شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

بعض الوثائق الاصلية تالفة

بالرسالة صفحات لم ترد بالاصل

PERCUTENOUS TRANSLUMINAL ANGIOPLASTY AND INTRAVASCULAR STENT PLACEMENT IN LOWER LIMB CHRONIC ISCHEMIA

Thesis Submitted in Partial Fulfillment
Of MD degree in Radiodiagnosis

Prepared by

Ahmed Tohamy Jaheen
Assistant Lecturer of Radiology
Faculty of Medicine
Suez Canal University

Supervisors

Prof. Dr. Adel N. Abu Saif
Professor of Radiodiagnosis
Faculty of Medicine
Suez Canal University

Prof. Dr. EL-Sayed El-Zayat
Professor of General Surgery
Faculty of Medicine
Suez Canal University

Prof. Dr. Ahmed Samy
Professor of Radiodiagnosis
Faculty of Medicine
Cairo University

Faculty of Medicine
Suez Canal University
2004

Dedicated To

The Soul of My Father

&

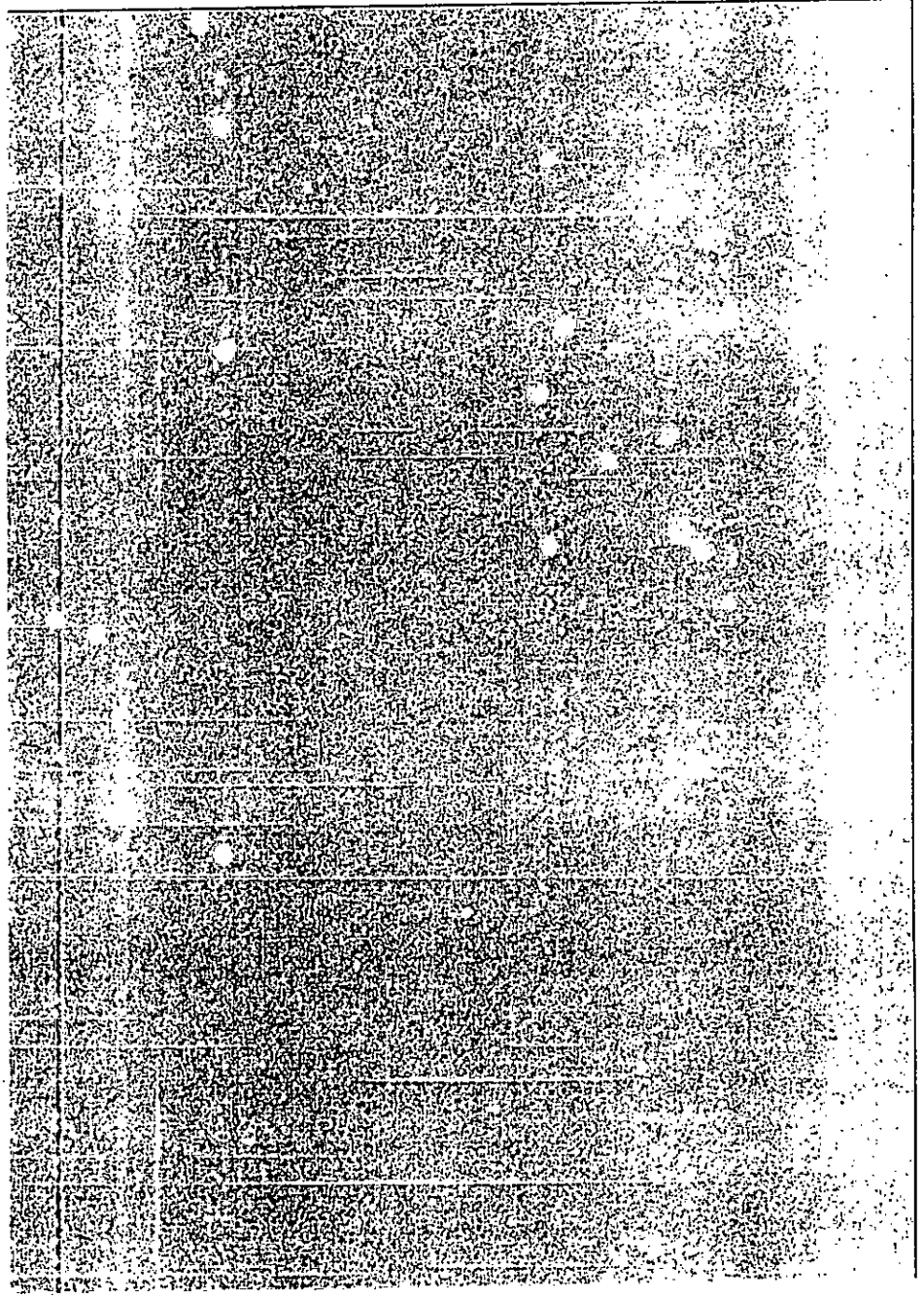
To My Wife

Contents

Abbreviations

Adverse Drug Events	ADEs
Ankle-Brachial Indices	ABIs
Arteriovenous Malformation	AVM
Color Doppler Sonography	CDS
Common Femoral Artery	CFA
Common Iliac Artery	CIA
Coronary Artery Disease	CAD
Diameter Reduction	DR
Digital Subtraction Angiography	DSA
End Diastolic Velocity	EDV
Femoral-Brachial Index	FBI
Fibroblast Growth Factor	FGF
Intra-Arterial Digital Subtraction Angiography	IADSA
Intra-Vascular Ultrasound	IVUS
Intra-Venous Digital Subtraction Angiography	IVDSA
Lipoprotein Lipase	LpL
Low Density Lipoprotein	LDL
Low Osmolar Contrast Media	LOCM
Magnetic Resonance	MR
Monocyte Chemoattractant Protein-1	MCP-1
Oxidized LDL	OxLDL
Partial Prothrombin Time	PTT
Peak Systolic Velocity	PSV
Percutenous Transluminal Angioplasty	PTA
Peripheral Vascular Disease	PVD
Profunda Femoral Artery	PFA
Prothrombin Time	PT
Recombinant human tissue-type Plasminogen Activator	rt-PA
Red Blood Cells	RBCs
Segmental Limb Pressures	SLPs
Smooth Muscle Cells	SMCs
Standard Deviation	SD
Streptokinase	SK
Superficial Femoral Artery	SFA
Tissue-type Plasminogen Activator	t-PA
Transluminal Extraction Catheter	TEC
Urokinase	UK
Vascular Endothelial Growth Factor	VEGF
Versus	vs.

Introduction



