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AN OVERVIEW ON HYPERTHYROIDISM: REVIEW

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ABSTRACT

Increased in synthesis and secretion of thyroid harmone from thyroid gland termed as Hyperthyroidism. At other hand eccess circulation of thyroid harmone irrespective of source reffered as thyrotoxicosis. Graves disease, Toxic multinodular Goitor and Toxic Adenoma are common causes of excessive prduction of thyroide harmone. In Hyperthyroidism overproduction of thyroide harmone treated by antithyroide medication, radioactive iodine and surgical thyroidectomy. Radioactive iodine ablation popularly used in United State. Antithyroide drug are not used long term in toxic nodular goiter due to high relaps rate of thyrotoxicosis. β-blockers are used for treatment of thyrotoxicosis. Hyperthyroidism and thyroid storm in preganancy and post partum period need special treatment and care. It is eight fold more common in female than male, generally ocurrs in young females of age 20 to 40 years.

KEYWORDS: Hyperthyroidism, thyrotoxicosis, antithyroide medication, radioactive iodine, surgery, graves disease.

INTRODUCTION[1,2,3,4]

As per pathalogy the term hyperthyroidism in that excess secretion and synthesis of thyroide harmone by thyroide gland. Thyroxicosis is excess circulation of thyroide harmone irrespective of source. characterised by normal or high radioactive iodine intake. Thyrotoxicosis without hyerthyrodism is caused by extrathyroidal source of thyroide harmone or by release of performed harmone into circulation with low thyroide radioactive iodine uptake. Hyperthyroidism due to low serum thyroide stimulating harmone (TSH) concentration and raised serum concentration of thyroide harmones:thyroxine (T4), tri-

idothyronine(T3), or both. In United State 50% to 80% s of hyperthyroidism cases are due to graves disease. It include other causes as multinodular goiter, toxic adenoma, inflamation of thyroide, eating too much iodine & excess synthetic thyroide harmone. Sign and Symptoms are vary person to person, it include irritability, muscle weakness, heat intollarance, diarrhea, fast heartbeat, enlargement of thyroide, hand tremor and weight loss. In thyroide storm an ifection goes to worsening symptoms as confusion, high tempreture and may lead to death.

Treatment of hyperthyroidism relats to its causes and severity of disease. Hyperthyroidism can be treated by antithyroide medication, radioiodine therapy and thyroide surgery. In radioiodine therapy iodine-131 is taken which used to dominate radioiodine and recovers thyroide over weeks to months. Hyperthyroidism can also be treated with antithyroide medication asmethimazole can temporaly controlls disease, β-blockers also controll symptoms. Surgery used to remove thyroide, is mainly applide on cancerous condition. It commonly occure in women than the men and in age group of 20 to 40.

Thyroide gland located in neck below larynx responsible for secretion of harmones triidothyronine (T3) and thyroxine (T4). As T3 and T4 travel through blood stream to body parts.they are responsible for regulation of energy, is also called as metabolism. pitutary gland controlls thyroide function; pitutary produces thyroide stimulating harmone.

Hypothyroidism, due to certain type of thyroiditis lead to hypothyroidism, as thyroid gland damage. radioiodine treatment of grave disease may also lead to hypothyroidism. Such hypothyroidism may treated by regular thyroide harmone testing and oral thyroide harmone supplementation.

Theory of Hyperthyroidism[5,6] Sign and Symptoms[7,8]

Hyperthyroidism may be asymptomatic or have significant symptoms. Hyperthyroidism mimic other health problem which create problem in diagnosis. There are some common sign and symptoms, such as

