Biology Case Study

Your Name (First M. Last)

School or Institution Name (University at Place or Town, State)

**Question.1**

**Definition of disease:**

Hantavirus Pulmonary Syndrome is a fiery disease in which a person suffers from respiratory issues and needs more oxygen for breathing. This disease is caused because of a virus called Hantavirus which is transmitted by the rodents.

**Signs and symptoms:**

There are some clear signs and symptoms for this disease that are given below:

* Fever and chills
* A headache along with muscle pain
* Abdominal pain and vomiting
* Difficulty in breathing
* Lowering of blood pressure
* Accumulation of fluid in lungs

**Name of the test:**

For knowing whether a person is suffering from HPS, a blood test is one of the most reliable tests for knowing whether a person is having the antibodies of Hantavirus or not.

**Explanation of the test:**

In this test, blood sample of the person is taken who thinks that maybe he is suffering from HPS. His blood sample is taken under observation and then the blood passes through the chemistry analyzers for knowing whether the antibodies of Hantavirus are present in the blood sample or not. If the reported are positive then the patient goes for a proper treatment.

**Test to diagnose the disease:**

If the antibodies of the suspected virus are present, then the report would be positive. This means that the person is suffering from HPS disease (Zaki,et,al,1995). But if the suspected virus is not present in the blood sample then report would be negative, meaning that the person is not suffering from HPS disease.

**Question.2**

A person would acquire HPS because of Hantavirus infection that would come by the rodent excrement. This virus is going to damage the lungs of a person that would cause respiratory failure. No, it is not a respiratory disease. One can also acquire this disease by inhaling the urine of the rodents. Not only urine but also saliva and droppings of rodents would cause HPS. Yes, there are some environmental factors attached to this disease, and they would increase the risk of acquiring this disease. In the environment where there would be infected rodents around is going to increase the risk of HPS. Age does not have any specific impact on risk of getting this disease as any person can acquire this disease, but the average age of suffers is 30 years. Not age nor race would have any role, but yes, there is the role of communities to some extent as the communities that live in such places where there would be more rodents are likely at more risk to be victimized with this disease (Hooper,et,al,2001). As far as the prevalence of HPS is concerned, it has been recorded that first case of HPS happened in 1993 and after that 122 cases of HPS have been reported with having almost 50% mortality rate in 23 states of United States. The most recent report about the prevalence of HPS has been reported in 2017 that there were total 728 cases of Hantavirus infection reported. Out of all these reported cases of HPS, thirty-six percent deaths occurred.

**Question.3**

In Hantavirus pulmonary syndrome disease mainly lungs of the patient are going to be infected and he is going to have difficulty in breathing. HPS is going to damage heart and lungs as it is going to damage blood vessels that would other organs. But the most affected organ would be lungs of the patient that the name of the disease is indicating as well.

A virus called ANDV causes acute HPS when this virus enters the body of a person it causes inflammation. Virus and this inflammation are going to damage various organs of the body. When this virus reaches the blood vessel, they become leaky. These leaky blood vessels when reaches lungs they cause the air sacs to be flooded which causes breathing issue for the patient.

This is going to have a severe impact on the functioning of the heart as the heart would fail to pump through leaky vessels. This would cause a reduction in the flow of the blood causing the lowering of blood pressure (MacNeil,et,al,2011). As a result of all this, there would be a shortage of oxygen to all the cells of the body. This shortage of oxygen is going to cause the failure of the proper functioning of many organs of the body that would could death ultimately. In the normal condition when the air sacs won’t be filled with fluid, lungs will work well and would perform function properly that has been assigned to them.

**Anatomy of the lungs:**

Lungs are kind of pyramid shape organs that are attached to the trachea through the right and left bronchi. There is a sheath called diaphragm that bordered the lungs. The diaphragm is a muscle that is located in the thoracic area. Pleurae are the structure that encloses the lungs. The right lung is slightly short and broader than the left lungs. There is a structure called coastal surface that borders the ribs. There are smaller units called the small lobes that compose the lungs.

**Physiology of lungs:**

It is the primary organ of the human body that performs the function of respiration, by having the two zones. The primary function of this organ is the exchange of oxygen and carbon dioxide from the air that comes and goes out.

**Question.4**

Hantavirus is going to have its severe impact on many organs. Primarily after damaging the lungs, this virus is going to damage kidneys badly. Researchers have investigated that a person who would be suffering from HPS would suffer from Hantavirus hemorrhagic fever with renal syndrome (HFRS). In HPS, symptoms of disease would appear 1 to 2 weeks after having exposure with any infectious things or directly inhaling the infectious material contaminated by the rodent’s droppings or urine (Engelthaler,et,al,1999). Kidneys would work normal in a person who would not be suffering from HPS as there would be no lesion that would cause swelling and patient would have difficulty in urination.

**Anatomy of kidneys:**

From the frontal section, there could be seen an outer part of kidney that is known as renal cortex and the inner part next to it would be called medulla. Some connective tissues look like extensions called renal column would be the next part of kidney. This renal column extends from downward to cortex through the medulla. From here three structures would separate as medulla, renal pyramids, and renal papillae. Renal papillae transport urine that is made up of nephrons, to calyces. The most affected part of kidney is nephron that turns into nephritis that would have lesion after being affected with HPS. In a severe case, there would be a failure of kidneys causing a condition called anuria.

**Physiology of kidneys:**

Kidneys perform the function of blood filtration, and it happens in three step process. Nephron first filters blood that passes through the glomerulus. Through the process of glomerulus filtration, all solutes except proteins are cleaned. Most of the solutes are going to be reabsorbed, by a process is called tubular reabsorption. As a whole, it could be said that this organ is used for excreting urine of the body.

**Conclusion:**

Hantavirus pulmonary syndrome is one of the severe respiratory diseases that are caused in humans by the infection of a virus called "**Hantavirus**." It has been seen that anyone who inhaled infectious material of rodents is going to develop this disease. The sufferer would have difficulty in breathing so in the severe case; the patient could die if proper treatment is not given in time. But till date, there is not even a single reported case in which it is said that this disease transmits from one person to other.

References:

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