

Hyperparathyroidism can be characterized health essay

[Health & Medicine](#)



**ASSIGN
BUSTER**

Introduction

According to Topiwala (2012), hyperparathyroidism can be characterized as disorder that occurs in the parathyroid glands as a result of overstimulation of the glands that cause it to secrete excessive amount of parathyroid hormone (PTH). It is a disease of endocrine system that effect skeletal system. As it is long term disease, it is undetected and can be very mild from primary type to secondary type and eventually to tertiary type (Kowalczyk & Mace, 2009 p. 326). So, what are the parathyroid glands? Why it has closer related to the skeletal system? Parathyroid glands are four pea-size glands located on the thyroid glands, which can be found on the thyroid glands in the neck region (MedicineNet, 2012). In fact, human born with one or more of the parathyroid glands with one superior or one inferior gland that attached to the lateral side of thyroid lobes. However, in most cases, these parathyroid glands function normally. Picture of the Parathyroid Glands Each of thyroid gland and parathyroid glands are completely different glands and both of them function in different way, in which they secrete distinct hormones with specific functions. Parathyroid hormones which are the hormone that are produced by parathyroid gland help regulate the homeostasis of calcium and phosphorus in the internal environment of the body via certain process. This process included absorption of calcium through kidney and excretion of calcium via urine. Thus, maintaining the level of calcium in the blood. Other than that, it also leads to increase in bone resorption, which is the process of releasing calcium and phosphate into the blood. This can be done through the increase of the number and activity of osteoclast (Tortora & Derrickson, 2009 p. 662). So, when the level

of calcium in the blood is at high condition, parathyroid glands responsible to secrete small amount of parathyroid hormone to restore the blood calcium level and vice versa.

Histopathology

Causes

This disease is the result of factors that change the production of parathyroid hormone in the internal environment of human body. Based on the article of hyperparathyroidism (2013), the parathyroid glands which function to produce parathyroid hormone maintain both of calcium and phosphorus in our body so that it always in optimum condition via turning on or off the secretion of parathyroid hormone. Besides that, controlling the level of calcium in our body also would include vitamin D as catalyze. In most cases, the homeostasis keeps in balance. As the level of calcium in our body decreases, parathyroid hormone plays a major role via negative feedback in order to gain the optimum condition. This occur when our bones release the calcium to the bloodstream, meanwhile the small intestine take part to increasing the amount of calcium via the absorption of calcium. In opposite, if the calcium levels are too high, the secretion of parathyroid hormone would decrease. However, in certain cases, the amount of these hormone being produce become more than enough, resulting in hypercalcemia and also poor levels of phosphorus in our body (MayoClinic, 2013). This could be a worst condition when the parathyroid gland is overstimulated and produce too much hormone. It cannot be deny that calcium is one of the mineral salts that keep your bones and teeth healthier. But still, when the calcium level getting too high in your blood stream, our body cannot tolerate with it well.

<https://assignbuster.com/hyperparathyroidism-can-be-characterized-health-essay/>

Calcium also plays role in the transmission of signals in nerve cells including in muscle contraction. The other mineral, which is phosphorus work the same way as calcium in these tasks. This disease can be classified into two types based on the cause. Firstly, it may occur due to the problem with the parathyroid glands themselves which we called it as primary hyperparathyroidism. Secondary hyperparathyroidism is the condition that occurs when other disease has affects the glands' function. Primary hyperparathyroidism This type of disease happens when there is one or more of the parathyroid glands getting problem (MayoClinic, 2013). The following points explain the causes of primary hyperparathyroidism. The most common cause would be a benign tumor such as adenoma growth on the gland that suppresses it to secrete excessive parathyroid hormone. It is found that this disease also may occur when there are two or more parathyroid glands become enlarge. However, research found that only small amount of cases involving a cancerous tumor. This type of hyperparathyroidism may happen randomly, however people may inherit a gene that causes the disorder. Secondary hyperparathyroidism Secondary and primary hyperparathyroidism can be differentiate by it cause. If primary hyperparathyroidism occur due to the problem on the glands itself, secondary hyperparathyroidism happen when there is something problem that causes the calcium levels in the body becomes lower than normal condition (MayoClinic, 2013). This causes the glands to work harder in order to give negative feedback for the calcium loss. So, the list below explains the factors that lead to the secondary hyperparathyroidism. Human body would loss calcium when digestive system does not absorb the calcium that had

been obtained from diet. Thus, lead to the severe calcium deficiency in the body. Vitamin D plays an important role to maintain the calcium level in human body by control the absorption of calcium in digestive system. Human get vitamin D from diet that they had consumed, and when human body absorb sunlight, it automatically produces it. So, deficiency in vitamin D would cause the calcium level in bloodstream to fall. It is believes that the most common causes of secondary hyperparathyroidism is the chronic kidney failure. Normal kidney synthesis vitamin D in a suitable form so that body can take it and use it properly. But when the kidney failed to function properly, vitamin D could not be consumed by the body, resulting in level of calcium to drop.