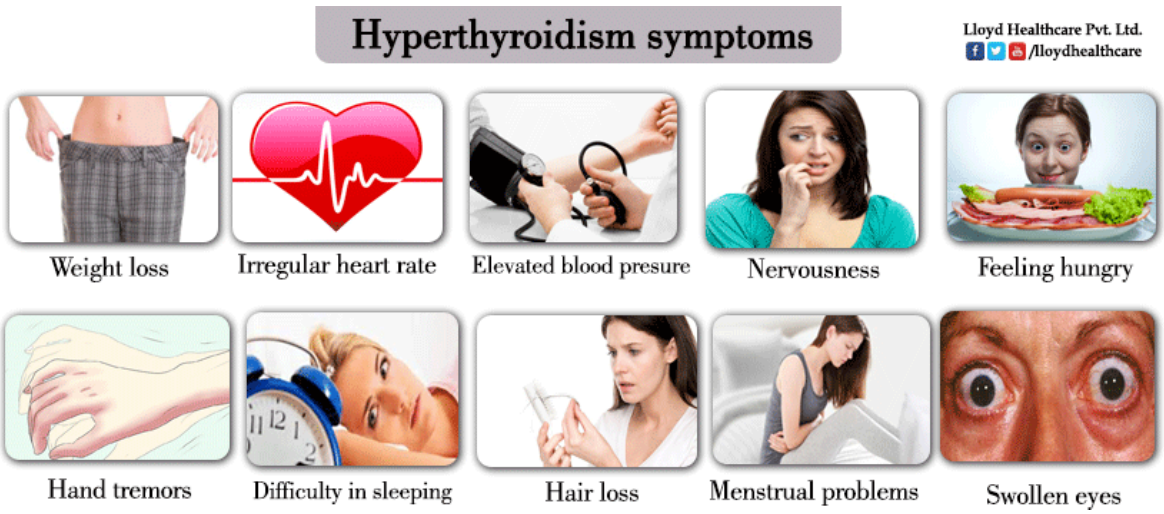
- Irregular heartbeat (arrythmia)
- Rapid heartbeat (tachycardia)-more than 100 beats a minute
- Unintentional weight loss,even though apetite and food intake is same or increase.
- Pounding of your heart (palpitation)
- Increase appetite
- Nervousness, anxiety and irritability

- Tremor-usually a fine trembling in your hand and fingers
- Sweating
- Changes in menstrual pattarn
- Increased sensitivity to heat
- Fatigue, Muscle weakness
- Difficulty sleeping
- Skin thinning
- Fine, brittal hair
- Changes in bowel pattern, especially more frequent bowel movements
- An enlarged thyroide gland

Some uncommon problem also seen named graves opthalmopathy may affect eyes, if you smoke, it makes eyeball protrude beyond normal protective orbits, tissue and muscle behind eye swell, it shows

- Dry Eyes
- Excessive tearing or discomfort in one or both eyes
- Protruding eyeball
- Red or swollen eyes
- Light sesitivity, blurry or double vesion
- Inflamation or redused eyemovement

Minor occular sign may present are eyelid retraction, extraoccular muscle weakness and lig-lag



Thyroide Storm

Thyroide storm is severe form of thyrotoxicosis lead to rapid and irregular heartbeat, high tempreture, vomitting and mental agitation. symptoms may not be similar in young, old and pregnant. It occure by untreated hyperthyroidism and provoke by infection.

Causes[8]

Hyperthyroidism has number of causes, from them major causes are Graves disease, Toxic thyroide adenoma, Toxic multinodular goitor,Inflamation, Postpartum thyroiditis, Struma ovari.Most commonaly entire gland over producess thyroide harmone. At some cases single nodule secreats excess harmone called hot nodule. Inflamation of thyroide i.e thyroiditis also cause hyperthyroidism. In number of clinical condition functional thyroide tissue producess excess of thyroide harmone.

Major Cuses

- Garaves disease: It is an auto-immune disease.It is one of most common cause worldwide with 50% to 80%. It varies with location i.e 47% in switzerland to 90%in USA. Due to varying level of iodine in diet. Near about eight times more common in women than men, often found in young females at age of 20 to 40 years.
- Toxic mutinodular goitor
- Toxic thyroide adenoma:

Number of causes occure due to high blood level of thyroide harmone.

- **Amiodarone:** an antiarrhythmic drug, is structurally similar to thyroxine and is just because of over or under activity of thyroide.
- **Postpartum thyroiditis:** In women during the year after they give birth near about 7%. PPT has typical phases from them first is hyperthyroidism and the hyperthyroidism in this case get corrected within week or months without need for treatment.
- **Thyroiditis:** Is inflamation of thyroide. Different kind of thyroiditis are seen which include hashimoto's thyroiditis and subacute thyroiditis. It is associated with excess secretion of harmone but leads to gland dysfuction and goes to harmone deficiency as hypothyroidism
- **Struma Ovari:** It is form of monodermal teretoma which contains thyroide tissue goes to hyperthyroidism.
- Iodine consumption in excess amount from algae such as kelp.
- Oral intake of excess thyroide harmone tablet is possible

- Thyrotoxicosis may occure due to taking excess thyroide harmone in suppliment like levothyroxine. Hypersecretion of thyroide stimulating harmone (TSH) is only because of pitutory adenoma.

DIAGNOSIS[9,10,11,12]

Hyperthyroidism can be diagnosed by

- **Medical history:** In examination doctor detect slight trmor in fingers, as they get extended, reflexes are not normal i.e overactive, changes in eye and warm, moist skin. doctor also examine thyroide gland as you swallow, if it enlarged, bumpy or tender. He will also check pulse if it's rapid or irregular.
- **Radio iodine uptake:** In this test small oral dose of radioactive iodine is taken to measure how much will collect in thyroide gland.it will be checked after four, six or 24 hours to measure iodine in thyroide absorbed.

