 МАНУ
MASA

ISSN 0351-3254
UDC: 616.137-007.272-089.844

TRANSRADIAL APPROACH AS FIRST CHOICE FOR STENTING OF CHRONIC TOTAL OCCLUSION OF ILIAC AND FEMORAL SUPERFICIAL ARTERY

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Abstract

The transradial approach (TRA) for treatment of aortoiliac occlusive disease (AIOD) is nowdays a more common approach than several years ago. This is due to less post-procedural bleeding complications and its impact on mortality. The main reason for the growing interest in the TRA is because of the safety profile of this access.

Peripheral arterial disease (PAD) is a growing phenomenon. It is a common circulatory problem in which narrowed arteries reduce blood flow to lower extremities due to atherosclerotic arterial lesions. According to the Trans Atlantic Inter-Society Consensus on the Management of Peripheral Arterial Disease (TASC II), an endovascular approach is recommended in type A and B lesions, and an open surgical approach for type C and D lesions.

The aim of the study is to put the accent on the advantages of the transradial approach (TRA) versus the transfemoral approach (TFA), its safety and efficacy in treating peripheral arterial disease (PAD) even in type C and D lesions, in well and properly selected patients on whom it may be performed, and to evaluate the outcomes of transradial iliac stenting (TRAIS), attempting to increase the demand for the new devices and tools for its treatment. These improvements will exclude some disadvantages and limitations of TRA in the field of endovascular peripheral interventions (distance from the puncture site to the lesion location, bigger support, thinner devices).

Despite difficult lesions, TASC C/D, the overall primary procedural and technical success rate was 100%. The ankle brachial index (ABI) significantly improved from a mean of 0.46 to 0.90 and 0.94 on the six months follow-up. Angiographic estimated residual stenosis was 0%.

No minor or major complications (haematoma, distal emboli, vessel dissection, rupture, death) were documented. The primary patency rate was 100% for the iliac and for the SFA. The secondary patency rate after 6 months follow-up was also 100%.

Transradial access might be recommended as the first-choice vascular access site for interventions on the iliac, and even proximal femoral territories. This technique is still limited by the lack of adequate equipment. This issue should be overcome in the future.

Key words: transradial approach, stenting, peripheral vascular disease, iliac artery occlusion, endovascular interventions.

Introduction

Dr. Lucien Campeau first reported the use of the radial artery for coronary angiography in 1989 [1]. Three years later, Dr. Ferdinand Kiemeneij adapted Campeau's technique for the first transradial coronary angioplasty [2, 3]. Since then, this approach has become more popular and has been extended to coronary interventions, particularly with the use of aggressive antithrombotic therapy. The main reason for the growing interest in TRA is because of the safety profile of this access.

Until a few years ago percutaneous interventions of the coronary and peripheral vessels were performed using a femoral artery. The transfemoral approach (TFA) may be difficult and problematic due to: access site complications, global severe peripheral vascular disease, obesity, or low support and pushability from contralateral femoral access when the iliac bifurcation is hostile [4, 5]. The importance of the vascular access site is because it is the first reason for bleeding and complications (MACE) after percutaneous interventions. The risk of bleeding complications with transfemoral access has been reported to range from 2% to 12%, and we know that bleeding increases mortality [6]. Because of this increasing recognition of post-procedural bleeding complications (haematoma, pseudoaneurysm, retro-peritoneal haemorrhage, AV fistula, ischaemia-thrombosis-emboli, infection, neuropathy) and its impact on short and long-term mortality, the transradial approach (TRA) becomes the preferred method compared to the transfemoral approach (TFA) [7–9]. Although lower extremity interventions via the brachial artery approach have been reported, they could be accompanied by major complications, and therefore make radial artery interventions safer. Coronary intervenetion done through TRA has gained popularity also due to early ambulation, patient comfort, and perhaps cost savings with early discharge. Despite this, the TRA technique has not become mainstream in the United States, as a large report from the National Cardiovascular Data Registry has shown a usage rate for coronary procedures of only 1.32% from 2004–2007 [10], but this technique is increasing dramatically in Europe and Asia [4, 7, 8, 11]. Worldwide, it is estimated that 20% of interventional procedures are performed via the radial artery [5].

Although coronary interventions are performed via the radial approach with increasing frequency, peripheral interventions using this approach have rarely been described. Transradial intervention (TRI) on the iliac artery and superficial femoral artery disease has been, previously and now, noticed only in anecdotal case and limited reports of renal and iliac artery [4, 7, 8, 11].

Transradial interventionists who perform these procedures must have a very good knowledge of normal anatomy, as well as of possible anomalies of the radial artery, in order to lessen the chance of complications. There is extensive communication between the ulnar and radial branches that maintain blood flow to the hand in the event of radial occlusion. The calibre of the radial artery is important for patient and devices selection, because small arteries are more prone to spasm.