Incidence and rate of Mortality and morbidity

Someone that is suffering from hyperparathyroidism will face a problem with their skeletal system such as osteoporosis. Skeletal system made up of various kinds of minerals such as calcium and phosphorus. This mineral salts give the bone it characteristics which is strength and dense. When bone lack of this minerals, bone loss its function to maintain its density causing it to become fragile and easily break. Hyperparathyroidism cause the parathyroid glands to secrete excessive amount of parathyroid gland to the bloodstream which cause the bone to carry out resorption. As a result, the bone release calcium into bloodstream and cause calcium blood level to become high. People also would suffer from hypercalcemia because of this phenomenon. Osteoporosis is a disease that can be characterized by fragile and spongy bone as a result of lack of mineral salts such as calcium. The bone density and bone quality ensure the bone strength. If the bone density and bone

quality decrease gradually, that indicate an individual has osteoporosis clinically. Nowadays, pathologic fractures which cause by osteoporosis become more popular from day to day in all Asian countries. Osteoporosis has gives so many impact on human life and sometime it will bring mortality. This causes the quality of life drop instantaneously. There is at least 10% of osteoporosis sufferers become bedridden and about 25% of them wheel chair bound. In 1997, the incidence of fracture of hip among Malaysians above 50 years of age was 90 per 100, 000. Most of them who had survived from this disease becoming disable while only 25% of them have chances to continue their normal life. Because of the hip fractures, our country had spent RM 22 million in order for direct hospitalization for the patients who had suffered that problem. Other than that, kidney failure also is the one common complication that someone would suffer when someone has hyperparathyroidism. It happens as a result when calcium level in blood elevates too much or when kidneys failed to excrete calcium that causes calcium level too remain in body excessively. This condition known is as hypercalcemia. Kidneys are the organ of excretion system that functions to excrete waste products by filtering them via urine. They also play several roles in control blood pressure, production of red blood cell and balancing rate of electrolyte in the body. Kidney failure sometime could be treated and return the kidney to normal condition. However, kidney failure may be develop back and the situation would become worse as it cannot be cured. If the kidneys damage completely, kidneys transplant and dialysis would be the only treatment that could be choose. This disease can be diagnosed through blood test measuring BUN, creatinine glomerular filtration rate. In

Malaysia, about 2500 people are diagnosed have a problem with kidney failure every year and it is believe that the numbers can still elevated from year to year if no action taken to search the prevalence of the disease.

Pathophysiology

Sign and symptoms

When symptoms become apparent, the calcium level in the blood stream become too high or too low in bones due to the damage or dysfunction in either organs or tissues (MayoClinic, 2013). So, usually before any of the symptoms or signs becomes apparent, this disease would be diagnosed first. The symptoms range would be from mild to severe. Sometimes they are not specific at all as they are not related to parathyroid role. These including: Osteoporosis, the condition where the bones become fragile and easily fracture. Renal calculiPolyuriaWeakness or easily tiredPain in abdomen regionNausea and sometimes would lead to vomitingLoss of appetiteDepressionFrequent illness that cannot be detect it causeBone and joint painCorrect time to see physicianIf you had encounters any signs or symptoms of hyperparathyroidism, just go find your doctor for some advice. The symptoms that you had would be caused by certain disorders and sometimes it will indicate serious complication. So it is crucial for you to take immediate action in order to get correct diagnosis and suitable treatment.

