Femoropopliteal Bypass Surgery Versus Transluminal Angioplasty In Treatment Of Femoropopliteal Arterial Occlusive Disease

Thesis

Submitted for partial fulfillment of MD in vascular surgery

By

Mahmoud Farouk Elmeniesy

M.B, B.Ch and Master degree Faculty of Medicine,

Ain shams University

Under supervision of

Prof. Mahmoud Sobhy Khattab

Professor of General and Vascular Surgery Faculty of Medicine, Ain Shams University

Prof. Sherif Mohamed Essam Eldin

Assistant Prof, of General and Vascular Surgery Faculty of Medicine, Ain Shams University

Dr. Atef Abdelhameed Desokey

Lecturer of General and Vascular Surgery Faculty of Medicine, Ain Shams University

Faculty of medicine
Ain Shams University
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Common Abbreviations

ABI	***ankle-brachial index***
AHA	***American Heart Association***
AKA	***above-knee amputation***
aPTT	***activated partial thromboplastin time***
ARF	***acute renal failure***
AVM	***arteriovenous malformation***
BKA	***below-knee amputation***
CABG	***coronary artery bypass grafting***
CAD	***coronary artery disease***
CFA	***common femoral artery***
CFV	***common femoral vein***
CIA	***common iliac artery***
CLI	***critical limb ischemia***
CRP	***C-reactive protein***
CT	***computed tomography***
CTA	***computed tomographic angiography***
CVI	***chronic venous insufficiency***
CVP	***central venous pressure***
3D	***three-dimensional***
DBI	***digital-brachial index***
DES	***drug-eluting stent***
DFU	***diabetic foot ulcer***
DIC	***disseminated intravascular coagulation***
DM	***diabetes mellitus***
DSA	***digital subtraction angiography***
DSE	***dobutamine stress echocardiography***

DUS	***duplex ultrasound***
DVT	***deep venous thrombosis***
ECA	***external carotid artery***
ECG	***electrocardiogram***
EEG	***electroencephalography***
EF	***ejection fraction***
EIA	***external iliac artery***
ePTFE	***expanded polytetrafluoroethylene***
ESR	***erythrocyte sedimentation rate***
ESRD	***end-stage renal disease***
FDA	***Food and Drug Administration***
FFP	***fresh frozen plasma***
FMD	***fibromuscular dysplasia***
GA	***general anesthesia***
GSV	***great saphenous vein***
GW	***guide wire***
HD	***hemodialysis***
HDL	***high-density lipoprotein***
HIT	***heparin-induced thrombocytopenia***
HTN	***Hypertension***
ICU	***intensive care unit***
IDL	***intermediate-density lipoprotein***
IH	***intimal hyperplasia***
IVC	***inferior vena cava***
LDL	***low-density lipoprotein***
LMWH	***low-molecular-weight heparin***
MAP	***mean arterial pressure***

MI	***myocardial infarction***
MRA	***magnetic resonance angiography***
MR	***magnetic resonance***
MRI	***magnetic resonance imaging***
OTW	***over-the-wire***
PA	***pulmonary artery***
PAD	***peripheral arterial disease***
PAOD	***peripheral arterial occlusive disease***
PBRCs	***packed red blood cells***
PCI	***percutaneous coronary intervention***
PE	***pulmonary embolism***
PET	***positron emission tomography***
PFA	***profunda femoris artery***
PSV	***peak systolic velocity***
PT	***prothrombin time***
PTA	***percutaneous transluminal angioplasty***
PTFE	***polytetrafluoroethylene***
PTT	***partial thromboplastin time***
PVI	***peripheral vascular intervention***
RBC	***red blood cell***
RCT	***randomized controlled trial***
SBP	***systolic blood pressure***
SD	***standard deviation***
SFA	***superficial femoral artery***
SFJ	***saphenofemoral junction***
SK	***Streptokinase***
SMC	***smooth muscle cell***

SVC	***superior vena cava***
TAO	***thromboangiitis obliterans***
TASC	***Trans-Atlantic Inter-Society Consensus for the Management of Peripheral Arterial Disease***
TEE	***transesophageal echocardiography***
TF	***tissue factor***
TGF-β	***transforming growth factor-β***
TMA	***transmetatarsal amputation***
TNF-α	***tumor necrosis factor-α***
t-PA	***tissue plasminogen activator***
TTE	***transthoracic echocardiography***
UFH	***unfractionated heparin***
UK	***urokinase***
VCAM-1	***vascular cell adhesion molecule-1***
VEGF	***vascular endothelial growth factor***
VLDL	***very-low-density lipoprotein***
VSMC	***vascular smooth muscle cell***
WBC	***white blood cell***

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AIM OF THE WORK

The aim of this thesis is to compare the results of revascularization in infrainguinal arterial occlusive disease due to isolated superficial femoral artery long or multiple lesions, using either femoropopliteal bypass surgery above the knee with Polytetrafluoroethylene (PTFE) graft or endovascular SFA angioplasty with stenting.

