A STUDY OF VARIOUS METHODS FOR DIAGNOSIS OF HUMAN LIVER

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ABSTRACT

This paper presents a study of diagnosis methods for human liver. Presently, there are many elders obtained from liver diseases in the case of an unknown before by themselves. If they do not diagnose such liver diseases before, they will die. Presently, there are many methods for diagnosing the liver e.g. a puncture of blood, ultrasound, computed tomography (CT) scan, X-ray and magnetic resonance imaging (MRI). These methods can be selected to verify the liver diseases depending on situations, chances and environments for human living. Therefore, we need to know these methods before, and how to choose suitable methods for diagnosis of our liver.

1. INTRODUCTION

Nowadays, many elders have been liver diseases (LDs) but they do not know such LDs before. Generally, the LDs are obtained from many reasons such as inflamed from Virus B, Virus C, alcohols or others etc. Such reasons can be the cause of cancers. If we diagnose it before, we will cure it earlier through the use of a new liver substituted to the old liver for stopping the distribution of cancers to inner and outer arteries of the liver. Therefore, it is necessary to know the diagnosis methods for checking the liver firstly. Finally, there are normally five methods of diagnosis for the LDs such as 1) a puncture of blood, 2) ultrasound, 3) computed tomography (CT) scan, 4) X-ray and 5) magnetic resonance imaging (MRI). The organized parts of this paper consist of knowledge of human liver in Section 2, puncture of blood in Section 3, ultrasound in Section 4, CT scan in Section 5, X-ray in Section 6, MRI in Section 7 and conclusion in Section 8.

2. KNOWLEDGE OF HUMAN LIVER

A liver is an organ which is an important of our body. There are many functions of the liver such as to build the gallbladder, to digest the food of fat, and to collect the food for glucose which is saved in the liver cell in terms of glucogen. The liver is a saving resource for various vitamins e.g. vitamins A, D and B12. It will remove toxic substances which are absorbed in blood. It also will build vitamin A from catorine stayed in carrots and papayas which will build iron and blond elements to protect the solid blood. Moreover, it will eat and destroy infections, as well as it still is heat energy for our body. It can be seen from many important functions of our liver that if the liver cell is destroyed, then it will be failure of our body. Therefore, we always should be interested in diagnosis of the liver for the failure or not. For a verification of the liver efficiently, the results cannot indicate that it is the normal liver (100%) or not, but it can imply the real results for useful purposes such as to classify types of the diseases, to monitor the diseases and to track the remedial results. Figure 1 shows an image of the human liver [1].

Figure 1. An image of the human liver [1].

3. PUNCTURE OF BLOOD

A puncture of blood is only a check of level substances in the blood. However, it cannot accurately diagnose diseases of the liver, but it will find other methods to help the diagnosis together e.g. ultrasound, X-ray etc. Therefore, there are basically three methods for puncturing the blood as follows [2].

3.1. Puncturing Capillary

This method uses to puncture the end of fingers which are chose for the middle finger or the ring finger because their works are less than other fingers. For the children, they will be punctured in their heels. The objectives are to measure values of volume in red blood cells and to monitor the sugar levels in blood.

3.2. Puncturing Vein

This method uses to puncture the shallow vein which is sucked into an injector of a hypodermic syringe. It is to like a puncture of the arm’s elbows. The objectives are to count blood cells, to check functions of the liver and to diagnose electrolytes.
3.3. Puncturing Artery

This method uses to puncture the artery using only medical doctor because it is hardly to stop the blood. Positions of the puncture are at the wrists and the nip legs. The objectives are to measure levels of oxygen and carbon dioxide.

4. ULTRASOUND

Ultrasound is a tool of measuring an organ of the body using the sound wave which the frequency is higher than 20,000 Hertz but it is not the X-ray. It is safe for measuring a baby stayed in her pregnant. The ultrasound is used for the organ consisting of water or tissue in our body except air organs or bonds which it cannot measure them. Therefore, the ultrasound cannot measure the lungs, the intestines of food paths and the other parts of bonds. It is the limitation of the ultrasound.

The advantages of the normal ultrasound are, for example, the safety, no radiation, quick measurement, convenience, no pain, and the capable of measuring several planes. Moreover, there is a color doppler ultrasound consisting of red, blue and yellow etc. This ultrasound is used for measuring the heart and the blood pipe which uses the concept of changing frequency whilst the moving objects. If the objects move near to a measuring head occurring to add the velocity, then it will increase the frequency which it is marked for the red color. In the opposition, if the objects move far from the measuring head, then it will decrease the frequency which it is marked for the blue color. It uses red blood cells in the blood pipe and heart for a principle of making images [3].

Principal of Work for Ultrasound

Principal work of ultrasound is to take charges of the electrical for adjacent distances into a crystal being a quality of piezoelectric effect which is produced for a period of the ultrasound pulses feeding into a part of our touch. When these pulses are moved through two mediums, it will be a reflection and a deviation through the moving path of sound in terms of two different mediums. Then, they will be reflected to the measuring head occurring different percents and degrees. Therefore, images generated from these sound pluses can be seen as the different tissues that it indicates abnormality for diagnosing the diseases [3].

