

**Endoscopic assisted harvesting of the
radial artery for coronary artery
bypass grafting,
A modified technique**

Thesis submitted for partial fulfillment of the M.Sc. general
surgery

By

Mahmoud Yousef Ahmed Kotb , M.B.B.Ch

Supervisors

Prof. Dr. Ezz Eldin Korashi

Professor of general surgery , faculty of medicine Cairo University

Prof. Dr. Osama Saeed Emam

Professor of general surgery , faculty of medicine Cairo University

طريقة معدلة لاستخراج الشريان الكعبري بالمنظار
الجراحي وذلك لاستعماله في جراحة توصيل الشرايين
التاجية بالقلب

رسالة مقدمة من

الطبيب / محمود يوسف أحمد قطب

المشرفون

الأستاذ الدكتور : عز الدين قرشي

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

الأستاذ الدكتور : أسامة سعيد إمام

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

Abstract

Six patients who were scheduled for coronary bypass grafting and decision for using the radial artery. Preoperatively, harvested radial artery tested by Allen's test, modified Allen's test and duplex ultrasound. Operatively, the operation was done endoscopically via two small longitudinal forearm incisions, use of nasal speculum to elevate and retract the skin and harmonic scalpel for cutting and coagulating the branches of radial artery to achieve haemostasis. The average length of the harvested radial artery ranged from 18 to 22 cm post-operatively. No complications as hand ischemia or paraesthesia were reported .

**Endoscopic assisted harvesting of the
radial artery for coronary artery
bypass grafting,
A modified technique**

Thesis submitted for partial fulfillment of the M.Sc. general
surgery

By

Mahmoud Yousef Ahmed Kotb , M.B.B.Ch

Supervisors

Prof. Dr. Ezz Eldin Korashi

Professor of general surgery , faculty of medicine Cairo University

Prof. Dr. Osama Saeed Emam

Professor of general surgery , faculty of medicine Cairo University

طريقة معدلة لاستخراج الشريان الكعبري بالمنظار
الجراحي وذلك لاستعماله في جراحة توصيل الشرايين
التاجية بالقلب

رسالة مقدمة من

الطبيب / محمود يوسف أحمد قطب

المشرفون

الأستاذ الدكتور : عز الدين قرشي

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

الأستاذ الدكتور : أسامة سعيد إمام

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

ACKNOWLEDGMENT

First of all I want to thank allah for giving me health and patients to complete this work .

I wish to express my deepest and sincere gratitude to Prof. Dr. Ezz Eldin Korashi and Prof. Dr. Osama Saeed Emam for their assistance and contributions during the course of this study .

Finally I would like to dedicate this work to my family , who support me through difficult times and who installed in me the ambition to continue my studies as much as possible .

**Endoscopic assisted harvesting of the
radial artery for coronary artery
bypass grafting,
A modified technique**

Thesis submitted for partial fulfillment of the M.Sc. general
surgery

By

Mahmoud Yousef Ahmed Kotb , M.B.B.Ch

Supervisors

Prof. Dr. Ezz Eldin Korashi

Professor of general surgery , faculty of medicine Cairo University

Prof. Dr. Osama Saeed Emam

Professor of general surgery , faculty of medicine Cairo University

طريقة معدلة لاستخراج الشريان الكعبري بالمنظار
الجراحي وذلك لاستعماله في جراحة توصيل الشرايين
التاجية بالقلب

رسالة مقدمة من

الطبيب / محمود يوسف أحمد قطب

المشرفون

الأستاذ الدكتور : عز الدين قرشي

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

الأستاذ الدكتور : أسامة سعيد إمام

أستاذ الجراحة العامة بكلية الطب جامعة القاهرة

ACKNOWLEDGMENT

First of all I want to thank allah for giving me health and patients to complete this work .

I wish to express my deepest and sincere gratitude to Prof. Dr. Ezz Eldin Korashi and Prof. Dr. Osama Saeed Emam for their assistance and contributions during the course of this study .

Finally I would like to dedicate this work to my family , who support me through difficult times and who installed in me the ambition to continue my studies as much as possible .

AIM OF THE WORK

Six patients who were scheduled for coronary bypass grafting and decision for using the radial artery . Pre-operatively, harvested radial artery tested by Allen's test , modified Allen's test and duplex ultrasound .

