Surgical Aspects of Lymphoedema

Essay

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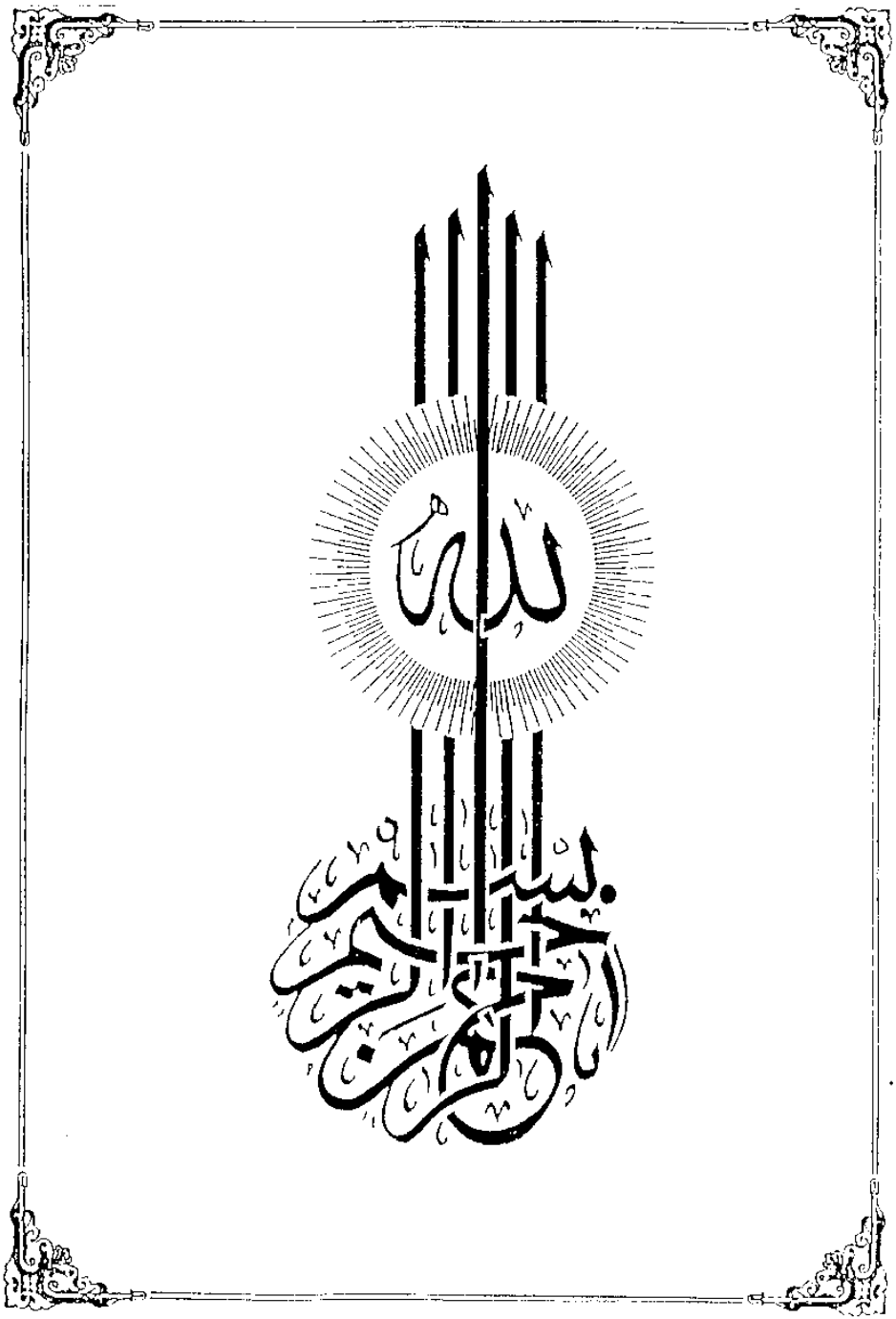
بسم الله الرحمن الرحيم

(وفي أنفسكم أفلا تبصرون)

صدق الله العظيم



To the Memory of my Father

To my Mother

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INTRODUCTION

Lymphoedema is the accumulation of lymph in the interstitial tissue caused by an imbalance in the lymph formation and transport.

This functional overload of the lymphatics may result from the maldevelopment or dysfunction of the lymphatic vessels, lymph nodes obstruction or venous stasis ***(Lewis & Wald 1984)***

So, lymphoedema is a general term given to the oedematous states of the different parts of the human system due to local or systemic disorder.

The aetiology of chronic local oedema is varied and the exact aetiology and pathology of every type is not yet well understood. The different states of lymphoedema are classified into primary and secondary lymphoedema.

(Aitken et al., 1988).

Regarding the clinical features, lymphoedema usually affects the lower limbs and scrotum and rarely the upper limbs, breast or vulva. The part becomes swollen, tense and heavy but no pitting can be elicited by pressuse ***(Riffat, 1989)***

The introduction of lymphangiography provided more accurate data regarding the lymphatic defects in these conditions and allowed surgical treatment to be planned on a more rational basis ***(Taylor, 1982)***

Recently, a new method of investigating the role of lymphatics in chronic limb oedema by using isotope lymphography *(Radio-nucleide imaging)* which is an accurate method for diagnosing lymphoedema and for differentiating venous and lymphatic oedema ***(Stewart et al., 1985)***

Management of lymphoedema comprises medical non-operative techniques (mechanic and pharmacologic) which satisfy the great majority of patients with lymphoedema, and surgical techniques and whatever surgical treatment is chosen, it should only be decided after aggressive trials of medical treatments such as strict elevation of extremity, pressure and massage technique; hygiene of skin to

avoid infection, weight control, the use of antibiotics, diuretics and miscellaneous anticoagulants (Heparin and Sodium warfarin "coumadin").