Two large reviews have demonstrated that anatomical variants of radial artery and wrist circulation, including high takeoff, tortuosities, stenoses, hypoplasias, and radioulnar loops occur in up to 23% of transradial catheterizations [12, 13].

Peripheral artery disease (PAD) is a common circulatory problem in which narrowed arteries due to atherosclerotic arterial lesions reduce blood flow to the lower extremities.

The exact overall incidence of peripheral artery occlusive disease (PAOD) is not known. Approximately 30% of the arterial lesions in PAOD are located in the iliac arteries [14]. Peripheral artery disease (PAD) affects 27 million people in Europe and North America. According the American Heart Association (AHA), approximately 8 million adults in the U.S. have PAD, and the disease burden may be higher in women than in men [15]. Twenty percent of people with PAD will suffer a nonfatal heart attack or stroke and thirty percent will die within 5 years. Amputation is a potential consequence of PAD. Life expectancy is less than 5 years after amputation. Diabetes is a leading risk factor for PAD [15]. According to the Trans Atlantic Inter-Society Consensus on the Management of Peripheral Arterial Disease (TASC II) if the ankle-brachial index (ABI) is less than 0.9 it is a sign of Peripheral Arterial Occlusive Disease (PAOD), but still only 20–25% of patients will be symptomatic [16]. Surgical and endovascular intervention is not indicated in patients with severe decrements in limb perfusion (ankle-brachial index < 0.4) in the absence of clinical symptoms of CLI [17].

Occlusion of peripheral artery may cause:

- intermittent claudication (IC) defined as ischaemic pain occurring during exercise, which is quickly relieved with rest (Fontaine II, Rutherford 1 to 3),
- critical limb ischaemia (CLI) defined as ischaemic rest pain (Fontaine III, Rutherford 4) or,

• ischaemic skin lesions: either ulcers or gangrene (Fontaine IV, Rutherford 5 and 6) and these can lead to major complications such as infection, amputation and even death. See Table 1.