Chapter I
Anatomy of the femoropopliteal arterial segment

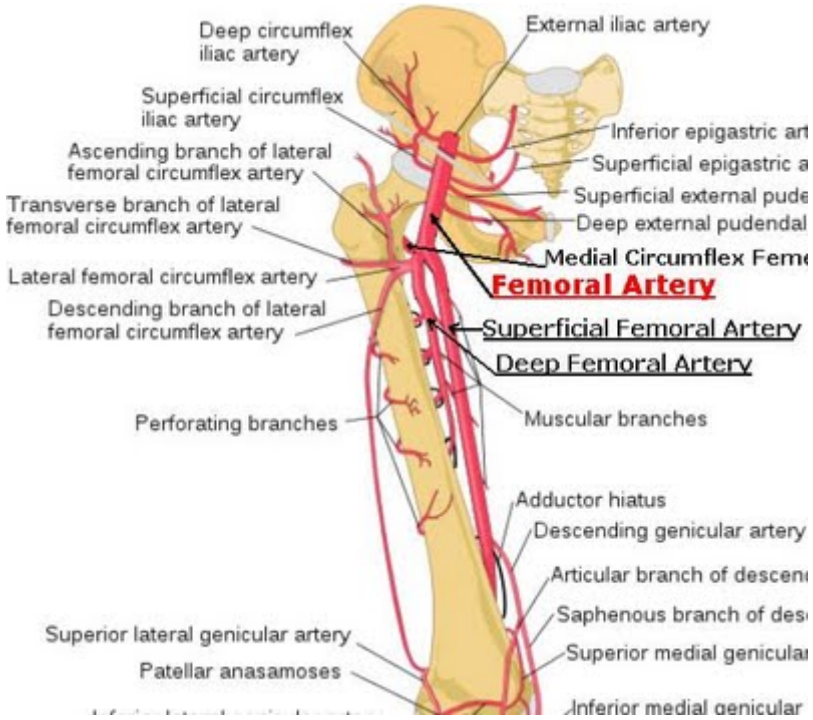
The femoral artery

The femoral artery (fig. 1) begins immediately behind the inguinal ligament, midway between the anterior superior spine of the ilium and the symphysis pubis, and passes down the front and medial side of the thigh. It ends at the junction of the middle with the lower third of the thigh, where it passes through an opening in the Adductor magnus to become the popliteal artery. The vessel, at the upper part of the thigh, lies in front of the hip-joint; in the lower part of its course it lies to the medial side of the body of the femur, and between these two parts, where it crosses the angle between the head and body, the vessel is some distance from the bone. The first 4 cm. of the vessel is enclosed, together with the femoral vein, in a fibrous sheath—the femoral sheath. In the upper third of the thigh the femoral artery is contained in the femoral triangle (Scarpa's triangle), and in the middle third of the thigh, in the adductor canal (Hunter's canal) ***(Gray and Lewis, 2008).***

The femoral sheath (crural sheath)

The femoral sheath (fig. 2) is formed by a downward prolongation, behind the inguinal ligament, of the fasciae which line the abdomen, the transversalis fascia being

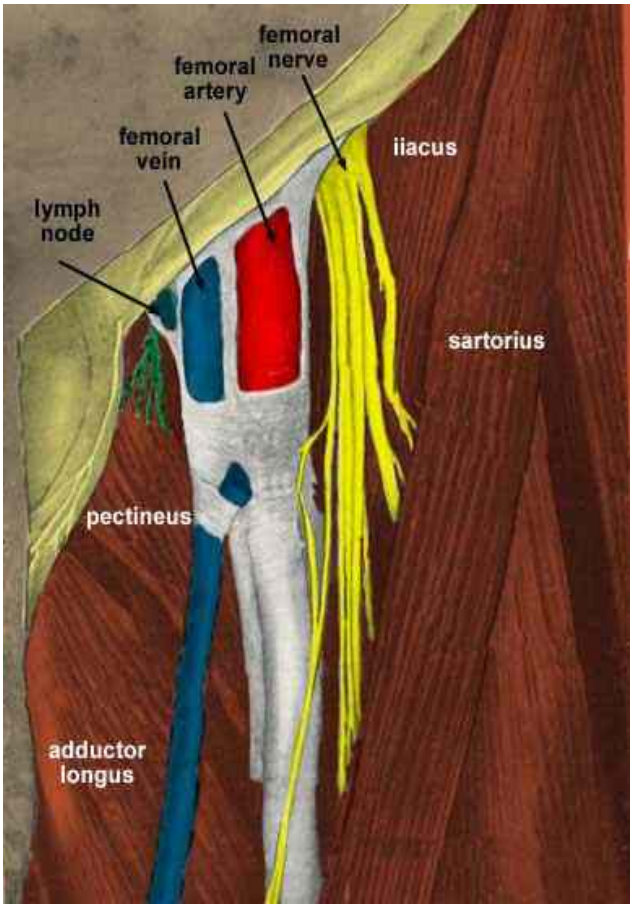
continued down in front of the femoral vessels and the iliac fascia behind them***(Gray and Lewis, 2008).***



