/diseases/submenus/sub_staphylococcus.htm - CDC and Staphylococcus

<http://medic.med.uth.tmc.edu/path/00001456.htm> - Staphylococcus

http://www.cdc.gov/ncidod/dhqp/ar_mrsa.html - MRSA(CDC)

<http://www.mayoclinic.com/health/mrsa/DS00735> - MRSA(Mayo Clinic)

<http://www.nlm.nih.gov/medlineplus/ency/article/007261.htm> - MedLine

Case Five: Peril in the Pinelands

A young undergraduate student at Rowan University specializing in Ecology checked in at her college medical care center, reporting a wide spectrum of health concerns. She had recently completed a deer population study as a part of a research project in the Pinelands of South Jersey. A week after her field work was completed, the student began to feel fatigued and listless. She experienced an inability to concentrate and a general feeling of malaise. She reported aches in her legs which she attributed to walking miles through the pineland forests. The physician noted a circular "rash" about 5 inches in diameter, with a bright red edge and a dim red center with the appearance of a "bull's eye". On physical exam, the patient had a fever of 38.5 °C and an irregular heart beat. Her white blood count reflected an elevation of white blood cells, greater than 15,000 cells/cm³. The physician ordered a test for Lyme's Disease to confirm his suspicions.

1. What evidence/symptoms suggested that the young graduate student had contracted Lyme's Disease?
2. How did the student come into contact with this vector?
3. What is the basis of the blood test that confirms the presence of this organism?
4. What are the characteristics of this pathogen? (Morphology, biochemistry, and pathogenicity)
5. What precautions should the graduate student have used to avoid this disease?

LINKS

<http://www.cdc.gov/ncidod/dvbid/lyme/> - CDC Lyme Disease

<http://www.nlm.nih.gov/medlineplus/lymedisease.html> - MedLine

<http://www.lymenet.org/> - Lyme Disease Network

http://www.medicinenet.com/lyme_disease/article.htm - Medicine net

<http://textbookofbacteriology.net/Lyme.html> - Todars Textbook of Microbiology

<http://www.wadsworth.org/databank/borreli.htm> - Wadsworth Center