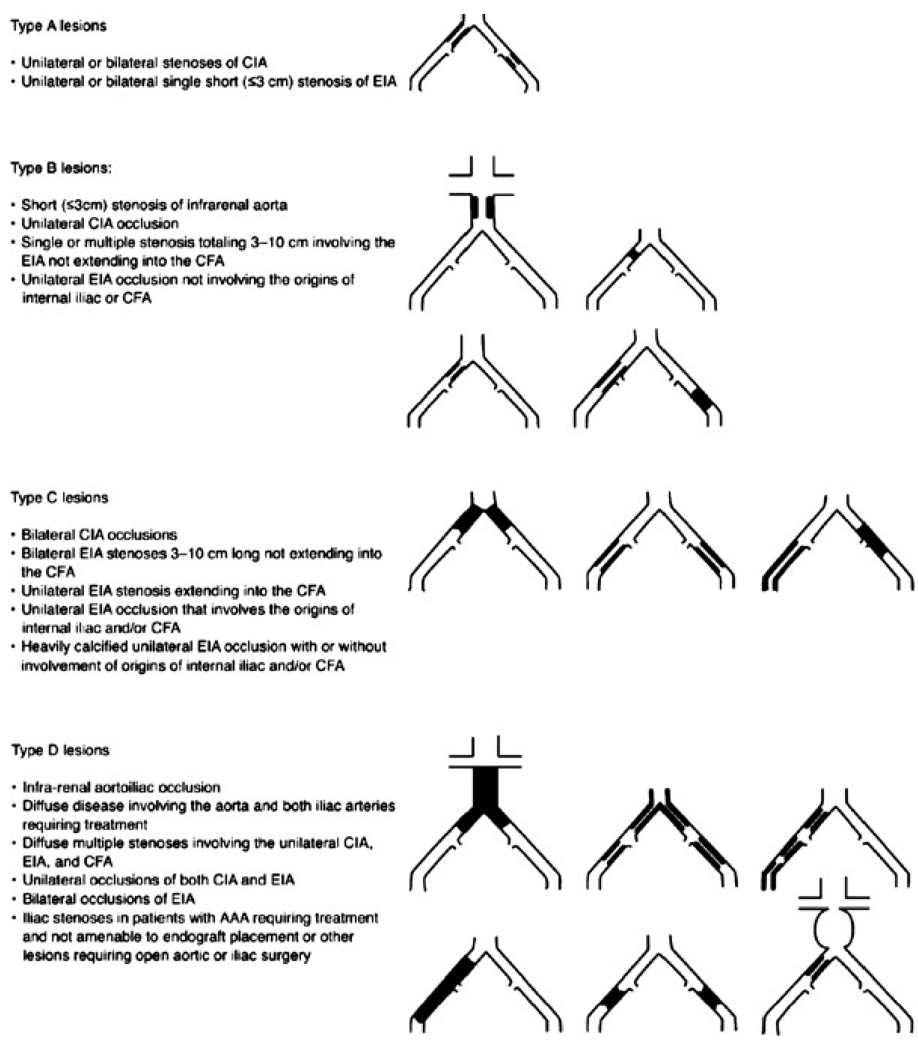
Table 1

Classification of PAD: Fontaine's Stages and Rutherford's Categories

Fontaine Classification		Rutherford Classification		
Stage	Clinical Description	Grade	Category	Clinical Description
I	Asymptomatic	0	0	Asymptomatic
IIa	Mild claudication	I	1	Mild claudication
IIb	Moderate-to-severe claudication	I I	2 3	Moderate claudication Severe claudication
III	Rest pain	II	4	Rest pain
IV	Ulceration or gangrene	III IV	5 6	Minor tissue loss ulceration or gangrene

Reprinted with permission from the Society for Vascular Surgery.[1]

The Trans Atlantic Inter-Society Consensus on the Management of Peripheral Arterial Disease (TASC II) divides Aorto-iliac Occlusive Disease (AIOD) into four types. See Figure 1.



An endovascular approach is recommended in type A and B lesions, and an open surgical approach for type C and D lesions. Endovascular repair is also recommended in patients with type C lesions, which have a low healing potential following surgical revascularization [15].

Identifying individuals at risk of lower extremity PAD is a fundamental part of the vascular review of systems. Individuals at Risk for Lower Extremity Peripheral Arterial Disease are:

- Age less than 50 years, with diabetes and one other atherosclerosis risk factor (smoking, dyslipidaemia, hypertension, or hyperhomocysteinaemia);
- Age 50 to 69 and a history of smoking and diabetes;
- Age 70 or older;
- Leg symptoms with exertion (suggestive of claudication) or ischaemic rest pain;
- Abnormal lower extremity pulse examination;
- Known atherosclerotic coronary, carotid, or renal artery disease [15].

Ten to twenty percent of patients with IC will progress to CLI in the course of their disease [14, 18]. The most important risk factors for progression to the advanced form of PAOD are age, tobacco use and diabetes mellitus [14, 18].

Treatment of PVD can be determined in two ways, first to control the symptom and then stop the progression of the disease to minimize complications. Treatment of PVD would include a change in lifestyle pattern, treatment of the existing conditions (diabetes and hypertension), medication, angioplasty and vascular surgery.

Manufacturers of peripheral vascular devices stimulate endovascular treatment of difficult lesions (TASC type C and D). They are coming up with newer products, which would overcome the concerns over earlier products and meet the requirements of surgeons. Thus, the market for peripheral vascular devices is expected to augment with the population continuing to age, changing lifestyle and incidence of PVD globally.

Materials and methods

The aim of the study is to show that the trans-radial approach is safe, effective and feasible in well and properly selected patients on whom it may be performed, and to evaluate the outcomes of transradial iliac stenting (TRAIS). The transradial approach as the first choice was made by the fulfilment of the inclusion criteria, and not as a result of absent femoral pulses, severe bilateral iliac artery disease, obesity, or conditions prohibiting prolonged supine rest, although these reasons should be taken into consideration.

We included six of the total thirteen patients who underwent percutaneous peripheral interventions of the supra and infra inguinal arteries for a period of one year. Inclusion criteria were:

1. The possibility of transradial artery stenting (stent shaft sufficient length),
2. Adequate anatomy of vessels (radial artery, supra-aortic vessels, aorta).

Patients had known PAD and occlusion of right or left common iliac or femoral superficial artery. Selection of the patients was made carefully, taking into consideration: anthropometric data (height of the patient, arm and torso length), anatomy of radial artery and supra-aortic vessels and details of pre-made diagnostic angiography. The whole interventions in all patients were performed by TRA. Demographics, the technique used to perform the intervention and deploy the stent in the common iliac artery, procedural details, results, and complications were evaluated. End points were:

– Procedural success rate (feasibility).
– Access-site related complications (safety).

Technique

Based on data published so far and from our experience we tried to establish a uniform TRA technique for the treatment of PAD. After puncturing the radial artery (cannula technique), over hydrophilic guide wire, we introduced a 6 or 7F/11cm hydrophilic sheath from Terumo. Before proceeding with the procedure appropriate spasmolytic cocktails and sedation were administrated for the prevention of spasm and thrombosis of the radial artery (verapamil and heparin 5000 IE). After inserting the sheath, radial artery angiography was made mandatory. A diagnostic 5F or 6F Judkins Left (JL), Judkins Right (JR), Pig-tail, and Multipurpose (MP) 125 cm. catheter is introduced over a 0.035"