A high uptake of radioiodine shows that thyroide gland produce too much thyroxine.Mostly seen caused is graves disease or hyperfunctioning thyroide nodule. If anyone has hyperthyroidism and his radioiodine uptake is low this indicates that thyroxine stored in gland leaking into bloodstream, it will be confermation to thyroiditis.

- **Thyroide scintigraphy:** This test used to characterised hyperthyroidism and thyroidities. This test procedure involves two test performed in connection with each other, such as iodine uptake test and scan with gamma camera.In uptake test administration of dose of radioactive iodine, iodine- 131, iodine-123. Iodine-123 is preferable due to its more favorable radiation domestry. Gamma photon energy more controlled to imaging with gamma camera.

In typical way pills or liquid containing sodium iodide administered orally, which contain small amount of iodine-131, amounting to less than a grain of salt. At least two hours fast of no food before and 1 hour after ingesting pill is neccesary. Excess radioiodine that does not get absorbed in thyroide gland is eliminated by body in urine. people with allergy to diagnostics radioiodine can be given antihistamine. after 24 houre the persone returns to have level of radioiodine uptake measured by device placed against neck which measure radioactivity emitted from thyroide. 4 minutes are required for test to measure uptake percent by machine software. scanning is done where images taken of contrasted thyroide gland with gamma camera.

- **Blood test:** Thyroxine and thyroide stimulating harmone get measured in blood test to

confirm diagnosis. High level of thyroxine and negligible amount of TSH shows an overactive thyroide. The level of TSH is important because its the harmone that signals thyroide gland to produce more thyroxine. This test is particularly useful for older adults who does not have classic symptoms of hyperthyroidism.

If a person taking biotin then the thyroide blood test may give false result. Biotin-vitamin B supplement that also found in multivitamin. Persone have to report doctor if he is taking biotin or multivitamine supplement with biotin. it ensures test accuracy, stop taking biotin before 12 hours to blood sample to test.

If blood test determines hyperthyroidism, doctor will recommands radioiodine uptake test, Thyroide scan and Thyroide ultrasound.

- **Thyroide Ultrasound:** Thyroide images are collected with high frequency sound waves. Ultrasound are better at detecting thyroide nodule than other tests and shows no exposure to any radiation.

Treatment[13,14,15,16,17,18]

Treatment of hyperthyroidism include various factors; Antithyroide drug, β-blockers, Diet, Radioiodine, Surgery and Alternative medicine.

1. Antithyroide Drug

Antithyroide drug i.e thyrostatics inhibite production of thyroide harmone. Thyrostatic drugs are methimazole Antithyroide drug, carbimazole and propylthiouracil. The mechanism of thyrostatics which inhibite iodination of thyroglobuline by thyroperoxidase leads to formation of teraidothyronine (T4). Conversion of mostly inactive form of T4 to active form of T3 prevented by propylthiouracil which also work outside thyroid gland. Thyroide tissue substantially contains thyroide harmone, to get effect thyrostatics require a week and the dose carefully titrated over period of month, with regular doctor visits and blood test to inspect result. In early treatment high dose is required but incase too high dose used frequently, symptoms of hypothyroidism may develope, the accurate titration of dose is difficulte to get and so sometime block and replace attitude is taken. In process of block and replace antithyroid drug taken in sufficient quantity for complete block of thyroide harmone.

2. Radioiodine

Dr. Saul Hertz was first pioneer to radioisotope therapy used radioiodine-131. Radioactive iodine- 131 is given orally in the form pills or liquid on one time basis. Its frequent action

destroy function of hyperactive thyroide gland. In this treatment iodine-131 chooses active cell in thyroide and destroy them, reaches to thyroide gland mostly or completely inactive. This isotope of radioactive iodine used in ablative treatment which is more potent than that of diagnostic radioiodine has biological half life of 8-13 hours. β particle emitted by iodine-131 damages the tissue at short range and has half life of 8 days. People those not responding to first dose are given an additional radioiodine treatment of larger dose. Thyroide cell pick up iodine redially and overactive cell also pick up iodine more readily local destruction is seen and no widespread side effect with this therapy. It has been 50 years over radioiodine ablation is used, the only reason for not using it are preganancy and breastfeeding. As per thyroide function is reduced replacement harmone therapy taken orally each day.