The surgical management of lymphoedema can be divided into two categories: physiologic and excisional.

A) The Physiologic Type: includes::

1- Lymphangioplasty.
2- More recently, the use of multifilament teflon.
3- Omental flaps.
4- Pedicle flaps which are of many types including a hinged chest flaps, a bi-hinged chest arm flaps, abdominal rotation flaps, cross leg flaps and arm to leg flaps.
5- Axial pattern and myo-cutaneous flaps which gained a recent popularity.
6- Intestinal flaps. (Enteromesenteric bridge).
7- Lymphatic anastomosis techniques "micro-surgical procedure" including lymph node to venous anastomosis. Lymph vessels to vein anastomosis and lymphatico-lymphatic anastomosis.

B) The Excisional Techniques: include:

1- Charles' procedure which is a radical excision for filariasis.
2- Staged excision of subcutaneous tissues and skin or both.

(Savage, 1985).

3- Thompson's shaved dermal flap.
4- Servelle's operation (modification of charles.)

The treatment of lymphoedema remains a problem for the patient and physician. However, most patients with both primary and secondary lymphoedema can be managed satisfactorily by conservative means.

Although no present surgical techniques after cure, significant improvement is possible by a variety of methods. The staged excision of skin and subcutaneous

tissues, the charles procedure, and the dermal flap by Thompson are still the most popular techniques in the united states, ***(Savage, 1985).***

It is not possible to make any generalization about the outcome of lymphoedema.Although the results in the majority of cases are very gratifying, but there are a few patients who continue to have troubles subsequently

(Kakkar, V.V. 1988).

Aim of the Work:

This work is aimed at:

1) Introducing an up-to-date discussion for the subject of lymphoedema.
2) Review the embryology and anatomy of the lymphatic system.
3) Studying the aetiologic and pathophysiologic factors involved in lymphoedema.
4) Stressing on recent investigations and the different advanced methods of surgical treatment.

Embryology of Lymphatic System

EMBRYOLOGY OF THE LYMPHATIC SYSTEM

The lymphatic system develops early in the third week of intra-uterine life in mesenchyme. Two different views are still current as the initial stage of the development of the lymphatic system.

1- Lymphatic spaces appear as clefts in the mesenchyme and their lining cells, take the characters of endothelium. These spaces form capillary plexuses from which certain lymph sacs are derived. The connections between veins and lymphatics are entirely secondary. This is a view put foreward by *Huntington and McClare.*

2- The earliest lymph vessels arise as capillary off-shoots from endothelium of veins which form capillary plexuses. These lose their connections with venous system and become confluent to form lymph sacs. This is a view put foreward by Sabin. The balance of the evidence suggests that the lymphatic system originates independently of the venous system and only acquires connection with it at a later stage ***(Williams et al., 1989).***

In the human embryo, the lymph sacs from which the lymph vessels are derived are six in number:

* Two paired (the jugular and the posterior lymph sacs).
* Two unpaired (the retro-peritoneal and the cisterna chyli).
* Additional pair in lower mammals (the subclavian).

But in the human embryo, these are merely extension of jugular sacs.

The position of the sacs is as follows:

a) The jugular, the first to appear, at the junction of the subclavian vien with anterior cardinal.
b) The posterior, at the junction of iliac vein with the posterior cardinal.
c) The retro-peritoneal, in the root of the mesentry near the supra-renal glands.

d) The cisterna chyli, opposite the third and fourth lumbar vertebrae

(Williams et al., 1989).

From lymph sacs, the lymph vessels bud out along fixed lines corresponding more or less closely with the course of embryonic blood vessels, in conjunction with blood vessels from mesenchymal aggragates known as blood islands, and establish connections with the existing vessels.

The lymphatic sacs, except cisterna chyli, are later divided up by a number of slender connective tissue bridges. Later, they are invaded by lymphocytes and transformed into group of lymph nodes ***(Williams et al., 1989).***

Anatomy of Lymphatic System

ANATOMY OF THE LYMPHATIC SYSTEM

The Lymphatic System Comprises:

a) A plexus of minute vessels (Lymph capillaries): that commence blindly in the tissue spaces in most tissues of the body and ultimately empty their contents (Lymph) into certain veins.

b) The Lymph nodes: consisting of small solid masses of lymphoid tissue, into which the lymph vessels at some part of their course pour their lymph, so that generally the lymph from any tissue or organ traverses one or more lymph nodes before it eventually reaches the venous blood stream.

c) Collections of lymphoid tissue: situated in the walls of alimentary canal (epithelio-lymphoid tissue) and in the spleen and thymus.

Lymph capillaries are present in most tissues of the body, but are absent from avascular structures (epidermis, hair, nails, cornea, articular and some other cartilages, the brain and spinal cord, the splenic pulp and bone marrow)

The larger lymph vessels are supplied with their own vasa vasorum and are accompanied by a plexus of fine blood vessels. If the wall of the lymph vessels become inflammed (lymphangitis), this plexus becomes congested and the paths of superficial lymph vessels are often marked by painful red lines visible through skin. Nerve networks are described both within and around the walls of the larger lymph vessels ***(Williams et al., 1989).***

The Structure of the Lymph Vessels:

The wall of a lymph capillary consists of a single layer of endothelial cells. It resembles that of a blood capillary but the basement membrane is often lacking and specialised attachment between adjacent endothelial cells have not been described. Occasional discontinuities between these cells may occur. As the capillaries unite to form larger vessels, a thin connective tissue is added outside