260 cm angle-tipped hydrophilic coated or stiff guide wire. Diagnostic catheters were used for coronary and peripheral angiogram. An analysis of the data obtained for each particular case was made, for a decision to be issued on the strategic approach. Before the interventional procedure, the radial hydrophilic sheath was replaced with a Destination 6F 90 cm or Shuttle sheath 6F 90 cm. A guiding catheter 6–7 F MB 125 cm, or JR4 100 cm was inserted as close as possible to the origin of the treated common iliac artery. For crossing the occlusion, coronary CTO wires (Shinobi plus 0.014” 180 cm, cross it 200–400 0.014" 190 cm, Pilot 200 0.014" 190 cm) were used. In one case we used stiff glide wire 0.035" (300 cm). After pre-dilatation with 1.5–2.0/20 mm balloons these wires were exchanged with extra-stiff Amplatz 260 cm, or extra support 0.014" 300 cm wire. In two cases, due to the insufficient inner diameter of the introducing sheath (stent diameter was bigger), we had to pull out the guiding catheter and introducing sheath and to finish the stenting only over extra-stiff Amplatz 260 cm. guide wire. Setting of external markers, using a premade diagnostic angiogram and injecting the contrast through the inner lumen of the stent shaft, was helpful in order to minimize the possibility of missing the lesion and a good positioning of the stent. Taking into consideration the anatomy and type of lesion balloon, expandable or self-expandable stents were placed. In all cases after stent placement, balloon post-dilatation was done. Procedures were ended with control angiograms. After sheath removal, patent haemostasis was done to prevent radial artery occlusion (RAO). See Tables 3 and 4.

Results and discussion

Patients were admitted for invasive diagnostics of the lower extremities, according to the established symptoms and noninvasive findings for critical limb ischaemia (left or right). Five patients had critical ischaemia of the left leg, and one patient of the right leg with intermittent claudication on the left. The average age was 59.5 (49–70). All patients were male. Of risk factors they had: hypertension and hyperlipidaemia, smoking, and diabetes. One patient was not a smoker, and had no diabetes. Body mass index (BMI) showed that two patients were normal weight at the upper limit, three were overweight and one was obese. The tallest patient was 183 cm. Three of the patients had never had previous interventions or problems with circulation, until the appearance of symptoms of peripheral arterial disease. One patient had had a previous coronary artery bypass graft (CABG), and one had had two coronary interventions on the left anterior descending artery (LAD).

The first intervention finished with a bare metal stent (BMS) implantation, and after the occurrence of restenosis in the first stent, a second intervention was performed with implantation of a drug-eluting stent (DES). The third patient had prior carotid artery stenting and an implanted pacemaker. Ankle brachial index before treatment in all patients showed severe blockage (less than 0.5). Three patients were in Rutherford Class 3 (moderate to severe claudication), and three in Rutherford Class 4 (rest pain). According TASC II classification, the distribution of the lesions were: type D four lesions, type C one lesion and type B one lesion. See Table 2.

All procedures were done through the right radial artery. Diagnostic guide wires that were used were: Glide Wire 0.035” 260 cm, Extra-stiff Amplatz 260 cm and BMW 0.014”300 cm (see Table 3). In Table 3 the most commonly used diagnostic catheters are also shown, as well as coronary and peripheral angiography findings. See Table 3.

We explained to patients the diagnostic findings and therapeutic options (endovascular v.s. surgery) and how we got their approval, we extended the endovascular procedure. Six Iliac Artery (IA) (5 left and 1 right), and one on the left Superficial Femoral Artery (SFA) lesions were treated successfully with a good final angiographic result via a 6 FR radial access system. Interventions were made through a 6F Destination 90 cm or 6F Shuttle Sheath 90 cm with commonly used 6F 110 cm MB 1 guiding catheter for a "mother and child" technique to stabilize the system and for better support. Passing through all lesions was done with coronary CTO wires. The first pre-dilatation was done with low-profile balloons, and later with a greater diameter. There followed the re-crossing of the lesions with a 0.014 "300 cm. Extra support wire or 0.035" 260 cm Extra-stiff or 0.035" 260 cm glide wire. Lesions were stented with three self-expanding stents, and five balloon–expandable stents. We performed post-dilatation with

Table 2

Patients characteristics

PATIENTS No CHARACTERISTICS	Pts 1	Pts 2	Pts 3	Pts 4	Pts 5	Pts 6
Age	55	57	66	49	60	70
Gender	Male	Male	Male	Male	Male	Male
Presentation/symptoms	CLI right leg IC Left leg	CLI left leg	CLI left leg	CLI left leg	CLI left leg	CLI left leg
Hypertension	Yes	Yes	Yes	Yes	Yes	Yes
Hyperlipidaemia	Yes	Yes	Yes	Yes	Yes	Yes
Diabetes	Yes	Yes	No	No	Yes	Yes
Smoker	Yes	Yes	No	Yes	Yes	Yes
Prior Interventions	CABG	No	No	No	PCI+stent LAD RePCI+DES to LAD in stent	CAS, PM
Height	160	175	160	170	183	176
Weight	63	85	74	75	105	70
BMI	24.6	27.8	28.9	26	31.4	22.6
Ankle-Brachial Index (ABI) pre-intervention	0.40	0.48	0.48	0.46	0.52	0.43
Rutherford Class.	3	4	3	4	4	3
TASK II Type	D	D	B	D	D	C