The femoral artery (fig. 1)

The sheath assumes the form of a short funnel, the wide end of which is directed upward, while the lower, narrow end fuses with the fascial investment of the vessels, about 4 cm. below the inguinal ligament. It is strengthened in front by a band termed the deep crural arch. The lateral wall of the sheath is vertical and is perforated by the lumboinguinal nerve; the medial wall is directed obliquely downward and lateraly, and is pierced by the great saphenous vein and by some lymphatic vessels. The sheath is divided by two vertical partitions which stretch between its anterior

and posterior walls. The lateral compartment contains the femoral artery, and the intermediate the femoral vein, while the medial and smallest compartment is named the femoral canal, that contains some lymphatic vessels and a lymph gland imbedded in a small amount of areolar tissue ***(Williams et al., 2003).***

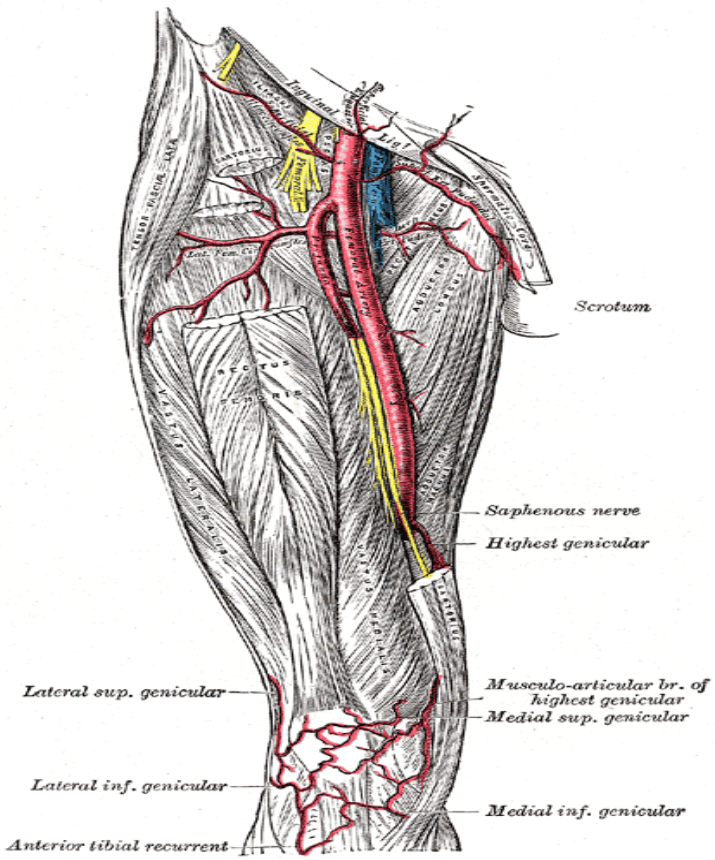


The femoral Sheath (fig. 2)

The femoral triangle (Scarpa's triangle):

The femoral triangle (fig. 3) Corresponds to the depression seen immediately below the fold of the groin. Its apex is directed downward, and the sides are formed laterally by the

medial margin of the Sartorius, medially by the medial margin of the Adductor longus, and above by the inguinal ligament. The floor of the space is formed from its lateral to its medial side by the Iliacus, Psoas major, Pectineus, in some cases a small part of the Adductor brevis, and the Adductor longus; and it is divided into two nearly equal parts by the femoral vessels: the artery giving off in this situation its superficial and profunda branches, the vein receiving the deep femoral and great saphenous tributaries. On the lateral side of the femoral artery is the femoral nerve dividing into its branches ***(Gray and Lewis, 2008).***



The femoral triangle (fig. 3)

The adductor canal (Hunter's canal):

Is an aponeurotic tunnel in the middle third of the thigh, extending from the apex of the femoral triangle to the opening in the Adductor magnus ***(Valentine and Wind, 2007).***

It is bounded, in front and laterally, by the Vastus medialis; behind by the Adductores longus and magnus; and covered in by a strong aponeurosis extends from the Vastus medialis, across the femoral vessels to the Adductores longus and magnus; lying on the aponeurosis is the Sartorius muscle. The canal contains the femoral artery and vein, the saphenous nerve, and the nerve to the Vastus medialis ***(Valentine and Wind, 2007).***

Relations of the Femoral Artery:

In the femoral triangle the artery is superficial. In front of it are the skin and superficial fascia, the superficial subinguinal lymph glands, the superficial iliac circumflex vein, the superficial layer of the fascia lata and the anterior part of the femoral sheath. The lumboinguinal nerve courses for a short distance within the lateral compartment of the femoral sheath, and lies at first in front and then lateral to the artery. Near the apex of the femoral triangle the medial branch of the anterior femoral cutaneous nerve crosses the artery from its lateral to its medial side ***(Valentine and Wind, 2007).***

Behind the artery are the posterior part of the femoral sheath, the pectineal fascia, the medial part of the tendon of the Psoas major, the Pectineus and the Adductor longus. The