5. COMPUTED TOMOGRAPHY SCAN (CT SCAN)

Computed Tomography Scan (CT Scan) or Computed Axial Tomography Scan (CAT Scan) called as “EMI Scan” is a medical measurement using the X-ray wave which can build the image following the cut line and cross line for three dimensions of the body needing to the medical diagnosis using highly resolute computer. using highly resolute computer. The computer converts image signal being clearer than ultrasound technique but it is poorer than magnetic resonance imaging (MRI). The diagnosis of the CT scan will use the X-ray wave which is a risk of the body when patients receive it for much quantity and they may be injected by thick substance of the radiation into the body [4].

Principle of Work for CT Scan

The CT san is the use of the X-ray technique including the computer which is substituted for taking the X-ray wave with one way direction e.g. a projection of the X-ray to lungs from a back to a front lateral, a left to a right lateral (or a right to a left lateral) i.e. two images. Meanwhile, the patients stay on a moving bed and then the X-ray detector is rotated around them. At the same time, the computer will collect the data until finishing the diagnosis of body and then it will take such the data to generate image films or to display on the monitor. Therefore, the ray mages of cross section is obtained from the computer (CT Imaging) or Computed Axial Tomography (CAT Scanning). Figure 2 shows computed tomography scan (CT Scan) [4].

Figure 2. Computed Tomography Scan (CT Scan) [4].

6. X-RAY

X-ray is the electromagnetic wave which is wavelengths in the ranges of 10 to 0.01 Nanometer or frequencies in the ranges of 30 to Picohertz. Basically, the X-ray will be used for taking photographs to a medical diagnosis and a crystallography. It is a radiation of splitting ions which are dangerous to the human.

The processes for producing the X-ray obtained from the human or nature consist of 2 main methods as follows. For the first method, the X-ray is produced by shooting a lam of particle electrons into steel sheet such as Tungsten. Shot of electrons runs to hit electrons of steel atom and then these electrons will change directions of orbiting around nucleus atom. As a result, it will have space positions of such these electrons around the nucleus.
Therefore, if other electrons orbit the positions of higher energy, then they will jump to substitute such these electrons and also release the energy in terms of the electromagnetic wave i.e. X-ray. This X-ray projector generally will be used in hospitals and industries.

For the second method, the X-ray is produced by moving charged particles in acceleration such as electron, proton or atom. It means that these charged particles moving with a higher velocity naturally will release the energy in terms of the electromagnetic wave. If this wave is released for sufficiently high frequency, then it will be the X-ray. This second method is favorable for the scientists to generate the X-ray in the laboratory [5].

7. MAGNETIC RESONANCE IMAGING (MRI)

Images produced by magnetic resonance or Magnetic Resonance Imaging (MRI) is a inspection of the body using a detector based on the electromagnetic wave of high intensity and radio frequency. This technique is to generate virtual images of organs of the body through the use of the computer which is a high resolution including sharpness and clearness. Such images belong to planes of horizontal, vertical and slant lines i.e. three dimensions. These images are clearer than the diagnosis using the CT Scan. The medical doctors can diagnose accurately an abnormality of the body. This diagnosis not causes any pain to the body and it is no danger from residual radiation but it may result in feelings of fear that the narrow. When the images are created by a cross section of the body, the medical doctors will see the details of organs of the body called as the computer X-ray. They can diagnose more any disease; however, if the image is soft tissue, then the details may not clear to see it [6].

Principal of Work for MRI

Principal work of MRI producing the images is occurred from influence of magnetic field to arrange atoms contained in the tissue. The atoms of hydrogen stay in water and body fat which they normally are arranged in the uncertainties; however, the magnetic field can arrange orderly atoms. In this method, the patients, therefore, lie on the high magnetic field which the atoms of proton can be arranged orderly by themselves. The arrangement of proton is changed by stimulation using radio frequency and the proton can arrange orderly regularity using the stop stimulation. At that time, it will release signals of the electromagnetic wave at the same frequency of stimulating frequency. It can record the radio emissions of tissue proton and then it can generate the images of organs of the body using the computer. As a result, if the tissue consists of the small atoms of hydrogen such as bones, then the color of images is black. However, if the tissue consists of the high atoms of hydrogen such as fat tissue, then the color of images is whiter. Therefore, the MRI can build the better images of soft tissue and it can construct the images of artery or biliary path based on no injection of color. Figure 3 shows magnetic resonance imaging (MRI) [6].

![An example of an MRI machine](image)

**Figure 3.** Magnetic Resonance Imaging (MRI) [6].

8. CONCLUSION

This paper has presented the study of diagnosis methods for human liver. Presently, there are many elders obtained from liver diseases in the case of an unknown before by themselves. If they do not diagnose such liver diseases before, they will die. Presently, there are many methods for diagnosing the liver e.g. a puncture of blood, ultrasound, computed tomography (CT) scan, X-ray and magnetic resonance imaging (MRI). These methods can be selected to verify the liver diseases depending on situations, chances and environments for the human living. Therefore, we need to know these methods before, and how to choose suitable methods for the diagnosis of our liver.

9. ACKNOWLEDGEMENTS

The author is grateful to Mr. Apirat Tachompoo, Mr. Tinankorn Chamnansutha and Mr. Kampanart Chomchuy for their useful help in this work.

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