Vascular recanalization for the treatment of lower extremity ischemia now be accomplished by both surgical and percutenous means. During the last 10 years many new procedures have been introduced to improve the circulation to lower extremities. Surgical revascularization with the use of a bypass graft remains the standard against which other modalities should be compared. The availability of percutenous interventions for the management of lower extremity arterial ischemic disease has given rise to controversy regarding selection of the definite procedure for a particular patient.[1]

Endovascular interventional procedures were developed from diagnostic angiography and now play a central role in the management of patients with vascular disease. Because these therapeutic angiographic procedures are often simple, effective, and efficient with a low morbidity and mortality, they have increased the number of treatment options available to patients by enabling a percutenous endovascular procedure to be performed instead of a conventional surgical one. They have also increased the range of treatment available by offering procedures to patients who are either unfit for surgery or whose symptoms do not merit its risks.[2]

Percutenous transluminal angioplasty (PTA) was the first percutenous procedure used for the treatment of ischemic peripheral arterial disease. Since its development in 1960, angioplasty has continued to be the most commonly performed percutenous vascular interventional procedure.[1]

PTA has become widely accepted because it offers several distinct advantages over surgical revascularization. Long-term patency rates after angioplasties of ideal lesions are almost similar to those after surgical bypass grafting.[3]

PTA is a general term for the direct, mechanical treatment of vascular lesions by catheter techniques. There are two similar procedures, which differ in important respects, including clinical applicability and prognosis. Transluminal balloon dilatation is a correction of stenotic but not occluded lesions. So transluminal balloon dilatation requires the presence of luminal patency; however sever the narrowing, there must be something to dilate.[4]

Some authors mentioned that transluminal balloon dilatation can be performed on multiple occasions; there was no statistical difference in patency rates between the initial angioplasty and subsequent dilatation of the same vascular segment.[1]

