VARICOSE VEINS OF THE LOWER LIMB

THESIS

Submitted in partial fulfilment

of the Master Degree

in

General Surgery

By

SHAKER MINA WISA

M. B., B.Ch.

Supervised by

Prof. Dr. KHALID H. ABD EL GHAFFAR

Chairman of Department of General Surgery

Faculty of Medicine

Ain Shams University

Asst. Prof. Dr. MAGED ZAYED

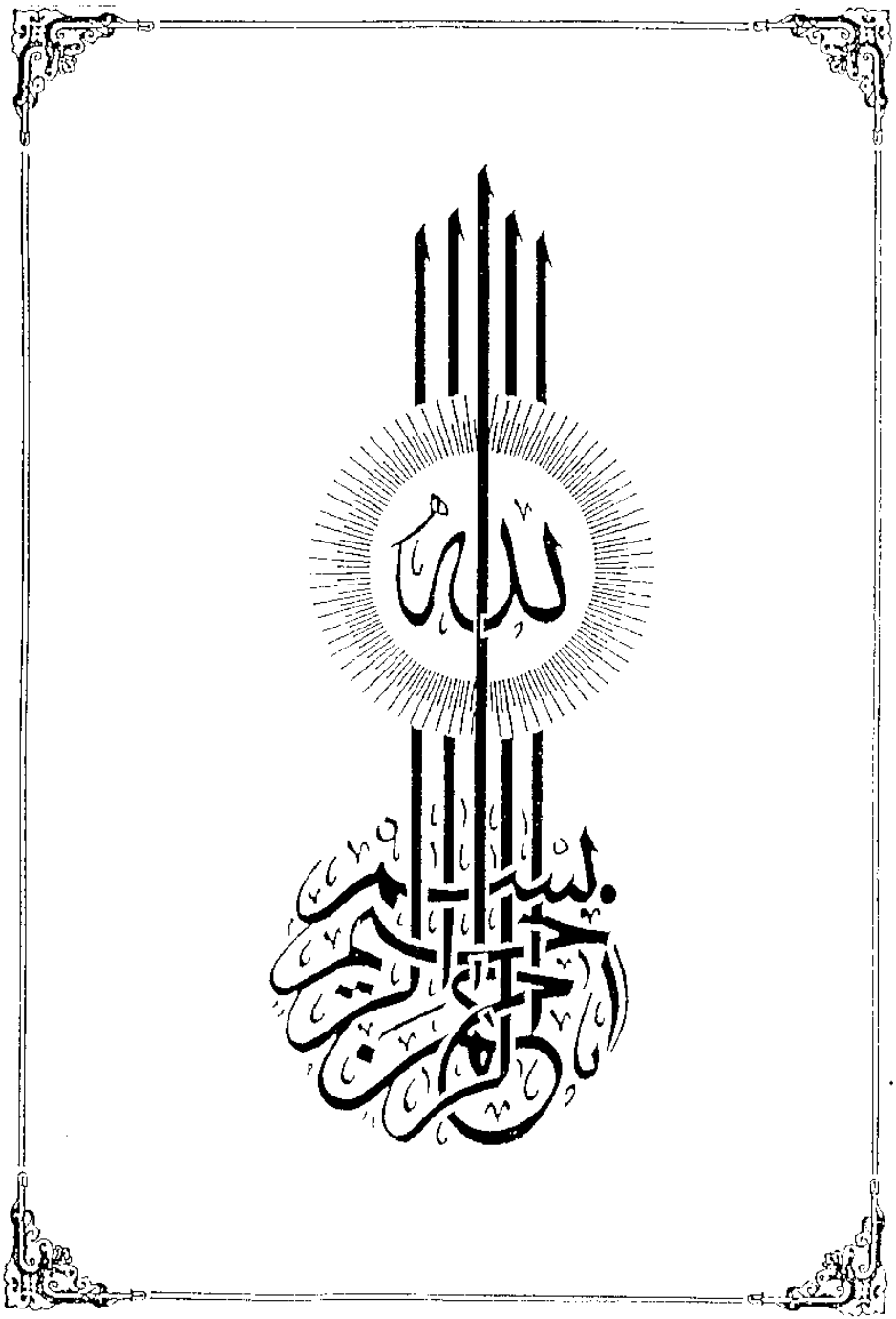
Asst. Professor of Surgery

Faculty of Medicine

Ain Shams University

1986

TO MY PARENTS



ACKNOWLEDGEMENT

I would like to express my deepest gratitude and cardial thanks to prof. Dr. **KHALID H. ABD EL GHAFFAR,** chairman of department of general surgery, Faculty of Medicine, Ain Shams University, who has been generous with his knowledge, experience, advice and continuous supervision throughout the whole work.

Also , I wish to express my sincere appreciation and gratitude to Asst. Prof. Dr. **MAGED ZAYED,** Asst. Prof. of general surgery, Faculty of Medicine, Ain Shams University for his generous helping, supervision and kind guidance given throughout the course of this work.

CONTENTS

INTRODUCTION

INTRODUCTION

A varicose vein is one which has permanently lost its valvular efficiency. Venous distension and dilatation especially in the erect position exaggerates this valvular incompetence. Even when some patients are horizontal their varicose veins do not shrink as healthy ones. As a result of continuous dilatation under pressure in the course of time a varicose vein becomes elongated , tortuous, pouched , thickened, inelastic and friable .

The term varicosity is applied generally to those superficial vessels so affected in the lower limb , .

Varicosities in the lower limb and its disorders will be described here. The actual definite cause of varicose veins is still unknown , but the more exact knowledge of the anatomy of the venous system of the leg and the physiological mechanism where-by venous blood returns to heart again by gravity has provided clearer understanding of the pathology and of the disorders that medical men are called upon to treat. The most important studies has been on the behaviour of the venous pressure of the superficial and deep veins of the lower

