MANAGEMENT OF THE DIABETIC FOOT

Essay

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Master Degree In (General Surgery)

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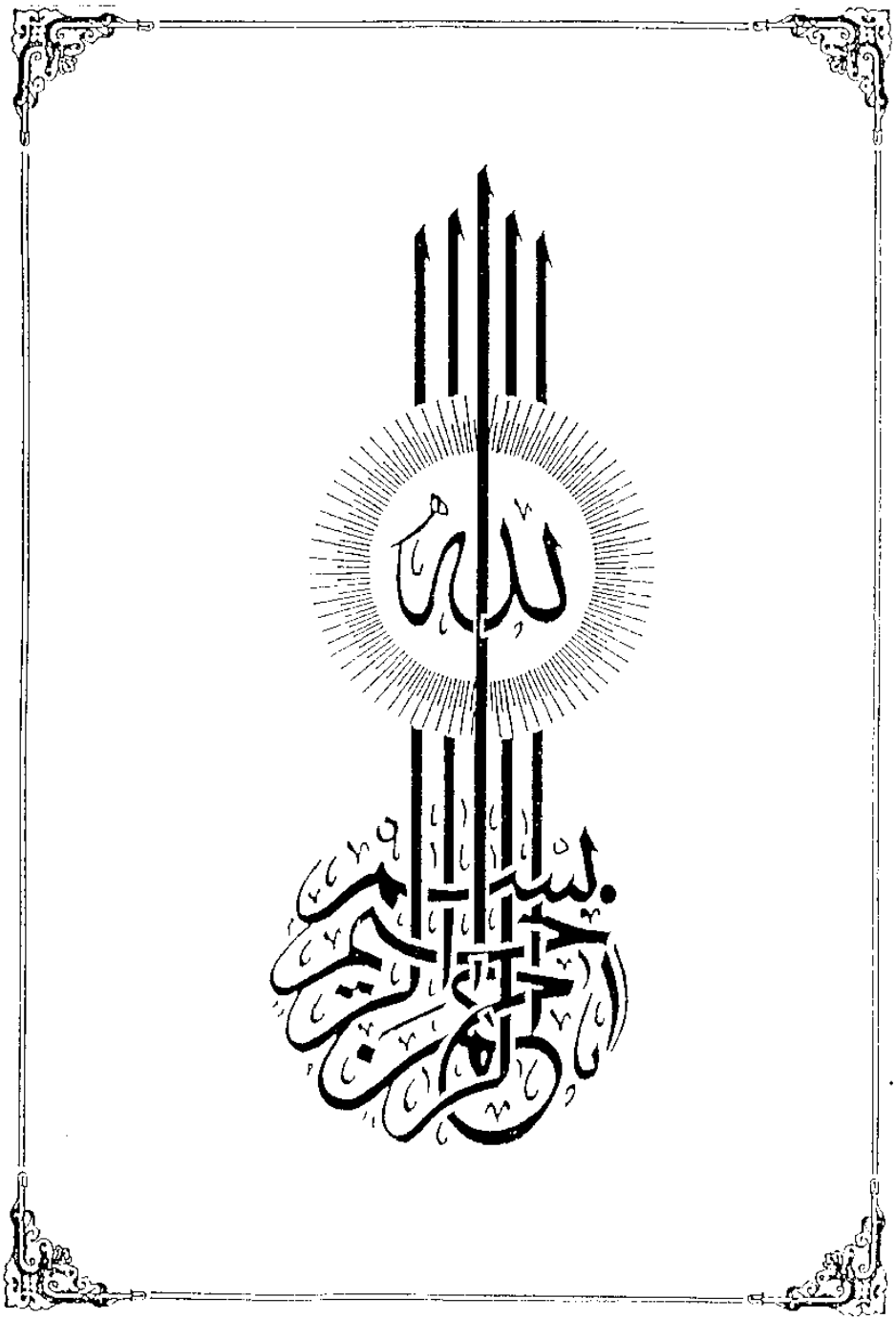

I N D E X

INTRODUCTION

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Diabetic foot is a prevalent and sometimes complicated problem, which if not manged properly it may indanger the life of the patient or his limb.

The major factors responsible for the development of foot lesions in the diabetic include peripheral neuroapthy, vascular impairment as a result of microangiopathy in the small vessels and infection or combination of the three.

In the management of the diabetic foot good result can only be obtained by close collaboration between surgeons, physicians, nursing staff and the patient.

The surgical techniques are used to preserve as much of the foot as possible to keep the patient ambulatory.

Prophylactic surgery is important line of treatment in a diabetic foot to avoid problems need a long time and high cost to patient and community.

This work had been done to review the ateopathology and main important points in the management of this common and potentially serious problem.

ANATOMY AND BLOOD SUPPLY OF THE FOOT

ANATOMY OF THE FOOT

Aknowledge of the anatomy of the foot is essential so that progression of disease in diabetic foot can be understood and proper surgical treatment applied.Effective clinical evaluation and effective surgery are based on understanding of gross anatomy and of alterations produced by disease.

ANATOMY :-

(1) Skin:-

The skin of the dorsum of the foot is flexible and contains hair follicles, sweat glands and scantly sebaceous glands. Its thickness is about 2 mm. Few fibrous septa penetrate to deeper fascial structures. In the areas of wrinkles overlying the metatarsophalangeal and interphalangeal joints, there is fibrous septa which attach the dermis to the deep fascia The skin in these sites is relatively more fixed than at other dorsal sites.

The planter skin is richly innervated and has no hair follicles or sebaceous glands, but numerous sweat glands. It's thickness is about 4-5 mm with the thickest

areas covering heel and distal metatarsals. The dermis is connected to the deep fascia by heavy firbous septa which seperate the subcutaneous fat into firm partly discontinuous lobules.

