Radial Artery Harvesting
Endoscopic Versus Conventional

Essay

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SUMMARY

The radial artery appears from its direction to be the continuation of the brachial artery but it is smaller in caliber than the ulnar.

The RA is a thick-walled muscular artery which consists of one layer of flattened endothelial cells aligned along the long axis of the artery. This constitutes the intima. The intima is very thin and rests directly on the internal elastic lamina which has multiple fenestrations.

The media is thick and consists of many leiomyocytes arranged in multiple tight layers with some elastic and collagen fibers, fibroblasts and rare macrophages. The external elastic lamina is less individual than the internal elastic lamina. Some evidence suggests that the vasa vasorum, nerves and lymphatic are confined to the adventitia, while others describe vasa vasorum penetration into the RA medial layer.

This may theoretically cause some degree of hypoxia following RA harvest. It is well-known that the biological features of the grafts employed in coronary operation may affect their long-term performance, in particular the

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List of Abbreviations

AT	**Allen test**
CABG	**Coronary Artery Bypass Graft**
CAD	**Coronary Artery Disease**
cAMP	**Cyclic Adenosine Mono phosphate**
cGMP	**Cyclic Guanosine Mono phosphate**
CRH	**Conventional Radial Artery Harvesting**
DBI	**Digital branch index**
DPA	**Deep palmar arch**
EDCF	**Endothelial Derived Contraction Factor**
EDHF	**Endothelial Derived Hyperpolarizing Factor**
EDNO	**Endothelial Derived Nitric Oxide**
EDRF	**Endothelial Derived Relaxation Factor**
EDV	**End diastolic volume**
ERAH	**Endoscopic Radial Artery Harvesting**
ESVH	**Endoscopic Saphenous Vein Harvesting**
EVH	**Endoscopic Vein Harvesting**
FPR	**Finger to Palm Ratio**
IMA	**Internal Mammary Artery**
IMR	**Intimal to Medial Ratio**
IMT	**Intima-media thickness**
ITI	**Intimal Thickness Index**

IVUS	**Intravascular ultrasound**
LACN	**Lateral antebrachial cutaneous nerve**
LCN	**Lateral Cutaneous Nerve**
MIRH	**Minimally Invasive Radial Artery Harvesting**
MW3	**Mobile Wade of 3**
NO	**Nitric Oxide**
PGI2	**Prostacyclin**
PPG	**Photoplthysmography**
PSV	**Peak Systolic Velocity**
OCT	**Optical coherence tomography**
RA	**Radial Artery**
RAC	**Radial Artery Compression**
ROC	**Receiver Operating Characteristic**
RPI	**Radial Perfusion Index**
SPA	**Superficial palmar arch**
SRN	**Superficial branch of Radial Nerve**
UA	**Ulnar Artery**
UPI	**Ulnar Perfusion Index**

INTRODUCTION

The use of radial artery for coronary artery revascularization has been steadily increased since the first report by **Acar and colleagues** in 1993. In patients with triple-vessel disease or risk factors for sternal wound complications, use of the radial artery allows the number of arterial anastomoses to be increased (**Acar C, et al., 1993).**

Studies have demonstrated short-term patency and superior mid to long-term results with radial artery grafts compared to saphenous vein grafts. A less invasive method of coronary artery revascularization, which includes minimally invasive direct coronary artery bypass grafting and beating-heart endoscopic coronary artery surgery.

However, a long skin incision from 1 cm proximal to the wrist to the antecubital fossa to harvest the radial artery was made. Many patients who underwent conventional open harvesting expressed cosmetic dissatisfaction. Furthermore, open harvesting is associated with several problems, particularly neurologic complications **(Mazzei V, et al., 2001)**.

Minimally invasive conduit harvesting techniques for coronary artery bypass grafting (CABG) have developed over the past decade aiming to reduce the morbidity and recovery time associated with the procedure, whilst preserving the quality of the conduit. In conventional radial artery harvest (CRH). The incision runs from just below the anticubital fossa to 1cm proximal to the crease, along the medial border of the brachioradialis muscle to 1 cm proximal to the wrist.

Minimally invasive radial artery harvest (MIRH) aims to reduce the length of the skin incision although the length of the subcutaneous tunnel is still the same with both techniques **(Athanasiou T, et al., 2003).**

The radial artery has become the second arterial graft of choice after the internal thoracic artery in patients undergoing coronary artery bypass grafting. Improved patency rates of the radial artery observed in recent years were attributed to improved harvesting technique and routine use of antispasmodic agents, such as calcium-channel blockers or nitrates **(Desai ND et al., 2004).**

Wound healing has an impact on postoperative pain, length of post-operative stay and cost of the procedure, and ultimately affects patient satisfaction with the procedure. Cosmetic outcome (risk of hypertrophic scarring), quality of life following surgery, and particularly in the case of radial artery harvesting, neurological deficit as a result of damage to the superficial radial or lateral antebrachial cutaneous nerves are all important components **(Casselman FP et al., 2004).**

The use of the endoscopic approach for radial artery harvesting offers several advantages when compared to the open technique in terms of wound complications, wound infections, hematomas, less neurological complications, and improved aesthetics. The advantages in terms of reduced neurological injuries are mostly related to the careful dissection of the distal part of the radial artery (**Bisleri G et al., 2006**).

Despite these significant advantages many surgeons avoid a more aggressive use of this conduit because of the bad cosmetic results in this widely exposed part of the body as well as the well-known harvest related complications. The incidence of major complications such as hand ischemia, wound infection and hematomas with the conventional harvesting approach is quite low and ranges between 0.2% and 1.5%. However, the incidence of sensory nerve injuries and scar-related complaints are significant higher **(Shapira et al., 2006).**

Aim of the work

The aim of this essay is to provide a review of literature about the endoscopic harvesting of radial artery and why it is preferred by many surgeons and patients over conventional harvesting of radial artery.

Anatomy of Radial Artery

Introduction

The artery which supplies the upper extremity continues as a single trunk from its commencement down to the elbow; but different portions of it have received different names, according to the regions through which they pass. That part of the vessel which extends from its origin to the outer border of the first rib is termed the subclavian; beyond this point to the lower border of the axilla it is named the axillary; and from the lower margin of the axillary space to the bend of the elbow it is termed brachial; here the trunk ends by dividing into two branches the radial and ulnar.

Our study will be about radial artery.

Compartments of the Forearm

The antebrachial fascia is a continuation of the brachial fascia. The antebrachial fascia surrounds the musculature of the forearm and divides it into mobile wad, volar, and dorsal compartments. Fascia surrounds the individual muscles and provides strong septal attachments