limbs in the erect position during rest and exercise and on the function of the muscular venous pump. They have brought forth a clear and simple concept of the basic physiological mechanism at fault in varicose veins. The fundamental fact to grasp is that the venous drainage of the superficial tissues in the erect exercising leg is inward to the deep veins via the various perforating or communicating veins. While exercising, the pressure in the main deep venous trunk is high but the pressure in normal superficial veins gradually falls to nearly zero. In other words the blood in the superficial veins is sucked inwards to the deep veins of the limb during muscular ;movement and from these it is squeezed up toward the heart. What prevents this high pressure in the deep veins from being transmitted to the superficial veins during exercise?

The answer is that at every point where a superficial vein joins a deep vein (great saphenous, small saphenous or perforating vein) there is a valve which prevents the reflux of blood from the deep to the superficial system. These valves prevent the hypertension in the deep veins from being transmitted to the superficial veins.

The primary cause of the development of varicosities in superficial veins lies in the destruction of the strategic valves in the perforating veins. This allows the normal high venous pressure developing within the musculofascial sheath during muscular activity to pass out and be exerted on the poorly supported superficial vein resulting in an ambulatory venous hypertension in the affected group of superficial veins. This sustained venous hypertension in the superficial veins during movement and standing results in their gradual enlargement and tortuosity; a process which goes steadily over the years until the original valvular leak is found and stopped by surgery. In fact the surgical aim in venous defects and their complications is to diagnose the site of the high pressure leak from the deep veins into the superficial veins and to close it by ligation at its source.

Heredity undoubtedly plays a great part in the genesis of varicose veins whether a particular anatomical arrangement of the valves or whether it is an actual weakness of the vein wall.

SURGICAL ANATOMY

The surgical anatomy of the veins of the lower limb

The anatomy of the arterial system is relatively constant: that of the venous system is subject to individual variation (Dodd and Cockett , 1976). The veins of the lower limb consists of three groups:

1. The superficial veins
2. The deep veins .
3. The perforating veins (Du plessis, 1975) .

1. The Superficial Veins

The superficial veins lie in the subcutaneous fat where they are observable in three strata.