Table 3

Diagnostic characteristics

DIAGNOSTIC	Pts 1	Pts 2	Pts 3	Pts 4	Pts 5	Pts 6
Access Site	TRA right	TRA right	TRA right	TRA right	TRA right	TRA right
Diagnostic Guide Wire	Glide wire 0.035" 260 cm BMW 0.014" 300 cm	Glide wire 0.035" 260 cm BMW 0.014" 300 cm	Glide wire 0.035" 260 cm	Glide Wire 0.035" 260 cm, Extra-stiff Amplatz 0.035" 260 cm	Glide Wire 0.035" 260 cm, Extra-stiff Amplatz 0.035" 260 cm	Glide Wire 0.035" 260 cm, Extra-stiff Amplatz 0.035" 260 cm
Diagnostic Catheter	Pig-tail 5F125 cm JR 6F 100 cm JL 5F 100 cm	Pig-tail 5F 125 cm JR 6F 100 cm JL 5F 100 cm	Pig-tail 5F 125cm JR 6F 100 cm JL 5F 100 cm	Pig-tail 5F 125cm JR 6F 100 cm JL 5F 100 cm	Pig-tail 5F 125 cm JR 6F 100 cm JL 5F 100 cm	Pig-tail 5F 125 cm JR 6F 100 cm JL 5F 100 cm
Coronary Findings	CABG = ok (Syn.Sc.=32)	No significant	LAD ostialntermedi ate	No significant	No in-stent restenosis (LAD = 0%)	Diffuse CAD (Syn.Sc. = 20)
Peripheral Findings	RCIA = 100% LFSA = 100%	LCIA = 100% RCIA = 90%	LCIA = 100%	LCIA = 100%	LCIA = 99–100% LFSA = 95%	LCIA = 100%

high pressure. Fluoroscopy time ranged from 13 min. to 42 min. (mean 30 min.). Full interventional time was from 36 min. to 120 min. (mean 70 min.). The total amount of contrast (for diagnostic and interventional procedures) was 280 ml. up to 400 ml. Hospital lengths of stay were 1 to 3 days.

None of the patients had any procedural or access site related complications (radial artery occlusions, forearm haematomas, radial artery pseudoaneurysm, traumatic peripheral neuropathy, related to the use of a 6F introducer sheath, bleeding with resultant compartment syndrome).

Despite difficult lesions, TASC C/D, the overall primary procedural and technical success rate was 100%. The ankle brachial index (ABI) significantly improved from a mean of 0.46 to 0.90 and 0.94 on six months follow-up. Angiographic estimated residual stenosis was 0%.

Neither minor nor major complications (haematoma, distal emboli, vessel dissection, rupture, death) were documented. The primary patency rate was 100% for the iliac and for the SFA. The secondary patency rate after 6 months follow-up was also 100%. See Table 4.

Thirty-day major adverse events, including myocardial infarction, stroke, death, target-vessel revascularization, or amputation, were also not present.

To date, we still do not have large randomized studies to encourage and support endovascular specialists to attack the most difficult type C and D lesions through TRA. Two studies retrospectively compared open surgical treatment and endovascular therapy. Significantly lower perioperative morbidity and a shorter hospital stay was reported in the endovascular group. Three and four year primary patency rates were also significantly lower for the endovascular group (69% vs 93%, P = 0.013, and 74% vs 93%, P = 0.002), however secondary patency was comparable with surgical repair (89% vs 100%, P > 0.05 and 95% vs 97%, P = 0.3), [18–20]. Recent meta-analysis was published by Jongkind et al., reporting on endovascular treatment for extensive AIOD (TASC C and D lesions). A total of 19 non-randomized cohort studies, containing 1,711 patients, were included. Although 4 and 5 year primary patency rates for endovascular repair were lower compared to open surgical treatment (60 to 86%), these meta-analyses show that the secondary patency rates were comparable (80 to 98%), and most reinterventions were performed endovascularly [18]. STAG, randomized clinical trial has clarified the dilemma: stents versus angioplasty for the treatment of iliac artery occlusions. Analysis of 112 patients had shown that primary stent placement for iliac artery occlusion (8 cm or less) increased technical success and reduced major procedural complications (predominantly distal embolization) compared with balloon angioplasty [21, 22]. A few observational feasibility studies, technical reports, case reports and series have demonstrated the successful application of TRA for addressing peripheral arterial disease (PAD) including internal carotid, vertebral and basilar, subclavian and innominate, renal, iliac, celiac, mesenteric, and superficial femoral artery lesions [4, 7, 23–26, 34–37).

