# MANAGEMENT OF LATE EMBOLIC ISCHEMIA IN THE EXTREMITIES

## THESIS

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BY
Ahmed Abdel Sattar Morsi
M.B., B. Ch., M. S.

Supervisors
Prof. Dr. Nabil Amin El-Mehairy
Prof.of General Surgery

Prof. Dr. Abu Bakr El-Seddik
Prof. of General Surgery

Prof. Dr. Mohamed Maged El-Deeb
Assist. Prof. of General Surgery

Dr. Ahmed Mahmoud Saad El-Din
Lecturer of General Surgery

Faculty of Medicine
Ain Shams University
1991

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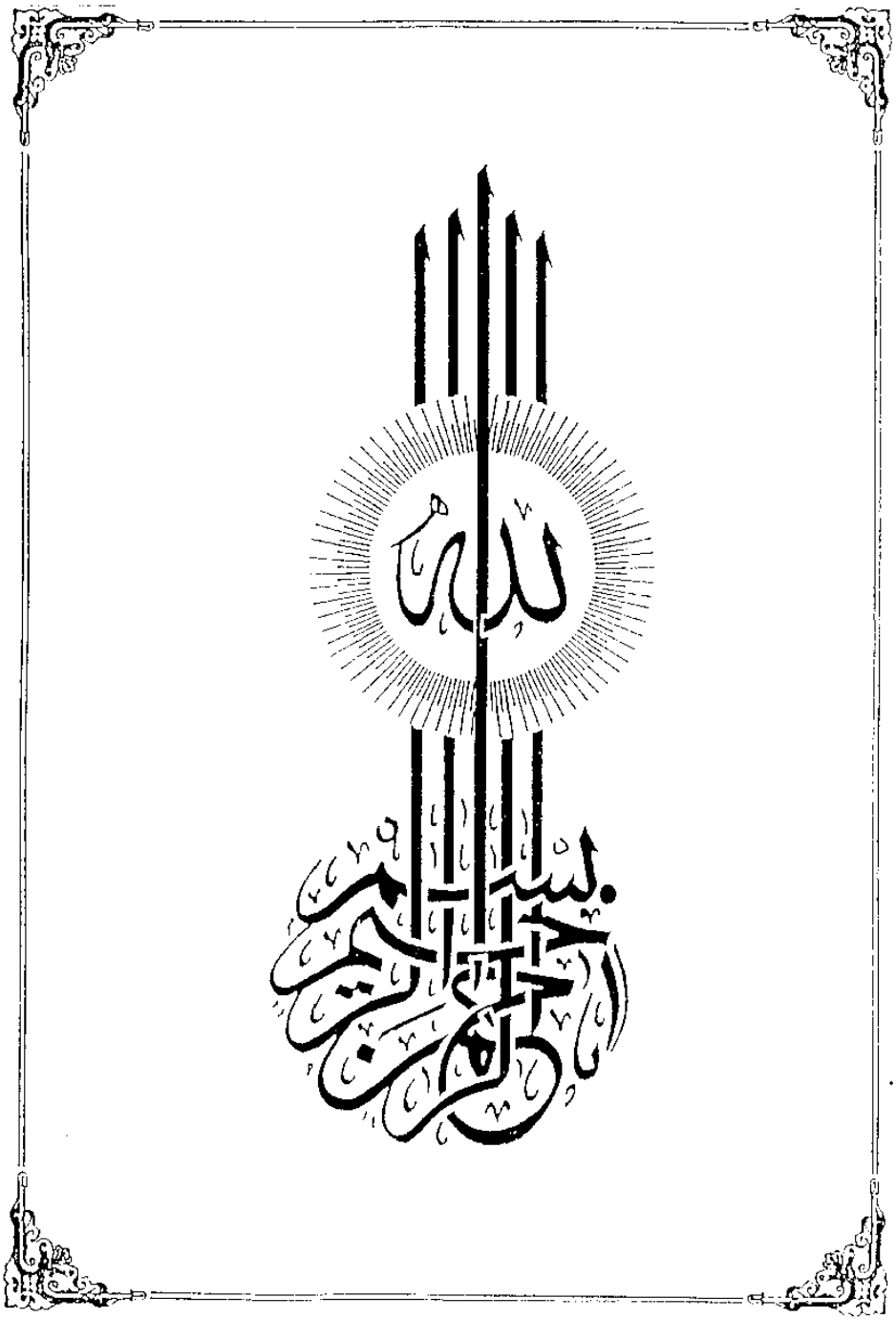

