

**Subintimal Angioplasty for the
Management of Long Segment Occlusions
of the Superficial Femoral Artery,
Feasibility & Short Term Results**

Thesis

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in
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By
Haitham Ahmad Abdul Azez

M.B.,B.Ch., M.SC (Cairo University)

Supervisors

Prof. Dr. Mohamed Hosni El -Dessoky

*Professor of General and Vascular Surgery
Faculty of Medicine
Cairo University*

Prof. Dr. Ayman Mohamed Atef El-Samadoni

*Professor of General and Vascular Surgery
Faculty of Medicine
Cairo University*

Dr. Ahmad Gamal El-Din Fouad

*Ass. Professor of General and Vascular Surgery
Faculty of Medicine
Cairo University*

**Faculty of Medicine
Cairo University
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Short-Term outcome results

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يبدأ فحص الرسالة بواسطة كل عضو منفرداً وتكليفه بتقرير منفرد لكل منهم المصدقات اللجنة
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
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List of Abbreviations

ABI	Ankle brachial index
ACC	American colleague of cardiology
AHA	American heart association
BASIL trial	Bypass versus Angioplasty in Severe Ischemia of the Leg
CAD	Coronary artery disease
CHF	Congestive heart failure
CLI	Critical limb ischemia
COPD	Chronic obstructive pulmonary disease
CTA	Computerized tomography angiography
FAST	Femoral artery stenting trial
FDA	
FEV1	Forced expiratory volume in one second
IC	Intermittent claudication
LDL	Low density lipoprotein
MRA	Magnetic resonance angiography
OTW	Over the wire
PFA	profunda femoris artery
PIER	Percutaneous intentional extra luminal revascularization

POBA	Plain old balloon angioplasty
PTA	Percutaneous transluminal angioplasty
ePTFE	expanded polytetrafluoroethylene
RESILIENT Trial	A Randomized trial comparing Edwards Self-expanding Life stent vs. angioplasty- alone In lesions INvolving The SFA &/or proximal popliteal artery
SA or SAP	Subintimal angioplasty
SFA	superficial femoral artery
TASC	Trans-Atlantic inter-Society Consensus
WSS	Wall shear stress

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Abstract

Subintimal angioplasty is such a procedure that provides a means to open a totally occluded blood vessel. This technique requires that a wire pass within the wall of a blood vessel but not within the occluded "true" lumen of the vessel. Once a wire has been re-entered into the natural, true lumen of the blood vessel, below the occlusion, a balloon is used to open this new pathway. Thus a wide open smooth passage is available for blood to pass freely into the calf and foot. The results short and intermediate terms have been very good. Certainly the risks of the procedure and complication rate are much less than bypass surgery. Limb salvage and resolution of claudication symptoms has been remarkably good in the hands of experienced vascular surgeons. Being a minimally invasive technique, subintimal angioplasty is well tolerated by most patients and requires a modest amount of equipment. The advantages of a percutaneous interventional procedure over bypass surgery are: avoidance of the complications of general anaesthesia, making an incision in an ischaemic leg and healing complications as well as less systemic stress (local anesthesia) and faster recovery and ambulation. Moreover, a re-do procedure might be more readily repeated than surgery, with the possibility of offering future surgical intervention if needed.

The technique of intentional subintimal recanalisation of femoropopliteal occlusions was first described by Bolia and his associates in 1990. Their publication of long-term results in 1994, suggested that this new approach was a useful alternative to bypass surgery.

Key words:

Subintimal intimal angioplasty.

Long segment SFA occlusive diseases.



Introduction & Aim of the Work



Introduction

The interest in and overall usage of endovascular procedures for the treatment of lower extremity ischemia continues to grow at a rapid rate. An increasing number of centers throughout the world are gaining experience with angioplasty. Promising results have been reported with the application of this technique. Although primary patency rates compared with bypass surgeries are relatively low for patients undergoing angioplasty, limb salvage rates remain high. When angioplasty fails, it frequently does so without the recurrence of symptoms, especially when a gangrenous lesion or ulcer has healed (*Matsi et al., 1994*).

In recent years, percutaneous treatment of long-segment superficial femoral artery (SFA) occlusive disease (> 15 cm) (Trans Atlantic Inter-society Consensus TASC lesions type C and D) has gained wider consent, representing a less invasive treatment option. Technical success rates range from 80 to 95% have progressively improved, due to the introduction of specifically designed guidewires and low-profile balloon catheters (*Setacci et al., 2009*).

According to the BASIL trial (Bypass versus Angioplasty in Severe Ischemia of the Leg) compared to surgery, percutaneous recanalization provides similar amputation-free survival rates, although it represents a less expensive and probably safer treatment option. The main limitation of intraluminal angioplasty is the relatively low mid- and long-term primary patency rates. The reported 5-year patency rate of femoropopliteal angioplasty is about 40–55%, which is lower than the corresponding 5-year patency rates of bypass grafts, ranging from 40 to 75%, according to the site of the graft (better results obtained above the



knee) and the type of conduits (significantly better results with venous grafts compared to synthetic grafts) (**Adam et al., 2005**).

With recent advances in endovascular procedures, new percutaneous or minimally invasive procedures have been developed and tried in an attempt to improve blood flow to lower extremities in patients who may be at risk using the traditional methods, such new techniques include: subintimal angioplasty, remote SFA endarterectomy, laser-assisted balloon angioplasty, and hemobahn endograft (**Coats et al., 2006**).

The technique of intentional subintimal recanalisation of femoropopliteal occlusions was first described by Bolia and his associates in 1990. Their publication of long-term results in 1994, suggested that this new approach was a useful alternative to bypass surgery (**Bolia et al., 1995**).

Subintimal angioplasty is such a procedure that provides a means to open a totally occluded blood vessel. This technique requires that a wire pass within the wall of a blood vessel but not within the occluded "true" lumen of the vessel. Once a wire has been re-entered into the natural, true lumen of the blood vessel, below the occlusion, a balloon is used to open this new pathway. Thus a wide open smooth passage is available for blood to pass freely into the calf and foot. The results short and intermediate terms have been very good. Certainly the risks of the procedure and complication rate are much less than bypass surgery. Limb salvage and resolution of claudication symptoms has been remarkably good in the hands of experienced vascular surgeons (**Aoife-Keeling, Karim Khalidi, 2009**).



Being a minimally invasive technique, subintimal angioplasty is well tolerated by most patients and requires a modest amount of equipment. The advantages of a percutaneous interventional procedure over bypass surgery are: avoidance of the complications of general anaesthesia, making an incision in an ischaemic leg and healing complications as well as less systemic stress (local anesthesia) and faster recovery and ambulation. Moreover, a re-do procedure might be more readily repeated than surgery, with the possibility of offering future surgical intervention if needed (*Amir-Hameed, Michelle Gluege, 2009*).



Aim of the Work

Evaluation of the technique of subintimal angioplasty in treatment of long segment occlusions of SFA as an alternative method for the conventional endoluminal angioplasty in patients who might be at high surgical risk for open surgical interventions, as regarding :

1. Feasibility.
2. Clinical assessment of results.
3. Short term patency.
4. Complications.