# REVIVAL OF THE RADIAL ARTERY FOR CORONARY ARTERY BYPASS GRAFTING

# *Thesis*

**Submitted for partial fulfillment of the requirements for**

**M.D. Degree**

# *By*


**IBRAHIM MOHAMED REDA KASAP**

***M.B.B. Ch., M.Sc.***


# *Supervisors*


PROF. DR. ALI SEIF EL-DIN MAKLAD

***Professor of Cardiothoracic Surgery***
***Ain Shams Faculty of Medicine***

PROF.DR. AHMED MAHMOUD ALI

***Professor and Head of Cardiothoracic Surgery***
***Benha Faculty of Medicine.***

PROF.DR. WALAA AHMED SABER

***Professor of Cardiothoracic Surgery***
***Ain Shams Faculty of Medicine***

PROF.DR. HOSAM EZZAT EL-OKDA

***Professor of Cardiothoracic Surgery***
***Ain Shams Faculty of Medicine.***

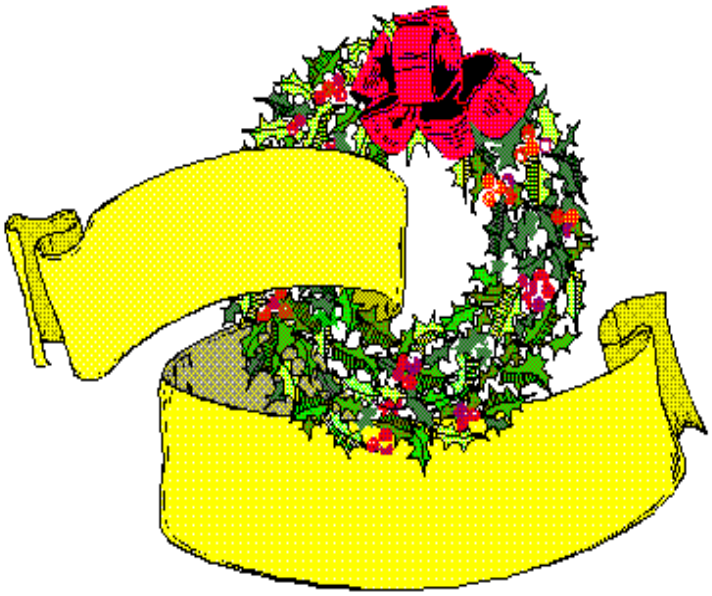

***2005***

# Dedicated

## To My

## Family And

## To My Wife



:

2005

# ACKNOWLEDGMENT

My deepest gratitude and thank to GOD the most merciful for guiding me through and giving me the strength to complete this work the way it is.

I find no words by which I can express my deepest thank and profound respect to **PROF. DR. ALY SEIF EL-DIN MAKLAD,** professor and head of the department of Cardiothoracic Surgery, Faculty of medicine, Ain Shams university for the continuos kind encouragment, guidance and support he gave me throughout the whole work. It has been an honour and a privilege to work under his generous supervision.

Also, I would like to express my deepest thanks and appreciation to **PROF. DR. Ahmed Mahmoud Ali** Professor and head of Cardiothoracic Surgery, Faculty of Medicine, Benha University for this great support, Valuable time, careful supervision and continuous advises which helped me to overcome many difficulties.

I am also deeply grateful and would like to express my sincere thanks and gratitude to **PROF. DR. WALAA AHMED SABER,** Professor of Cardiothoracic surgery, Faculty of Medicine, Ain Shams University, for his great help.

I am deeply indebted to **PROF DR HOSAM EZZAT EL-OKDA** Professor of Cardiothoracic surgery, Faculty of Medicine Ain Shams university for his great help, continuous support and sincere advice during this work.

