سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بالرسالة صفحات لم ترد بالأصل

STUDY OF THYROID FUNCTION IN LIVER CIRRHOSIS

Thesis

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By

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INTRODUCTION

Anatomy Of The Thyroid Gland

The thyroid gland is one of the largest endocrine gland in the body. It is about 15-20 grams in normal adult person. It extends from the thyroid cartilage superiorly to the fifth or sixth tracheal ring inferiorly. It is enclosed in a sheath of pretracheal fascia which is attached to the cricoid cartilage and the thyroid cartilage, so the gland is moving with all laryngeal movements. It is also enclosed in a fibrous capsule inside the sheath and between them the vascular bed lies .

The gland is always relatively larger in women and children than in man. [1]

Normal thyroid gland consists of two lobes joined by a thin band of fibrous tissue called the isthmus. Each lobe is conical in shape, and has a convex superficial surface which is covered by the sternothyroid, sternohyoid, and omohyoid muscles, and is overlapped by the anterior border of sternocleidomastiod. Each lobe is about 2 - 2.5 cm in both thickness and about 4 cm in its largest diameter in length. The right lobe is usually larger and more vascular than the left lobe and is one that tends to enlarge more in disorders associated with a diffuse increase in size.

There are two pairs of parathyroid glands lying on the posterior surface of the gland.

The isthmus is the connection between the two lobes of the thyroid gland. It is about 0.5 cm in thickness, 2 cm in width and 2 cm in length, lying on the second, third, fourth tracheal rings.

Occasionally, a pyramidal lobe is seen as a finger like projection upward from the isthmus,just lateral to the midline mainly on the left side.[1-2]

Blood Supply

The thyroid gland is a very vascular organ as the blood flow ranges from 4-6 ml/min./gm thyroid tissue.

The superior thyroid arteries arise from the external carotids to the upper poles and the inferior thyroid arteries from the subclavians to the lower poles, and occasionally thyroid ima artery ascends to the isthmus.

The thyroid gland is drained by 3 pairs of veins, the superior thyroid vein that joins the internal jugular vein, or facial vein. The middle thyroid vein which is very short and ends in internal juglar vein. The inferior thyroid vein which ends in the brachiocephalic vein. All these veins drain the venous network on the superficial surface of the gland but the main tributaries emerge from its substance through its deep surface.

The thyroid nerve supply is derived from the sympathetic ganglion as well as parasympathetic (vagal) nerves.

Lymph vessels accompany blood vessels to the gland and they drain in the deep cervical lymph nodes, pretracheal, paratracheal and mediastinal lymph nodes. [1-2]

Development Of The Thyroid Gland

The thyroid gland is developed from the median bud from floor of the pharynx[3] and the ultimobranchial body[4] of the embryological structures.[5]

Early thyroid gland is composed of solid masses of cells, later the masses become broken into plates and cords of cells which are arranged in clusters due to invasion by the surrounding vascular mesenchyme, by the third month colloid starts to accumulate in the center of each cluster of cells. The capsule and stroma develop from the surrounding mesenchyme.[6]

Physiology Of The Thyroid Gland

The thyroid gland has two main functions :-

1-Secretion of the thyroid hormones, thyroxine (T4) and triiodo thyronine (T3) by the follicular cells.

2-Secretion of calcitonin by the C cells.[7]

Both thyroxine and triiodothyronine are iodine containing amino acids.[8] About 90 % of the hormone is secreted as thyroxine and only 10 % is secreted as triiodothyronine. However, a considerable portion of thyroxine is converted to triiodothyronine in the peripheral tissues, the function of these hormones are the same but they differ in rapidity and intensity of action, as triiodothyronine is about 4 times stronger than thyroxine but it persists for shorter time than does thyroxine.[9]

Iodine Metabolism

The thyroid gland stores iodide as it can concentrate it about 25 times of that of the plasma, the mechanism of concentration of iodide is not known, but it is an active process.[10]

The daily requirements of iodine is (75-150) μg /day,[11] which enters the body mainly with food and water ingestion,[12] then it is converted into iodide which is absorbed and circulates in the blood and extracellular fluid, then it is taken up by the thyroid gland which concentrates it or by the kidney which excretes it.[13]

Some thyroid hormone derivatives are excreted in the bile and some of the iodine is then reabsorbed again (enterohepatic circulation). [13]

Thyroglobulin

It is an iodized glycoprotein with a molecular weight of about 600,000, it is the storge form of thyroxine. [14]

Thyroglobulin consists of 2 polypeptide dimers. Each containing 10% carbohydrate, each molecule contains 115 tyrosines, which are particularly available for iodination, the polypeptide chains are synthesized by the endoplasmic reticulum where some of the proximal carbohydrate are added, as with that secretory proteins, thyroglobulin is packed in vesicles and carbohydrate is added at the Golgi complex. the process is enhanced by the thyroid stimulating hormone of the pituitary gland.[15]

Biosynthesis Of The Thyroid Hormones: Fig (1)

One needs approximately 1 gm of ingested iodine per week to form the normal quantities of the thyroid hormones.[16] The essential ingradients for formation of thyroid hormone are iodine and the tyrosine. The end products of iodine metabolism in the thyroid follicles are thyroxine and triiodothyronine.[17]

Steps Of Biosynthesis Of The Thyroid Hormones :

1- Iodide Trapping

The thyroid takes up iodide from the extracellular fluid and concentrates it to many times, up to 25 times of the iodine concentration in the serum; this process is called iodide trapping which is a highly efficient process. It is an active transport system which requires energy that is supplied from oxidative metabolism and can be blocked by cyanide, and dinitrophenol. Also, perchlorate, and pertechnetate can inhibite iodide trapping by competing for binding sites on the carrier.[18] Thiocynate, perchlorate, and pertechnetate compete with iodine for uptake mechanism and cause rapid discharge of the exchangable iodide from the thyroid gland.[15]

2- Iodide Oxidation

The process of oxidation of iodide to iodine occures within follicular cells in the presence of thyroperoxidase enzyme which needs the hydrogen peroxide for its reaction.[15]