Limitations of TRA for the treatment of PAD are mainly related to diameter compatibility (stent diameter/inner lumen diameter of the guiding catheter or introducing sheath) and distance (access site – lesion). Radial artery size may preclude utilisation of large diameter equipment (> 6-French), and limitations imposed by catheter length may make it impossible to reach arteries distal to the common and external iliac, especially in taller patients. However, the use of left TRA and a high puncture may provide a solution in many of these cases [27, 28].

With peripheral intervention of the lower extremities we started fifteen years ago with rare occasional interventions. Between 2007 and 2012, 151 peripheral interventions were performed, of which 38 were completed with stenting. In 2012, of 4800 percutaneous interventions, 36 peripheral diagnostic procedures and 11 peripheral interventions with stenting were done. We are dedicated solely to the trans-radial approach (95.3% in 2010 and 99.4% in 2012).

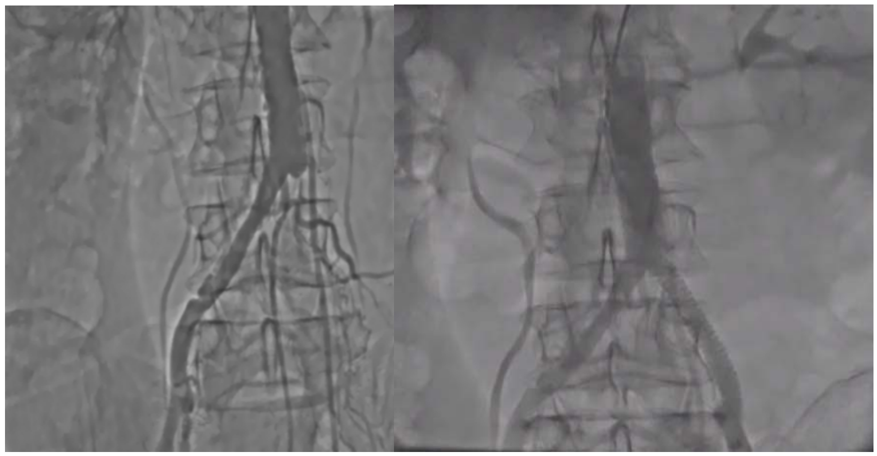
Despite the small number of patients with peripheral artery disease treated through a transradial approach, as in other publications, results show a clear tendency that this access gives excellent results when patients are properly and well selected [4, 11, 24–26]. Of all patients with PAD who were treated during 2012 with endovascular interventional procedures, 46% of cases (100% of iliac stenosis) were done using

Table 4

Interventional characteristics

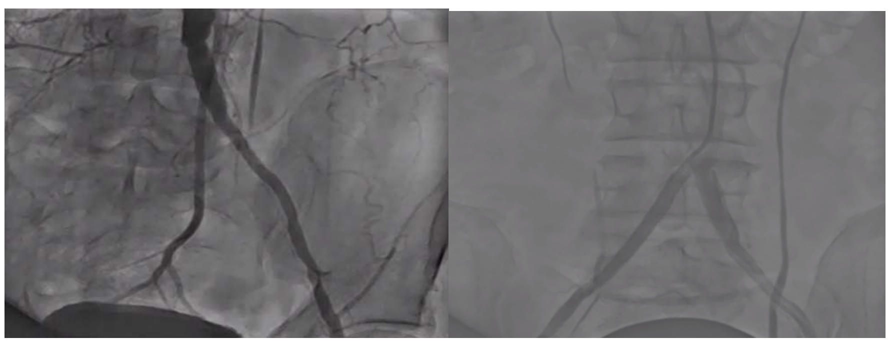
INTERVENTION	Pts 1	Pts 2	Pts 3	Pts 4	Pts 5	Pts 6
Intervention Site	RCIA	LCIA	LCIA	LCIA	LCIA LFSA	LCIA
Introducer Sheath	6F Terumo Short Sheath, Destination 6F 90 cm	6F Terumo Short Sheath	6F Terumo Short Sheath	6F Terumo Short Sheath, Destination 6F 90 cm	6F Terumo Short Sheath,	6F Terumo Short Sheath, Shuttle sheath 6F 90 cm.
Guiding Catheter	MB 1 6F 110 cm	MB 1 6F 110 cm	MB 1 6F 110 cm	MB 1 5F 110 cm	MPA 2 5F 125 cm, MB 1 5F 110 cm	MB 1 6F 110 cm
Intervention Guide Wire	Shinobi Plus 0,014" 180 cm, Whissper MS 0,014" 190 cm, Cross-it 400 0,014" 190 cm, Glide wire 0,035" 260 cm, Ex. supp. 0.014" 300 cm	Cross-it 300 0.014" 190 cm, Ex. supp. 0.014" 300 cm	Shinobi Plus 0.014" 180 cm, Pilot 200 0.014" 190cm, Glide wire 0.035" 260 cm,	Shinobi Plus 0.014" 180 cm, BMW 0.014" 190 cm, Ex. supp. 0.014" 300 cm	Cross-it 200 0.014" 190 cm, Ex. supp. 0.014" 300 cm	Shinobi Plus 0.014" 180 cm, Ex. supp. 0.014" 300 cm
Balloon/atm	1.5/20, 2.0/30 × 12 atm	1.5/20 × 20 atm	1.5/20, 3.5/30 × 18 atm	2.0/20, 2.5/20 × 18 atm	1.5/20 × 18	1.5/20, 3.5/30, 7.0/30 × 10 atm
Type of Stent I	Herculink 6/15	SelfX 8/68	Complete SE ILIAC 9/40	Omnilink-Elite 7/59	Luminex 6/60	Omnilink-Elite 8/59
Pressure I (atm)	20	0	0	10	0	18
Type of Stent II (size x atm.)	Omnilink-Elite 7/59	0	0	Omnilink-Elite 7/39	0	0
Pressure II (atm)	10	0	0	12	0	0
Balloon post dilatation x atm	7.0/59 × 18	8.0/20 × 8	7.0/60 × 8	5/20 × 10 7.0/39 × 14	6.5/30 × 12	8.0/59 × 12
Residual Stenosis	0%	0%	0%	0%	0%	0%
Fluoroscopy time (min)	42	13	25	30	36	34
Interventional time (min)	120	36	80	70	90	100
Contrast amount (ml)	350	350	400	280	300	350
Complications	No	No	No	No	No	No
Ankle-Brachial Index (ABI) post-intervention	0,88	0.92	0.90	0.90	0.86	0.91
Days in Hospital	1	1	1	1	3	1
6 months Follow up (ABI)	0.90	0.96	0.90	1,1	0.88	0.90