# ABSTRACT

**Revival of Radial artery in CABG:**

- *Authors: Kasap I, Maklad AS, Ali AM, Saber W, El Okda H.*
- *Departments: of cardiothoracic surgery, Ain Shams university Hospital, Egypt, and Nasser Institue Hospital, Cairo Egypt.*
- *Objectives: the aim of the work was to evaluate the early postoperative results of CABG using radial artery grafts with or without other grafts (venous or / and arterial).*

*- Patients and methods: The study comprised 60 patients aged 34-67 (54.1 ± 6.9 ) years who underwent coronary artery bypass operation (CABG). All patients received radial artery graft with or without other grafts (arterial or/and venous). A total 147 coronary grafts were performed with a mean of 2.45 per patients. LIMA was used in 40 patients and saphenous vein was used in 41 patients. All patients data were collected at the operative, postoperative (hospital stay) and 3 months post operative periods, Thalium scientigraphy was done for 21 patients and coronary angiography was done for 15 patients, after 3 months postoperatively.*

*Results: Cardiopulmonary bypass time was 93.5 ± 25.4 minutes and the aortic cross clamp time was 63.2 ± 19.8 minutes. The hospital stay was 12.9 ± 5.44 days and the ICU stay was 36.3± 14.3 hours. The early postoperative MI was 1.66% and the ECG changes was 3.33%. The post operative low cardiac output was 25%, the postoperative cardiac tamponade was 3.33%. There was no hand ischaemia after RA harvesting. Two patients (3.33%) died at hospital stay from cerebral stroke and one patient (1.66%) died 2 months after discharge due to acute pulmonary oedema. Thaluim scientegraply was done for 21 patients which revealed no areas of perfusion defects in RA territories. Coronary angiography was done for 15 patients with perfect patency rate 93.33%.*

*Conclusion: RA is a safe arterial conduit for CABG provided gentle harvesting and medical treatment by calcium channel blockers to prevent its spasm.*

# CONTENTS

# LIST OF FIGURES

# LIST OF TABLES

# LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| **AC** | : | Arterial conduit |
| **ACs** | : | Arterial conduits |
| **ALT** | : | Alanine transaminase |
| **AST** | : | Aspartate Transaminase |
| **CABG** | : | Coronary artery bypass grafting |
| **CBC** | : | Complete blood count |
| **COPD** | : | Chronic obstructive pulmonary disease |
| **CPK** | : | Creatinine phospho kinase |
| **CX** | : | Circumflex artery |
| **$D_1$** | : | First diagonal artery |
| **DCIA** | : | Deep Circumflex iliac artery |
| **DLFCA** | : | Descending branch of lateral femoral circumflex artery |
| **ECG** | : | Electro-cardiogram |
| **ENDO** | : | Endothelial derived nitric oxide |
| **ENDRF** | : | Endothelial derived relaxing factor. |
| **GEA** | : | Gastro epiploic artery |
| **HBV** | : | Hepatitis B virus |
| **HCV** | : | Hepatitis C virus |
| **ICU** | : | Intensive care unit |
| **IEA** | : | Inferior epigastric artery |
| **IHD** | : | Ischaemic heart disease |
| **IMA** | : | Internal mammary artery |
| **ITA** | : | Internal thoracic artery |
| **LAD** | : | Left anterior descending artery |
| **LCA** | : | Lateral costal artery |
| **LDL** | : | Low density lipoproteins |
| **LIMA** | : | Left internal mammary artery |

| | | |
|---|---|---|
| **LITA** | : | Left internal thoracic artery |
| **Na** | : | Sodium |
| **OM** | : | Obtuse marginal artery |
| **PDA** | : | Posterior descending artery |
| **PT** | : | Prothrombin time |
| **PTFE** | : | Polytetrafluro-ethylene |
| **PTT** | : | Partial thromboplastin time |
| **RA** | : | Radial artery |
| **RBCs** | : | Red blood cells |
| **RCA** | : | Right coronary artery |
| **RGEA** | : | Right gastro-epiploic artery |
| **RIMA** | : | Right internal mammary artery |
| **RITA** | : | Right internal thoracic artery |
| **SV** | : | Saphenous Vein |
| **SVG** | : | Saphenous vein graft |
| **SVGS** | : | Saphenous vein grafts |
| **TACR** | : | Total arterial coronary revascularization |
| **U.S.A** | : | United state of America |
| **UA** | : | Ulnar artery |
| **VD** | : | Vasodilator |

# B-Venous Conduits:

## Long Saphenous Vein:

### Indications for using the saphenous vein:

1- Patient older than 70 years.
2- Poor flow through the IMA.
3- Sever brachiocephalic atherosclerosis.
4- Lack of other arterial conduits.
5- Poor lung function.
6- When the bilateral internal mammary artery is contraindicated as in diabetic and obese patients **(94)**.