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## CONTENTS

# INTRODUCTION & AIM OF THE WORK

Arterial embolic ischemia occurs acutely and needs urgent embolectomy before local and systemic complications appear. However, acute ischemia may passed untreated which may be due to misdiagnosis or uncertainty over the severity of the symptoms. The patient either develops severe limb ischemia with massive gangrene or develops chronic ischemia in a viable limb having an arterial embolic obstruction. These are the late manifestations of acute embolic ischemia. The management in such a case depends upon the condition of the limb, the general condition of the patient and the condition of the arterial tree beyond the obstructing embolus. So management of late embolic ischemia is late embolectomy or arterial reconstruction in some patients.

The aim of the work is to diagnose and treate cases of late embolic ischemica and to differentiate them from cases of chronic ischemia due to chronic occlusive diseases. The management differes between both cases. Also it aims to obviate the criteria of acute and late embolic ischemia so that

misdiagnosis of these case becomes less and the referal to the vascular surgery units must be as early as possible.

# VASCULAR ANATOMY
# OF THE LOWER LIMB

## FEMORAL ARTERY

The femoral artery is a direct continuation of the external iliac artery.

The artery lies on the floor of the femoral triangle between the psoas and the pectineus muscles, and extends downward to disappear under the sartorius muscle where it enters the subartorial canal.

The proximal half of the artery lies immediately behind the deep fascia covering the femoral triangle, at a point 4 cm below the inguinal ligament the artery gives off the large PROFUNDA branch. It is convenient to speak of the short portion of the femoral trunk above this branch as the common femoral artery, the remaining part as the superficial femoral artery. (*McVay, 1984*).

### Branches of the femoral artery:-

*A- Superficial branches*

1- The superficial circumflex iliac artery.

2- The superficial epigastric artery.

3- The superficial external pudendal artery.

4- The deep external pudendal artery

*B- Deep branches:-*

**1- The profunda femoris artery :-**

It soon passes beneath the adductor longus muscle and descends towards the popliteal space. It gives off

three perforating branches and terminates as the fourth perforating artery.

2- **The supereme geniculate** (anastomotica magna) artery: It arises from the superficial femoral artery in the lower part of the adductor canal (of Hunter).

**Surface anatomy of the femoral artery:-**

With the thigh abducted, externally rotated and slightly flexed, the artery corresponds to a line drown from the midinginal point to the adductor tubercle.

**Collateral circulation in femoral artery obstruction :-**

1- The common femoral artery: collateral circulation is established through anastomosis between the superior and inferior gluteal branches from the hypogastric artery and the two circumflex branches and the first perforating branch of the profounda femoris artery.

2- Femoral artery at the apex of the femoral triangle and in the adductor canal (of Hunter), collateral circulation is established by anastmoses around knee joint.

**Vascular approach of femoral vessels:-**

The femoral vessels are best exposed by a vertical incision 15 cm long. This vertical incision is centered

over the palpable pulse provides the best exposure of the common femoral artery. In the absence of a pluse, the diseased artery can frequently be rolled beneath the index figer. Lacking either of these aids, the femoral artery is located one third of the distance from the pubic tubercle to the anterior superior iliac spine.

The lateral femoral circumflex artery arises from the lateral side of the profunda artery. It is well to isolate this vessel for subsequent control should this be necessary.

**Exposure of the profunda femoris artery:-**

Occasically the deep femoral artery must be located in a patient with a badly scarred groin following repeated operations. *Naraynsingh, 1984* , has described an approach lateral to the sartorius muscle. The incision lies over the branches of the lateral femoral circumflex artery. These branches are followed medially to the profunda femoral artery.