a trans-radial approach. All patients had successful interventions completed through the TRA. A contralateral femoral or retrograde approach, was not used because of the inadequate stent shaft length. See Figs. 1, 2, 3.



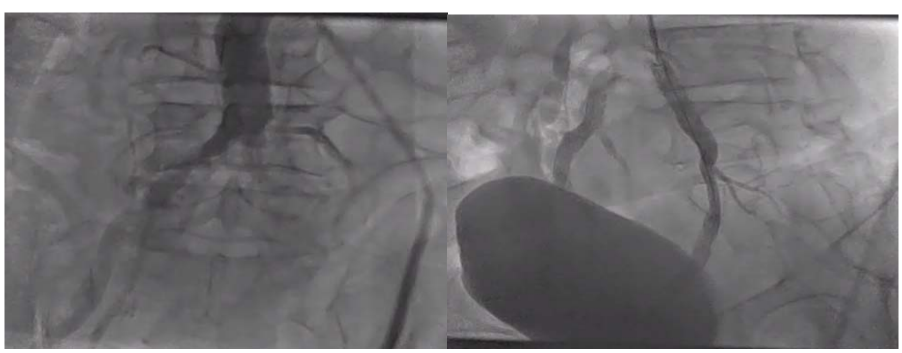
Before intervention **After stenting**

Figure 1



Before intervention **After stenting**

Figure 2



Before intervention **After stenting**

Figure 3

Transradial access for Iliac Interventions shows a lot of advantages. This approach should be particularly beneficial for patients undergoing peripheral interventions for several reasons. The first reason is decreased bleeding and complications and a reduced need for blood transfusions. Secondly, this is easier access and haemostasis for obese patients is incomparably simpler because the radial artery is a superficial artery and easy for compression. Thirdly, this approach facilitates safer outcomes, earlier ambulation and same-day discharge of patients, improved patient comfort and reduced patient anxiety level and increased patient satisfaction. Fourthly, it can be done as an outpatient procedure, which decreases post-procedural cost. Fifthly, these patients frequently present with bilateral disease that not infrequently means the crossover technique is hampered by severe tortuosity. Sixthly, TRA eliminates compressing the common femoral artery after the procedure which, in the presence of occlusive disease, may lead to ischaemia or thrombosis [11, 23–28].

There is a small number of disadvantages for TRA. First, the learning curve, which means that the operator has to be familiar with TRA. Second, the distance from the puncture site to the lesion location. The third is related particularly to the lack of adequate TRA compatible equipment on the market [11, 23–28].

Alternative access sites, including the brachial and axillary arteries, have been employed in clinical scenarios where groin access is contraindicated. Nevertheless, these approaches have been associated with a relatively high risk of vascular and nerve complications. Furthermore, cannulation of these arteries has the potential for thrombotic occlusion, which may put the entire distal limb at risk [29].