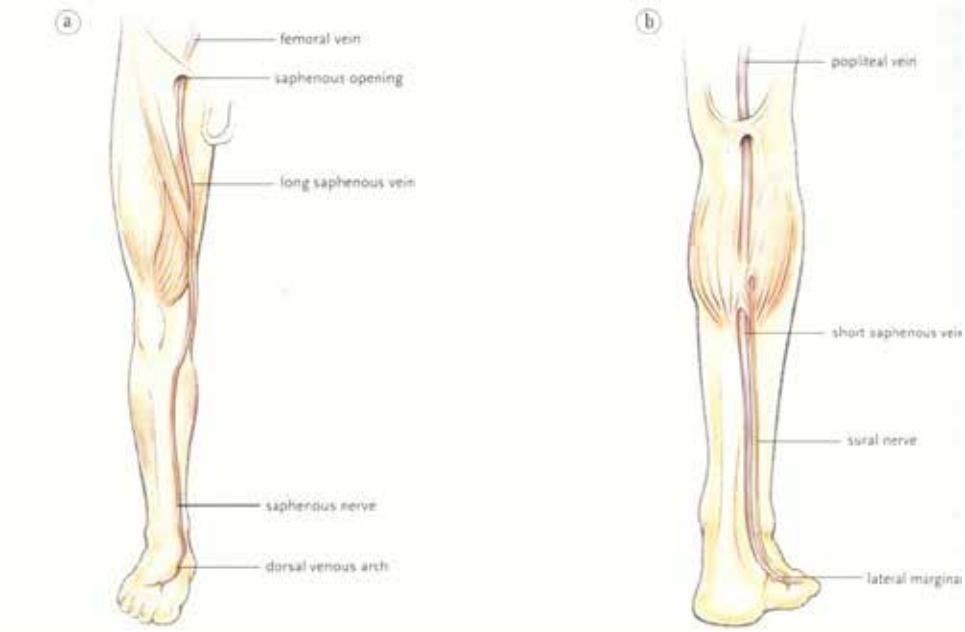



***Fig (17):*** *Anatomy of the long and short saphenous viens (187).*

### Contraindications for using the saphenous vein

1- Bad quality of the saphenous vein.
2- Lack of the vein in redo operation.
3- Peripheral vascular disease as varicose veins.

4- Discrepancy between the size of the vein and the native coronary size.
5- Young aged patients, as the arterial conduits are preferred for complete myocardial revascularization.
6- Trauma to the leg or previous operation in the leg **(95)**.

**Advantages of the use of the saphenous vein:**

1- Easy accessible and available.
2- To accomplish complete myocardial revascularization when other arterial conduits not available.
3- It can be used safely in patients >70 years.
4- It can be used in patients with diabetes mellitus when bilateral ITA use is contraindicated.
5- It can be used in emergency patients when there is no enough time to harvest the ITA **(95)**.

**Disadvantages of using the saphenous vein:**

1- Diffuse, concentric intimal hyperplasia develops in nearly all vein grafts **(96).** Intimal hyperplasia produces stenosis in some vein grafts, and these stenoses can lead to total occlusion **(97).**
2- Angiotensin II-forming activity through chymase in the SV was higher than that in the ITA, and the chymase- positive mast cells in the medial layer may play an important role in the development of vascular hyperplasia in the SV used as a graft conduit **(98)**.
3- Myofibroblast formation occurs around and within saphenous veins after bypass grafting **(99)**. The histologic changes are strikingly similar to events that occur during wound healing and may have implications for