

An Assignment Submitted by

Name of Student

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Class, Section, Date

### Introduction to Health Breakdown

1. Explain why a booster tetanus injection was given to Vivienne. (2 Marks)

The booster tetanus injection was given to Vivienne as a prevention measure to make sure she does not develop tetanus. It is a very serious disease, which can be life threatening and if left without attention might lead to a lethal outcome. This condition is caused by bacteria, which can be found in manure, soil, and dust. This way, as Vivienne was exposed to manure before she got the cut, it is clear that the booster tetanus injection was simply necessary in this case.

The microorganism enters the organism of a human being through the damaged skin with cuts, puncture wounds, pinpricks, burns, and other injuries (Wassilak, Kretsinger, 2009). When the bacteria is introduced to an individual, vegetative cells are releasing toxins known as tetanospasm toxins that make muscles spasm uncontrollably, causing seizures.

2. Describe the physiological basis of any three of her wound observations. Relate your response to the case study. (6 Marks)

What Vivienne is experiencing with her general state as well as her local wound condition is generally referred to inflammation. Inflammation is a typical process that occurs as a response to injuries and introduction of foreign environment into the body of a living organism. There are certain characteristic features of inflammation, which almost always occur indicating the distinctiveness of this occurrence, which include the processes of redness, swelling, heat, and pain (Wild, Rahbarnia, Kellner, Sobotka, Eberlein, 2010; Young). Sometimes decrease of function is also mentioned in this list, however, in Vivienne's case it is not necessary to pay attention to such inflammation manifestation.

The physiological basis for this reaction is vasodilation, enhanced vascular permeability, and emigration of white blood cells. This way, due to increased vascular perfusion relaxation of the smooth muscle that is around the terminal arterioles occurs and leads to elevated flow of blood to the wound. As more red blood cells pass through the tissue redness is caused as well as warmth, because blood is able to carry the heat from the core of the body to cooler parts of it (Young; Wild, Rahbarnia, Kellner, Sobotka, Eberlein, 2010). Swelling, on the other hand, occurs due to increase in vascular permeability and, therefore, the build up of the fluid, which results in oedema and can be observed as puffiness.

3. Explain how Vivienne's fever developed and state two benefits of fever (3 Marks)

Fever is a classic reaction of an organism that occurs due to introduction of foreign antigens into the organism of a human being. In Vivienne's case this developed due to the booster tetanus injection, which was given to provide immunity and make the body produce antibodies for protection. Vaccine creates an impression of infection, however, the dose makes it possible for the antibodies to fight back successfully and create immunity for it in the future (Launey, Nessler, Malledant, Seguin, 2011; Young; NDRI).

Elevated temperature is considered a sign of organism fighting with infection or sickness. It is good because ferments are able to perform required functions faster and, thus, inflammatory response is stimulated more actively (Hurt; NDRI). Microbial agent is much easier destroyed with higher temperature, as most of them are able to do best at normal human's body temperature.

4. Name two most likely sources of the contamination of the wound by *S. aureus* and explain how the organism was transmitted to the wound from each source. (4 Marks)

*S. aureus* is an enterotoxin producing Gram-positive organism (Food Doctors, 2008). It quite essentially and naturally lives on humans and animals without causing any infections or troubles. Individuals with good health carry these microorganisms in the nose, throat, and on their hands without even thinking or sometimes knowing it. It is practically everywhere, as *S. aureus* can also colonise foods, as well as food contact surfaces (Food Doctors, 2008; Wolk, Struelens, Pancholl, Davis, Della-Latta, Fuller, Picton, Dickenson, Denis, Johnson, Chapin, 2009).

Thus, the wound can be contaminated through hands, materials and surfaces, and air, as well. For example, a medical professional or the patient herself may have *S. aureus* while bandaging or covering the wound up (Food Doctors, 2008; Wolk, Struelens, Pancholl, Davis, Della-Latta, Fuller, Picton, Dickenson, Denis, Johnson, Chapin, 2009). A person can simply cough and the wound could become contaminated.

5. Explain why Augmentin is one of the appropriate drugs given to Vivienne. (4 Marks)

Augumentin is a medication that is administered for treatment of various infection types (Cormio, Vicino, Loizzi, Tangari, Selvaggi, 2007). It consists of amoxicillin, a substance that is able to prevent bacteria from creating walls of cells and beta-lactamase inhibitor or clavulanate potassium, which helps preventing amoxicillin from being destroyed by the bacteria (Salvo, Polimeni, Moretti, Conforti, Leone, Leoni, Motola, Dusi, Caputi, 2007). As it is clear that the patient had a high risk of obtaining

infections it was important to prevent them with this potent drug that treats different types of them.

6. Discuss the mode of action of Augmentin and name two common adverse reactions of the drug. (4 Marks)

The antibacterial medication used in this case scenario obtains two very specific compounds, which make it very appealing for individuals with different kinds of infections. The compounds include amoxicillin, a substance that is able to prevent bacteria from creating walls of cells and clavulanate potassium, which helps preventing amoxicillin from being destroyed by the bacteria. Generally, side effects that can be caused by this medication are considered to be mild and temporary. The most common ones, however, include diarrhea and nausea (Salvo, Polimeni, Moretti, Conforti, Leone, Leoni, Motola, Dusi, Caputi, 2007).

7. If Vivienne's blood sample was taken for a differential blood count when she returned to the medical centre, name two leucocytes that will be elevated and explain why. (3 Marks)

The Blood differential test is utilized to measure the percentage of each type of white blood cells that a patient has in his or her blood (MedlinePlus). With the help of this test a medical professional can also find out and detect if there are any abnormal or immature cells in the organism of an individual.

During the test the blood is taken from patient's vein and collected into an airtight container. A drop of blood from the sample is taken by a laboratory specialist and smeared onto a slide of glass (WebMD). A special dye is used then to differentiate between different types of white blood cells that can be normally found in blood. These

types of cells include neutrophils, lymphocytes (B and T cells), monocytes, eosinophils, and basophils.

Later, the health care provider or a computer counts the number of every single type of cells, determines the cells' proportion with one another, and if there exists more or less of one cell type (MedlinePlus). Usually this type of test is introduced as a part of the Complete Blood Count when a patient is experiencing signs and symptoms of certain infection or inflammation (WebMD). The symptoms include: fever, chills, body aches and pain, headaches, and so on.

In Vivienne's case two leucocytes that would be elevated could be eosinophils and neutrophils. This is a possibility due to the fact that quantity of neutrophils increases as an organism's response to acute infection and inflammation, as these cells are the most potent ones in creating reaction towards the foreign agents (LabTestsOnline). At the same time, eosinophils could also be increased because these cells appear to be an indication of organism's allergic reaction, as a response to drug administration, inflammation of the skin, and infection as well (LabTestsOnline). As Vivienne was administered the booster tetanus injection it is quite possible that her organism will increase the production of eosinophils and cooperate with the vaccine through an allergic response. This way, elevation of white blood cell quantity means that an individual is exposed to a certain infection.

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