Comparison between Computerized tomographic angiography and intraoperative conventional angiography in critical lower limb ischemia

Thesis

Submitted For Fulfillment of M.D. Degree In vascular surgery

By

Ahmed Mohamed Taher Ghanem

M.B., B.Ch., M.Sc. general surgery

Under Supervision of

Prof. Dr. Tarek Ahmed Abdul Azeem

Professor of Vascular Surgery

Faculty of Medicine – Ain Shams University

Prof.Dr. Wagih Fawzy

Professor of vascular surgery

Faculty of Medicine – Ain Shams University

Dr. Atef Abdel Hameed Desouki

Assistant professor of vascular surgery

Faculty of medicine-Ain Shams university

Faculty of Medicine

Ain Shams University

2015

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List of Abbreviations

2D	Two dimensional
3D	Three dimensional
ABPI	ankle brachial pressure index
ACE	Angiotensin converting enzyme
ALI	acute limb ischemia
AP	Ankle pressure
AP	antero-posterior
AT	anterior tibial
CD	Cluster of differentiation
CF	Common femoral
CFA	common femoral artery
CIA	common iliac arteries
CLI	critical limb ischemia
cMPR	Curved multiplanar reconstruction
CT	Computerized tomograohy
CTA	computed tomographic angiography
CVD	cardiovascular diseases
DES	drug eluting stents

DM	Diabetes mellitus
DSA	Digital subtraction angiography
ECG	Electro-cardiogram
ECM	extracellular matrix
ECs	endothelial cells
EMI	Electro Musical Instruments
FDA	Food and Drug Administration
FGF	fibroblast growth factor
FN	False negative
FOV	field of view
FP	False positive
HDL	high-density lipoprotein
HGF	Hepatocyte growth factor
HMG-CoA	3-hydroxy-3-methylglutaryl coenzyme A
IADSA	intraarterial digital subtraction angiography
IC	intermittent claudication
IEL	Internal elastic lamina
IPC	Intermittent pneumatic compression
IPOP	immediate postoperative prosthesis
	Lower popliteal

L pop	Lower superficial femoral artery
L SFA	low density lipoprotein
LDL	Lower peroneal
LP	Lower posterior tibial
LPT	Lower anterior tibial
LAT	multidetector Computed tomography
MDCT	Myocardial infarction
MI	maximum intensity projection
MIP	Multiplanar reconstruction
MPR	Magnetic resonance angiography
MRA	Number
No.	negative predictive value
NPV	Peripheral arterial disease
PAD	Peripheral arterial occlusive disease
PAOD	Profunda femoris
PF	profunda femoris artery
PFA	Prostaglandin E1
PGE1	positive predictive value
PPV	posterior tibial

PT	Percutaneous transluminal angioplasty
PTA	Pulse volume recording
PVR	Standard deviation
SD	superficial femoral artery
SFA	subintimal angioplasty
SIA	smooth muscle cells
SMCs	Shaded surface display
SSD	society of vascular surgery
SVS	Trans Atlantic Inter Society Consensus
TASC	Transcutaneous oxygen
Tc PO_2	True negative
TN	Toe pressure
TP	Upper popliteal
U pop	Upper superficial femoral artery
U SFA	Upper anterior tibial
UAT	Upper peroneal
UP	Upper posterior tibial
UPT	world health organization
WHO	wound, ischemia, and foot infection

WIfI **χ^2**	Chi-square test

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Introduction and Aim of the Work

Peripheral arterial disease (PAD), a manifestation of systemic atherosclerosis, is a significant health problem affecting 202 million people worldwide ***(Fowkes et al.,2013).*** PAD is characterized by a partial or complete failure of the arterial system to deliver oxygenated blood to peripheral tissue. Atherosclerosis is by far the most common etiology of PAD ***(Andrew & Azhar, 2008)***.

The manifestations of chronic lower extremity ischemia usually include some type of pain and are produced by varying degrees of muscle ischemia; they range from no symptoms to intermittent claudication to critical limb ischemia (CLI) ***(John, 2010*)*.***

The diagnosis of PAOD is usually made clinically on the basis of the medical history and ankle–brachial index measurements. PAOD is categorized according to the classification of Fontaine, which is based on pain-free walking distance and the presence or absence of tissue loss. Stage I PAOD is asymptomatic. Stage II is characterized by intermittent claudication.

A pain walking distance greater than 200 meters is classified as stage IIa disease, and a walking distance less than 200 meters is stage IIb. Rest pain and ulcerations are the clinical characteristics of stages III and IV PAOD, respectively ***(Schernthaner et al., 2009).***

CLI is defined as chronic lower extremity PAD and ischemic rest pain or the ischemic skin changes of non healing ulcers and gangrene. Typically, symptoms have to

be present for more than two weeks and associated with an ankle pressure less than 50 mm Hg or a toe pressure less than 30 mm Hg ***(John & Spence, 2010).***

The challenge for the vascular specialist is to recognize the presence of lower extremity ischemia , quantify the extent of local and systemic disease , identify and control the risk factors , and establish a comprehensive treatment program ***(John, 2010*)*.***

In the management of PAOD, clinical examination findings must be complemented by visualization of the peripheral arteries. According to the recommendations of the Trans Atlantic InterSociety Consensus group , visualization should include the localization and length of not only the target lesion but also the entire peripheral vascular tree, including inflow and outflow ***(Schernthaner et al., 2009).***

Despite many advances in the quality and availability of less invasive arterial imaging modalities , Arteriography remains the " gold standard". Alternative modalities such as duplex arterial mapping , computed tomographic angiography (CTA) , magnetic resonance angiography (MRA) , are being used with increasing frequency because of improved image quality and minimal risk ***(Mell et al., 2007).***

The vastly improved scanning speed and z-axis resolution afforded by multidetector technology has allowed CT to refine its traditional roles and to explore many new applications in imaging ***(Bell et al., 2006).***

With improvements in computed tomography technology , such as the development of the multidetector scanner, CTA has become another frequently used imaging modality for viewing even the small distal tibial vessels ***(Heijenbrok-Kal et al., 2007)***.