Imaging modalities

There are many types of imaging modalities that can be used to detect hyperparathyroidism by looking at their size, who become enlarge as a result of benign tumor which cause primary hyperparathyroidism. The imaging

modalities that can be used to check up for any enlargement in parathyroid glands are ultrasound, computed tomography (CT), magnetic resonance imaging (MRI) and sestamibi scan. General x-rays cannot be used to detect any abnormality occur on parathyroid glands. However it can still be useful in order to detect the extent of the hyperparathyroidism by enable the visualization of skeletal system in patient body. If the patient suffers from secondary hyperparathyroidism, x-rays are taken to visualize the effects of the disease to the skeletal system of the patient. Other than that, ultrasound is also one type of imaging modalities that can be used to check any abnormalities on the parathyroid glands. Parathyroid ultrasound is very useful in order to check the size and shape of parathyroid glands. It also enable us to check all the parathyroid glands location whether behind or next to the thyroid glands. However, it cannot tell how the glands are working. During examination, transducer which is the small handheld equipment is used to make a picture of parathyroid glands by passed it over the neck repeatedly. Parathyroid glands which are in normal condition are very difficult to be visualized by the ultrasound and also cannot be palpate during physical examination. However, the glands that become enlarged can easily be visualized by ultrasound. A high resolution parathyroid computed tomography (CT) scan is very useful to detect any parathyroid growth tumor when a parathyroid scan and parathyroid ultrasound failed to detect any abnormalities in parathyroid glands. It is been proved that CT scan is the technique that can localized any abnormalities at parathyroid glands even if the parathyroid glands located at other place than the thyroid itself, such as when the glands not located in the neck but in the chest (ectopic). A general

CT scans are not good enough at visualizing parathyroid glands, rather than the newer techniques that can detect the parathyroid glands in both thyroid and chest. This modified technique, which is called as parathyroid CT scan can be complete in less than 30 minutes and required skillful radiologist at visualization for any sign of abnormalities in parathyroid glands. Sometimes, parathyroid CT scan is not a first choice to begin with but if and only if the sestamibi scan of the parathyroid and ultrasound failed rather than CT of parathyroid to help visualize ectopic parathyroid adenoma. Besides that, CT scan is also faster and cheaper than magnetic resonance imaging (MRI). A parathyroid magnetic resonance imaging (MRI) is a reserved technique that only is used when facing with difficult cases. It become the second choice for checking primary hyperparathyroidism when sestamibi scan and high resolution parathyroid ultrasound failed to detect any abnormalities on the parathyroid glands since it is not a schedule test. MRI can become more specified and sensitive to visualize parathyroid glands that become enlarged. It always served for a patient who had already undergone unsuccessful examination. It also may be performed as a referral cases from other health care institutions involving persistent hyperparathyroidism after an initial neck examination. If any of neither sestamibi scan nor ultrasound is negative in identifying any abnormalities, T2 weighted high resolution MRI of the neck and superior mediastinum would be carried out. Thus T2 weighted MRI would be very useful in order to detect any of abnormalities including ectopic parathyroid glands. The parathyroid sestamibi scan is one of the chosen examinations in order to search for any abnormalities in parathyroid gland. So what is Sestamibi? Sestamibi is a labeled protein as radiopharmaceutical

technetium-99m that is approved a very safe and mild radioactive agent that would be absorbed by the abnormal parathyroid gland when it is injected in the body. With the combination of sophisticated gamma nuclear camera, the location of the parathyroid gland can be visualized clearly. Sestamibi scan of the parathyroid gland would not visualized normal parathyroid gland rather than the bad one. It is because normal parathyroid gland would not take radioactive particles as they are suppressed by increasing level of calcium when abnormal parathyroid gland secrete excessive amount of parathyroid hormone. The sestamibi scan is very safe than the other iodine-base examinations as it never produce any complications or allergies when someone undergone it. However it still takes a longer time in which less than three hours.

Image features

General x-rayFull-size image (16 K)Radiograph of a single vertebra, visualizing sign of osteoporosis indicating that radiolucency and verticalization of the trabeculae has increased. Ultrasoundhttp://www.endocrinesurgery.net.au/storage/parathyroid/US%20PT%20adenoma1-ws.jpg?__SQUARESPACE_CACHEVERSION=1273231426752http://www.endocrinesurgery.net.au/storage/parathyroid/US%20PT%20adenoma%20Doppler%20ws.jpg?__SQUARESPACE_CACHEVERSION=1273231503094Figure 1 shows the ultrasound of parathyroid adenoma while figure 2 shows the ultrasound of parathyroid adenoma with color Doppler signal which demonstrating vascularity. High resolution computed tomographyFigure 2BFigure shows thorax computed tomography without intravenous contrast visualizes a small ectopic adenoma located within the <https://assignbuster.com/hyperparathyroidism-can-be-characterized-health-essay/>

thymus with measuring approximately 5mm x 3. 5mm. Magnetic resonance imaging http://www.endocrinesurgery.net.au/storage/parathyroid/MRI%20parathyroid%20arrow%20ws.jpg?__SQUARESPACE_CACHEVERSION=1273234793004 Figure shows parathyroid adenoma that can be visualized at lower neck region (red arrow). MRI could be reasonably useful imaging modalities, but usually only after failed surgery as a re-exploration. Sestamibi scan http://www.ghorayeb.com/PARATHYROID_ADENOMAS__large_SESTAMIBI_L_2_.JPG Figure 1 shows technetium 99 Sestamibi scan for the first 15 minutes and Figure 2 visualizing large adenoma after 3 hours delay.