Operatively , the operation was done endoscopically via two small longitudinal forearm incisions , use of nasal speculum to elevate and retract the skin and harmonic scalpel for cutting and coagulating the branches of radial artery to achieve haemostasis .

The average length of the harvested radial artery ranged from 18 to 22 cm post-operatively . No complications as hand ischemia or paraesthesia were reported .

LIST OF ABBREVIATIONS

- (CABG) Coronary artery bypass grafting
- (GEA) Gastro epiploic artery .
- (IEA) Inferior epigastric artery .
- (IMA) Internal mammary artery .
- (ITA) Internal thoracic artery .
- (LAD) Left anterior descending artery .
- (LCS) Laparoscopic coagulating shears .
- (LDL) Low density lipoprotein .
- (LIMA) Left internal mammary artery .
- (LPs) Lipids .
- (PDA) Posterior descending artery .
- (RA) Radial artery .

LIST OF FIGURES

Fig. (No.)	FIGURE	PAGE
Fig.(1)	Radial artery in the forearm covered by brachioradialis muscle	17
Fig.(2)	Course of the radial artery in the forearm and branches	18
Fig.(3)	Controlling the balance between cutting and coagulation : power	29
Fig.(4)	Controlling the balance between cutting and coagulation : blade harpness	29
Fig.(5)	Controlling the balance between cutting and coagulation : tissue tension	29
Fig.(6)	The operation is done via two longitudinal incisions ...	34
Fig.(7)	Using of nasal speculae to elevate the skin to deal with the radial artery	34
Fig.(8)	Introduction of the nasal retractor to elevate and retract the skin with incised deep fascia and the brachioradialis tendon and the muscle as one unit	35
Fig.(9)	Showing the Harmonic scalpel beside the forearm that was used in the operation	35
Fig.(10)	Using of the nasal retractor to retract the brachioradialis muscle and deep fascia laterally	36
Fig.(11)	The artery harvested and flushed with warm heparinised saline to see any leak in the wall of the artery	36
Fig.(12)	Both incisions are closed using continuous subcuticular 4/0 vicryl sutures with no drains	37

TABLE OF CONTENTS

	Page
Acknowledgments	iii
Table of contents	iv
List of Figures	v
List of Abbreviation	vi
Aim of the work	vii
INTRODUCTION	1
LITERATURE REVIEW	
Anatomy of the radial artery and coronary arteries	3
Consideration in the choice of the radial arteries	19
Harmonic scalpel	27
PATIENTS AND METHODS	31
RESULTS	35
DISCUSSION	41
SUMMARY AND CONCLUSION	45
PRIFEENCES	46

INTRODUCTION

In 1971 , Carpentier used for the first time the radial artery to bypass coronary arteries (Carpentier et al, 1973) . A series of 30 patients were then operated upon using the radial artery . Four years later , at the Annual Meeting of the American Association for Thoracic Surgery in New York, Carpentier reported that one-third of the radial artery grafts were occluded (Carpentier (1975) .

It was suggested that occlusion of this arterial conduit was due to spasm of the denervated vessel and concluded that the RA should no longer be used as a graft until this physiological problem was resolved . Other reports from small series seemed to confirm these results and the use of the radial artery was completely abandoned (Curtis et al, 1975) .

However , long term follow up of operated patients revealed patency of the radial artery grafts and revival of the use of the radial artery occurred since 1989 (Acar et al , 1992) .

The technique of preparation of the radial artery used 20 years earlier was probably the cause of graft failure . The RA was dissected alone separately from the satellite veins . Moreover , progressive instrumental dilatation of the vessel was performed using metallic probes which might have caused intimal damage . At that time , no antispastic drugs were available . In view of the recent advances in arterial revascularization and an improved understanding of the vasoreactivity of arterial conduits , it was decided to reinvestigate the use of the RA for coronary bypass (Acar et al , 1992) .

Harvesting of the vessel was performed using a perfectly a traumatic technique . The artery was dissected "enbloc" with the satellite veins similar to the internal mammary artery (IMA) dissection and no instrumental maneuver was performed . Conversely the artery was dilated using blood and papaverine at low pressure and antispastic drugs (diltiazem) were administered . Five years clinical and angiographic results have been reported recently (Acar et al , 1998) .