## POPLITEAL ARTERY

The popliteal artery enters the popliteal space through the tendinous arch in the adductor magnus muscle. It descends to the distal border of the popliteus muscle and terminates by dividing into the

anterior and the posterior tibial arteries. The popliteal artery throughout its course is placed deeply and lies in direct contact with the posterior ligament of the knee joint. (*McVay, 1984*).

Many types of anomalies may be present in the course of popliteal artery which may produce the popliteal artery entrapment syndrome:

Type I anatomy: the most anatomic arrangement of the anomaly is compression of a medially displaced popliteal artery by the medial head of gastrocnemius that is normally inserted into the medial condyle of the femur

Type II anatomy: this anomaly consists of popliteal artery compression due to its medial displacement by the medial head of gastrocnemius muscle which is inserted on the medial condyle of the femur more lateral than normal.

Type III anatomy: this anomaly consists of conpression of the popliteal artery in its usual course across the popliteal fossa by an accessory slip of the gastrocnemius muscle (*Lamberth & Doty, 1987*).

Three pairs of branches are given off by the popliteal artery.

*The superior genicular arteries, lateral and medial, originate at the level of the femoral condyles.

*The middle genicular arteries: enter the knee joint through the posterior ligament.

*The inferior genicular arteries, lateral and medial, wind around the front of the knee. No branches are given off in the upper course of the popliteal artery.

**Collateral circulation in popliteal artery obstruction :-**

The collateral circulation around the knee is poor, and occlusion of the popliteal artery is often followed by gangrene. However in occlusoin of the popliteal artery the collateral circulation consists of:-

*** The articular anastomosis:-**

This occurs around the knee.

*** The muscular anastomosis:-**

This takes place between the vessels to the muscles of the thigh (the hamstrings) and the muscles of the calf

**Surface anatomy:-**

The popliteal artery extends to the center of the popliteal fossa from the opening in the adductor magnus in the thigh (*a hand's breadth above the knee*) to its birfurcation at the level of the neck of the fibula (*a hand's breadth below the knee*). It is about 20 cm long.

**Vascular approach:-**

1- **The proximal popliteal artery** is exposed through an incision placed in the grove between the vastus medialis and sartorius muscles.The greater saphenous vein lies just posterior to this incision. The sartorius muscle is retracted posteriorly, and the investing fascia incised longitudinally where the popliteal ertery lies under the adductor mangus tendon. Additional exposure can be obtained distally by dividing the tendon of the medial head of the gastrocnemius muscle.

2- **The terminal popliteal artery** and the tibial peroneal arterial trunk are exposed through an incision placed one cm. posterior to the medial margin of the tibia. The thick muscular fascia overlying the gastrocnemius muscle in incised and the popliteal space entered. The large popliteal vein is usually encountered first. The artery is easily felt by its pulse or, if absent, as a cord structure beneath the vein. The dissection can be carried distally until the anterior tibial artery origin is located arising anteriorly and laterally from the termial popliteal artery. This distal dissection requires the division of the soleus

muscle fibres arising from the medial margin of the tibia (*Smith & Killeen, 1987*).

3- **Posterior approach** for popliteal artery through a posterior popliteal fossa incision is used in

* Popliteal artery entrapment, and
* Large popliteal artery aneurysm.

An "S"- shaped incision is made begining superior and medial to the popliteal fossa, extending the incision transversely across the popliteal fossa, and curving inferior to the lateral aspect of the leg below the fossa.

The deep fassia is incised longitudinally. The popliteal artery, vein, and accompanying tibial nerve are identified at the exit from the adductor canal. The popliteal artery is then followed throughout its course.

## VESSELS OF THE LEG

Cross- sectional anatomy of the leg shows the division of the muscles by fascia and interosseous membrane into four compartments:-

1- The anterior compartment containing the tibialis and extensor digitorum longus.
2- The lateral compartment containing the peroneus longus.