These septa are haevier at the creases because of dermal fixation to deep fascia. So planter skin is fixed to deeper structures more than dorsal skin.

(2) Nails:-

They are specialized skin appendages. It is composed of keratinous flattened epithelial cells derived from generative areas of the nail fold and nail bed. The adult nail is composed of three illdefined layers: the dorsal nail, the intermediate one, and the ventral nail. The dorsal nail arises from the most proximal half of the nail fold and from the most proximal part of the floor of the nail fold.

The intermediate nail arises from the distal part of the nail fold and the proximal nail bed up to the distal margin of the Lunula. The ventral nail arises from the distal one half to two thirds of the nail and up to the hyponychim.

The nail is bedded firmly on the epithelium of the nail bed, which apparently advances with nail growth. The margins of the nail are overhung with skin folds called nail wall.

(3) Nerves:-

Elements of sciatic nerve furnish the motor and sensory innervation of the foot. The fourth and fifth lumbar segments and the first and second sacral segments contribute.

Cutaneous nerves supply of the dorsum of the foot:-

The saphenous nerve reaches the skin over the anteromedial side of lower tibia and as far distally as the medial side of the first metatarsophlangeal joint.

The intermediate part by the musculocutaneous nerve (superficial penoneal nerve).

The lateral part by the sural nerve.

Cutaneous nerve supply of the dorsum of digites :-

The medial branch of superficial peroneal nerve to the medial side of the big toe and the adjoining sides of 2nd and 3rd toes.

The lateral branch of superficial peroneal nerve to the adjoining sides of 3rd and 4th toes and those of 4th and 5th toes.

The meidal branch of anterior tibial nerve (deep peroneal n.) to the adjoining sides of big toe and 2nd toe.

The sural nerve to the lateral side of the little toe.

Cutaneous nerve supply to the sole :-

The medial calcanean branch of posterior tibial nerve to the heel.

The cutaneous branch of lateral plantar nerve to the lateral third of the sole and lateral one and half toes.

The cutaneous branch of medial plantar nerve to the medial two-thirds of the sole and medial three and half toes.

(4) Vessels:-

The arterial supply of the foot is all derived from the popliteal artery which lies on the knee joint and popliteus muscle.

At the lower border of popliteus muscle., the popliteal artery divides into anterior and posterior tibial arteries. The anterior tibial artery penetrates the upper part of the interosseus membrane to reach the extensor compartment of the leg. Lower down, it crosses the ankle joint anteriorly and becoming in the foot the dorsalis pedis a. The dorsalis pedis artery lies laterally to the extensor hallucis longus tendon and ends in the space between the first and second metatarsales.

It gives lateral and medial tarsal arteries , arcute artery which gives three dorsal metatarsal arteries for the lateral three and half toes, the first dorsal metatarsal artery to the dorsum of the medial one and half toes, and the first plantar metatarsal

artery which sharing in the sole in the formation of plantar arch and supplying the plantar aspect of the medial one and half toes.

The posterior tibial artery descends in the posterior flexor compartment. At the ankle it passes behind medial malleolus through the flexor retinaculum where it divides into medial and lateral plantar arteries. Near the medial malleouls it sends a branch to the heel with the medial calcanean nerve. The medial and lateral plantar arteries course with the corresponding nerves and anastomose with each other to form the plantar arch which recieves a contribution from dorsalis pedis artery.

The Plantar Arch :-

It is deeply situated and extends from the base of fifth metatarsal bone to the proximal part of first interosseous space. It lies plantar to the bases of second, third, and fourth metatarsal bones and the corresponding interossei. The plantar arch gives three perforators and four plantar metatarsal branches.

The perforators ascend through the proximal parts of the second, third and fourth interosseous spaces

between the heads of the dorsal interossei muscles, and anastomose with the dorsal metatarsal arteries.The four plantar metatarsal arteries run distally between the metatarsal bones in contact with the interossei, each divides into a pair of plantar digital arteries which supply the adjacent sides of the toes near their point of division. Each plantar metatarsal artery sends dorsally a distal perforating branch to join the corresponding dorsal metatarsal artery. The first plantar metatrasal artery springs from the junction between the lateral plantar and the dorsalis pedis arteries and sends a digital branch to the medial side of the first toe.The digital branch for the lateral side of fifth toe arises from the lateral plantar artery near the base of the fifth meatarsal bone.

Surface anatomy of dorsalis pedis artery :-

The vessel can be felt pulsating along a line from a mid point between the two malleoli to the proximal end of the first intermetatarsal space.

Muscles, Tendons and Fascia :-

The muscles in the extensor group are located anteriorly in the leg. They include the tibialis anterior,

the extensor hallucis longus and the extensor digitorum longus. Laterally, there are the peroneal muscles. Both the anterior and lateral muscle groups are innervated by the common peroneal nerve.

The flexors of the foot and toes are innervated by the tibial nerve. These flexor groups are in the posterior compartment of the leg behind the interosseous membrane which include tibilais posterior, flexor digitorum longus and flexor hallucis longus.

The deep muscular fascia encloses the muscles in the leg is adherent to the periosteum of superficial portion of the tibia and of the lateral malleolus. At the anterior surface of ankle, thickened areas of this fascia form the extensor retinacula under which the extensor tendons course. The fascia then continued with the thinner fascia of the dorsum of the foot and toes.

The plantar aponeurosis is the most superficial fascia , it is central portion is the thickest and attached to the medial tubercle of the calcaneus . The plantar fascia spreads fan like distally. Near the metatarsal heads the fascia fibres divide into fine processes , which form bundles surrounding the metatarsal heads.,