We hope that the increased incidence of peripheral vascular disease, as well as the increased number of TRA interventions in this field, will have an impact and will increase the demand for the devices used for its treatment. Transparency Market Research, a leading U.S.-based Market Research firm, analyses the market for peripheral vascular devices and predicts a compounded annual growth rate of 7.1% for the period 2012 to 2018. The peripheral market is projected to grow by 37% in the next four years. Maybe for the first time from very beginning of endo-vascular therapy in 1964 these improvements in materials and techniques over the past decades have enabled open surgery to be replaced. These minimally invasive techniques, with miniaturization of the interventional equipment and improved physician experience, show reduced morbidity and mortality with this approach when compared to open surgery [11, 18, 30–37]. The kit designed for peripheral interventions on the iliac and femoral arteries should contain: introducing sheaths of at least 110–125 cm length, exchange wires of at least 300 cm and balloon and stent shafts of at least 135–150 cm.

Conclusion

The transradial approach (TRA) is a safe, efficient, feasible and consistent technique for proximal iliofemoral interventions with low major and minor complications and a high technical success rate in carefully selected patients. Therefore, we strongly recommend the use of the TRA as the first-choice vascular access site for interventions on the iliac, and even proximal femoral territories. This technique is still limited by the lack of adequate equipment. This issue should be overcome in the future. Efforts to better identify asymptomatic PAD patients may allow for earlier diagnosis and intervenetions. Even TASC type C and D lesions can be treated with endovascular interventions with satisfactory results, and high secondary patency rates can be achieved. The use of stents seems to result in a higher patency rate.

We hope that the increased incidence of peripheral vascular disease, as well as the increased number of peripheral interventions through TRA, will have an impact on developing new products. That could improve, simplify and expand this method and we would like to see longer devices so we can reach the SFA and popliteal arteries.

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Резиме

ТРАНСРАДИЈАЛЕН ПРИСТАП КАКО ПРВ ИЗБОР ВО СТЕНТИРАЊЕ НА ХРОНИЧНИ ТОТАЛНИ ОКЛУЗИИ НА ИЛИЈАЧНИТЕ И СУПЕРФИЦИЈАЛНИТЕ ФЕМОРАЛНИ АРТЕРИИ

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Трансрадијалниот пристап (ТРП) во третманот на аортоилијачната оклузивна болест (АИОБ), денес е многу почест пристап отколку до пред неколку години. Ова се должи на помалиот број на пост-процедурални крвавечки компликации и нивното влијание на смртноста.

Главна причина за зголемениот интерес за ТРП е во безбедносниот профил на овој пристап.

Периферната артериска болест (ПАБ) е растечки феномен. Таа претставува чест циркулаторен проблем, при кој стеснети артерии поради присуство на атеросклеротски лезии го намалуваат протокот на крв во долните екстремитети. Според Транс атлантскиот меѓународен консензус за лекување на периферната артериска болест (TASC II), ендоваскуларниот пристап се препорачува за тип А и Б лезии, а хируршки пристап за тип C и D лезии.

Целта на студијата е да се стави акцент на предностите на трансрадијалниот пристап (ТРП), наспроти трансфеморалниот пристап (ТФП), евалуација на неговата безбедност и ефикасност во третманот на периферната артериска болест (ПАБ), кај добро и правилно избрани пациенти (по претходна оцена на добиените дијагностички резултати) со тип C и D лезии. Со добиените резултати кај пациентите кај кои можело да се изврши трансрадијално стентирање на оклудираните илијачни артерии (ТРСИА), да се зголеми побарувачката за нови посовремени и адекватни уреди и алатки за овој начин на лекување. Овие подобрувања би требало да исклучат некои од недостатоците и ограничувањата на ТРП на полето на ендоваскуларните периферни интервенции (оддалеченост од местото на пункција до локацијата на лезијата, поголема поддршка, потенки уреди).

И покрај тешките лезии, (TASC C и D тип на лезии), целокупната примарна процедурална и техничка стапка на успех беше 100%. Глуждбрахијалниот индекс (ГБИ) беше значително подобрен со средна вредност од 0,46–0,90 до 0,94 за шест месеци следење. Ангиографски процентата резидуална стеноза беше 0%.

Мали и големи компликации (хематом, дистална емболија, дисекција на крвниот сад, оклузија, односно прекин на доток на крв, смрт) не беа документирани. Основната стапка на успешност беше 100% за илијачните и за SFA. Секундарната стапка на успех по 6 месеци следење, исто така изнесуваше 100%.

Трансрадијалниот васкуларен пристап може да се препорача како пристап од прв избор за интервенции на илијачниот, па дури и за регионот на проксималната територија на бутната артерија. Оваа техника сè уште е ограничена поради недостигот на соодветна опрема. Ова прашање треба да се надмине во иднина.

Клучни зборови: трансрадијален пристап, стентирање, периферна васкуларна болест, оклузија на илијачната артерија, ендоваскуларни интервенции.