It is much higher success rate than medication which is principal advantage of radioiodine treatment. The disease under treatment is responsible for dose of radioiodine chosen, the success rate of hyperthyroidism resolution vary from 75% to 100%. One of the expected side effect of radioiodine with grave disease is devlopment of lifelong hypothyroidism, require daily treatment with thyroid harmone. Ocasionally people require more than one radioactive treatment, depend on disease type present, size of thyroide and intial dose given. Those people having grave disease as grave opthalmopathy are cautioned against radioactive iodine-131 treatment which worsen existing thyroide eye disease. People having mild or no opthalmic symptoms may mitigate risk with six week cource of prednisone.

As the 78% people treated for thyrotoxicosis and 40% of them with toxic multinodular goitor or solitary toxic adenoma by radioiodine gives outcome as swing from hyperthyrodism to easily treatable hypothyroidism. Result of radioactive iodine treatment is destruction of thyroide tissue, there is transient periode of days to week when symptom of hyperthyrodism actually worsen following radioactive iodine therapy, all this scenario happen due to release of thyroide harmone into blood stream due to radioactive iodine mediated destruction thyroide cell contain thyroide harmone, treatment with β-blocker useful during this periode. In some cases, neck tenderness or soar throat may become obvious after few days, If imflamation in thyroide is devolops or produces discomfort in neck or throat area, it is transient and not associated with a fever. Breastfeeding women should discontinue breastfeeding at least for a week or longer as radioactive iodine treat ment goes on, as small amount of radioactive iodine may found in breast milk even sevral week after the radioactive iodine treatment. Increas sensitivity to radioiodine therapy on ultrasound scan as more

uniform because densly packed large cell.

3. SURGERY

Surgery not widely used because most common form of hyperthyroidism are treated by radioactive iodine method, because there is risk of removing parathyroid gland and cutting recurrent laryngeal nerve, difficulty in swallowing difficult and it may goes to staphylococcal infection as with any major surgery. Surgery may attempted to thoes people who can not tolarate medicine for one reason or another, people with iodine allery, people those refuse radioiodine. people with toxic nodule treatment typically removal or injection of nodule with alcohol.

4. DIET

Those people having autoimmune hyperthyroidism should not use food with high iodine, like edible seaweed and kelp. people health perspective, the general introduction of iodised salt in US in 1924 results in lower disease, goiters, improved lives of children whoes mother does not have eaten enough iodine during pregnancy which may lower IQs of their children.

5. β-BLOCKERS

There are some common symptoms of hyperthyroidism like trembling, palpitation and anxiety are mediated by increase in β-adrenergic receptor on cell surface. Typical use of β-blockers is treating blood pressure, reduce rapid pulse associated with sensation of palpitation and decreasing treamor and anxiety. Until hyperthyroidism characterised with radioiodine test beta blockers give temporary relief from hyperthyroidism. These drug do not treat hyperthyroidism or any of its long term effect, but they treat or reduce symptoms of condition. Some minimal effect on production of thyroide harmone comes with propanol, it kindly performs two role in treatment of hyperthyroidism. L-propanol leads to beta blokage treat symptoms associated with hyperthyroidism like palpitation, anxiety, heat tolarance and tremor. D-propanol inhibite thyroxine deiodinase then block conversion of T4 to T3, provide somewhat therapeutic effect. Other beta blockers treat only symptoms of hyperthyroidism.

Etiology and Pathogenesis[19]

The endogenous cause of hyperthyroidism are toxic multinodular goiter, graves disease, toxic adenoma and painless thyroiditis. In united state graves disease is common cause of hyperthyroidism. Risk factor for grave disease include female sex and personal or family history of an autoimmune disorder. In united state toxic multinodular goiter is second

common cause of hyperthyroidism and most common cause in older persone is iodine deficiency. As time passes, nodules aries from frequent replication of clonogenic cell that lead to somatic activating mutation of TSH receptor. Toxic adenoma is single nodule. Opposite to these three disorder painless or transient thyroiditis leads to destruction of thyroid follicle via an autoimmune mechanism and release of thyroide harmone in blood circulation. Painless thyroiditis gain by childbirth or use of medication like lithium, interleukin-2, interferon alfa and amiodarone. In first trimester of pregnancy gestational hyperthyroidism devlope due to stimulatory action of placental beta human chorionic gonadotropin that structural features with TSH.

CONCLUSION

The purpose of this review article is to acquire knowledge of disease condition i.e Hyperthyroidism. In this reveiw article we try to discuss sign and symptoms of hyperthyroidism, its cause, diagnosis and treatment. We describe some commone and some typical sign and symptoms. In causes major description of grave disease and other related to high blood level of thyroide harmone. further diagnosis is evaluated with different technique like scintography, blood test, ultrasound thyroide, radio iodine uptake. We focus on treatment gives various option like radio iodine, β-blockers, antithyroide drug, surgery and diet. Etiology and pathology also explained.

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