The second procedure is transluminal re-canalization; is a correction of short length complete vascular occlusion by mechanicol formation of an artificial lumen through the occluded segment.[4]

So PTA now play a major role in the management of lower extremity peripheral arterial ischemic disease, more precisely, focal iliac arterial stenosis, as it yield a greater than 90% initial success rate and a favorable 5 years outcome ranging from 50% to 90%. However, the patency rates for femoro-popliteal lesions are less favorable, generally 50% for 2 years. Also limited success has been obtained with PTA of the infra-genicular vessels in carefully selected patients.[5]

The initial failure of PTA is considered based upon the predictors of failure included number of lesions, lesions length, lesion morphology, limb threat, and other contrib. ting medical disease as diabetes mellitus.[1]

Often it is considered as a low risk procedure, PTA is not without risk. When morbidity and mortality are tabulated within 30 days of the procedure, as is the standard in the surgical literature, PTA has some complications as initial failure, vessel perforation, and injury of patent proximal and distal segments with intimal hyperplasia as well as re-stenosis or re-occlusion.[6]

Although PTA has become established as an endo-vascular technique, the long-term results must still be considered as unsatisfactory since recurrences are frequent and required repeated interventions. Therefore new therapeutic strategies are required that can reduce re-stenosis or re-occlusion especially in these peripheral vascular segments. So in the more strict sense, the PTA is now being supplemented by endovascular stent implantation for many vascular regions.[7]

Charles Dotter was the first investigator who introduces the concept, as well as the first prototype, of an endoluminal stent. Expandable intraluminal vascular stents were developed to overcome several problems associated with balloon angioplasty. The primary purpose of an intraluminal stent is to support the vascular wall and oppose elastic recoil. In doing so, a stent may improve the hemodynamic gradient across a stenotic segment, even more than is possible with angioplasty alone.[8]

By smoothing-out the ragged, disrupted intimal surface and by exerting radial forces, the intraluminal stent optimizes the morphological changes and flow conditions at the angioplasty site.[9]

Generally endovascular stents can be categorized into balloon-expandable, which proved a rigid scaffold to support the artery, and self-expanding which exert radial force to resist external compression.[5]

The ischemia of the lower extremity is caused by either stenosis or occlusion of the arterial tree, includes iliac, ilio-femoral, femoral, femoro-popliteal and infra-genicular segments, sharing almost of the same technical steps, but differ in the patency rates. So our study aiming to evaluate the safety and short term efficacy of the PTA and endo-vascular stent in the indicated lower limb chronic ischemic patients.

References

1 **Allan D. Callow, Calvin B. Ernst**: *Angioplasty and Vascular Stents.* Vas Surg 1995: 736-770.

2 **David Sutton**: *Textbook of Radiology and Imaging;* Arteriography and interventional radiology. 1998: Vol. I: 673-742.

3 **Martin EC**: *The impact of angioplasty: A perspective.* JVIR. 1992: 3:511-514.

4 **Abrams**: *Transluminal Angioplasty, Endo-vascular Visualization and Therapy.* Angiography 1971: vol. II: 1119-1143, 1287-1297.

5 **Ahn SS, Obrand DI, Moore WS**: *Transluminal balloon angioplasty, stents, and atherectomy.* Semin Vasc Surg 1997 Dec; 10(4):286-96.

6 **Weibull H, Bergqvist D, Jonsson K, et al.**: *Complications after percutaneous transluminal angioplasty in iliac, femoral, and popliteal arteries.* J Vasc. Surg. 1987: 5:681-686.

7 **Wagner HJ, Rager G:** *Infra-popliteal angioplasty: a forgotten region?.* Rofo Fortschr Geb Rontgenstr Neuen Bildgeb Verfahr 1998 May 168:5 415-20.

8 **Rousseau HP, Raillat CR, Joffâre FG, et al.**: *Treatment of femoro-popliteal stenosis by means of self-expandable endo-prosthesis: Midterm results.* Radiology. 1989; 172:961-964.

9 **Kuhn F-P, Kutkuhn B.Torsello G, et al.**: *Renal artery stenosis: Preliminary results of treatment with the Strecker stent.* Radiology. 1991; 180:367-372.

Lower Extremity Arterial Anatomy & Histology