Discussion

Treatment

The treatment for the hyperparathyroidism can be classified into 3 options. That would be: Regular monitoring Surgery Drugs Regular monitoring In this condition, the doctor would recommend no treatment instead just make a regular monitoring if the calcium level in your blood stream has increased slightly. This indicates that your kidneys are functioning properly. Besides that, you could choose this method if your bone mineral density is in optimum condition or decreased slightly below normal level and if the treatment does not growth any other symptoms. However, for somebody who just chooses this type of approach, they need to diagnose their calcium levels at least twice per year. In addition, it is important to carry out other types of monitoring diagnosis at least once per year. Surgery Surgery is the most efficient technique in order to treat primary hyperparathyroidism. At least over 80 percent of all cases involving this treatment over this disease <https://assignbuster.com/hyperparathyroidism-can-be-characterized-health-essay/>

had successfully cured. By this method, " a surgeon will remove only those glands that are enlarged or have a tumour" (MayoClinic, 2013). However if all of the parathyroid glands being affected, the surgical will only covered for only 3 out of 4 glands and if and only if it involved the fourth gland, it only just a portion of the gland. This could leave only a small portion of functioning parathyroid tissue that sometimes not sufficient to bring negative feedback to human body. This treatment would be done as outpatient examination; in fact you can go home after you had the surgical procedure. If the examination occurs on you, this could be said that the procedure is carried out via a very small incision in your neck. With that, you only had given local anesthetics. It cannot be denied that this method provide better route of cure rather than receive regular monitoring or taken medicine, but still it will lead to risk. However these risks are rare and sometimes you just need to take supplement to counter it. These include: Destruction to nerves, which function to control the voice cords. You may suffer for long-term low blood-calcium level because of the removal parathyroid tissue, but you can reverse it by taken calcium and vitamin D supplements. Drugs also play role in order to treat hyperparathyroidism. These medications involving calcimimetics, hormone replacement therapy and biphosphonates with each of them have specific function. Below is the explanation regarding the medication and how its function to cure hyperparathyroidism. CalcimimeticsIt is a drug which mimicking as calcium in blood circulation. As a result parathyroid gland would be tricking by the drug and secrete less parathyroid hormone. It is sold as cinacalcet (sensipar) which had been approved by the Food and Drug

Administration as it can cure hyperparathyroidism that are caused by chronic kidney disease or parathyroid cancer. If surgery method does not give fully positive feedback to the patient, this drug would be the second choice to treat primary hyperparathyroidism. Hormone replacement therapy Hormone replacement therapy is the best method for women who had undergone menopause. As stated by MayoClinic (2013), hormone replacement therapy would help bones to maintain its calcium level as needed by menopause women who had osteoporosis. However the use of this method in a long term would cause one to suffer cardiovascular disease and sometimes, cancers too. So it is crucial for you to get some advice from your doctor before you proceed to the next stage so that the benefits outweigh risks.

Biphosphonates Biphosphonates are antiresorptive drugs which slow or stop the natural process that dissolves bone tissues, resulting in maintained or increased bone density and strength. This statement is supported by MayoClinic (2013), which had stated that someone who had taken biphosphonates would be avoided from having loss of calcium from bones, and you indirectly decreased the effect of osteoporosis that is caused by hyperparathyroidism. As a result, osteoporosis would not develop, and if it is already has developed, the effect of the drugs which has slow the rate of bone thinning would reduce the risks of broken bone.

Prognosis

It is believed that hyperparathyroidism is a chronically progressive disease that would not be cured with medical treatment only unless one would undergo parathyroidectomy that have high chances to be healed from hyperparathyroidism. Thus, someone that only take medication as a

<https://assignbuster.com/hyperparathyroidism-can-be-characterized-health-essay/>

treatment need to be monitored closely and carefully in order to prevent any complication that might happen. Unlike the individuals that had undergoes surgery, most of them are successfully treat. The bones that have become fragile as a result of calcium release from bones would be recovered when the tumor is removed. However, the damages that are cause by hypercalcemia to the renal and pancreas would not recovered to normal condition.

Conclusion