First , The thin walled subcuticular vessels or venules which form a considerable plexus under the skin.

Second , in varicosis venules join to make a network of larger subcutaneous veins of moderate size , and are the veins which form most of the prominent superficial varices following incompetence of the main trunks.

The third layer consists of the main trunks of the long and short saphenous veins which lie on the deep fascia (Dodd and Cockett, 1976) .

Drainage from the toes and foot :

Each toe has four digital veins , two dorsal and two planter. The dorsal digital veins join in the toe clefts to form the dorsal metatarsal veins which unite to form a dorsal venous arch. The dorsal arch is linked with medial and lateral marginal veins which run along the inner and outer borders of the foot.

Ultimately the medial part of the dorsal venous arch is continued upwards as the long saphenous vein. The lateral marginal vein , which is less well defined and smaller than its medial counter part , communicates with the short saphenous vein by way of the venous plexus, behind and below the external malleolus.

The planter digital veins form the four deep metatarsal veins which run between the metatarsal bones and unite to form the deep planter venous arch , which lies in association with the deep planter arterial arch .

The dorsal and planter digital and metatarsal veins communicate each other freely at the roots of the toes between the metatarsal bones. The planter digital veins also communicate with the adjacent superficial vessels in the sole of the foot to form a planter subcutaneous

venous arch which has numerous connections extending backwards to the veins of the heel, and by twigs to the lateral and medial marginal veins.

The numerous perforating veins of the foot are valved in such a way that most venous drainage from the dorsum passes to the long and short sapherous veins at the ankle and from the planter surface to the posterior tibial veins. (Fegan and pegum , 1968) .

The long saphenous vein (Great-Internal - large) :

The long saphenous vein is the longest in the body , begins in the medial marginal vein of the foot , and ends in the femoral vein about 3cm below the inguinal ligament. It ascends about 2.5 to 3 cm. in front of the tibial malleolus, crosses the lower part of the medial surface of the tibia obliquely to its medial border , about a finger's breadth behind which it ascends to the knee . It runs upwards postero-medial to the medial condyles of the tibia and femur and along the medial side of the thigh and passes through the saphenous opening into the femoral vein .

The saphenous opening is about 2.5 to 3.25 cm. below and lateral to the pubic tubercle , and the vein may be represented by a line from here to the adductor

tubercle of the femur . (Gray's , 1975) .
It is occasionally duplicated from the knee to the groin and this can render it useless as an arterial substitute in operating to relieve femoral artery occlusion.

Duplication may also result in adequate removal of incompetent main channels in the surgery of varicose veins. (Dodd and Cockett, 1976) .

The structures accompanying the long saphenous vein:

1. In The foot and Leg :

The saphenous nerve lies close beside the long saphenous vein. The nerve approaches the vein below the knee after piercing the fibromuscular root of the adductor canal and going between the sartorius and gracilis muscles.

The nerve is most closely applied to the vein in the lower two thirds of the leg and here it is often injured in exploring or stripping the saphenous vein.

2. At the Knee :

The saphenous branch of the descending genicular artery accompanies the long saphenous vein . This artery

becomes an important collateral vessel following thrombotic obstruction of the femoral artery in the adductor canal.

In the Thigh:

Twigs of the medial femoral cutaneous nerve run in the vicinity of the vein, although they are not closely applied to it . Throughout its length the long saphenous vein is accompanied by lymphatic trunks draining the dorsum of the foot and the anterior and medial aspects of the leg and thigh. These end in the superficial group of inguinal lymph nodes (Hollinshead, 1974) .

Tributaries and communications of the long saphenous vein:

1. Below the ankle : This vein is fed by the medial marginal vein whose tributaries have already been described.

2. In the leg: The long saphenous vein has few tributaries .

There is a constant small connection between it and the upper of the three internal ankle perforating veins, and there may be one or two small tributaries from the anterior aspect of the leg joining it in its lower third.