Short Communication

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Journal of Clinical Cardiology and Research

2022
Vol.5 No.4:001

Evaluation of Early Term Results of Endovascular Procedures Performed with Retrograde Popliteal Artery Intervention

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Received date: February 07, 2022, Manuscript No. IPCCR-22-12871; **Editor assigned date:** February 10, 2022, PreQC No. IPCCR-22-12871(PQ); **Reviewed date:** February 25, 2022, QC No. IPCCR-22-12871; **Revised date:** April 11, 2022, Manuscript No. IPCCR-22-12871 (R); **Published date:** April 19, 2 022, DOI: 10.36648/IPCCR.5.4.001

Citation: Ozkok A, Goktas H (2022) Evaluation of Ea rly Te rm Re sults of Endovascular Procedures Performed wi th Retrograde Popliteal Artery Intervention. J Clin Cardiol Res Vol:5 No:4

Abstract

Background: Femoral access is practically the most utilized access point in a patient for trans catheter interventions, though subclavian and direct aortic access are also alternatives that are on the rise to some extent. In this retrospective study we wanted to explore the viability of retrograde popliteal access in patients with chronic total occlusion of superficial femoral arteries due to the anatomical availability of the artery.

Objective: We aimed to deduce whether Retrograde Popliteal Access (RPA) is a viable treatment option in chronic occlusion of superficial femoral arteries.

Method: From June 2017 to February 2019, 27 patients in total (21 mens, 63 ± 5) underwent balloon dilatation *via* retrograde popliteal access under Duplex Ultrasound (DUS). Age, gender, tobacco use, comorbid diseases were all noted for each subject. Subjects were for a year postoperatively. They were reevaluated 1st, 6th and 12th months after the procedure for restenosis.

Results: In 100% of 27 subjects successfull RPA was achieved. The initial success of balloon angioplasty was noted as 96%, 296. During the regular follow ups claudication, rest pain and toe ulcers were noted to improve significantly. Ankle-brachial index changed from 0.52 ± 0.11 to 0.93 ± 0.2 at 1 year after intervention (p<.001), although patency rates at 1, 6, 12 months after the procedure were 96%,296,92%,593,88%,89 respectively. The noted restenosis cases were endovascular procedures. Patients with tobacco use, comorbid diseases (COPD, hyperlipidemia, chronic renal failure) were noted to be at higher risk of restenosis.

Conclusion: RPA under DUS guidance has been exhibited to be an effective method in treating chronic total occlusion of superficial femoral arteries due to its high procedural success and low morbidity rates. Tobacco use and comorbid diseases were found to be factors that interfere with RPA balloon dilatation failure.

Keywords: Hyperlipidemia; Tobacco; Retrograde Popliteal Access (RPA)

Introduction

Peripheral artery disease is a common disease that causes a great deal of mortality and morbidity. Elderly population, patients with diabetes mellitus and smokers are the major risk group of said disease, while superficial femoral artery and popliteal artery are the most commonly affected sites. Since percutaneous femoral angioplasty became the mainstay method of treatment for ailments that possess endovascular revascularization indications, conventional open surgery has been on a rapid course of decline. Such fact can be corroborated with the changes in treatment approaches in current guidelines (recommendation of endovascular techniques were implemented to a heavier extent in TASC II which was published in 2007). Though antegrade endovascular approach provides high success rates, shorter recuperation time, better limb salvage options and a generally high quality of life [1]. Though this approach provides a multitude of positive outcomes, it is not without shortcomings of its own right. The difficulty of intraluminal reentry in sub intimal recanalizations, the challenge of peripheral recanalization's through anterograde access limit the primary success of endovascular treatments. In this study we focused on what sort of changes retrograde access through popliteal artery could bring into this clinical picture.

Description

Data was collected retrospectively on all patients who underwent lower extremity angioplasty through retrograde popliteal access between June 2017 to February 2019 in a single clinic (Yeditepe University Kozyatagi Hospital), the procedures were performed by institution cardiovascular surgery unit.

All patients had Intravenous Digital Subtraction Angiography (IVDSA) or Magnetic Resonance Angiography (MRA) prior to procedure. Intentional sub intimal angioplasty was performed for occlusions [2]. Procedures were performed under local anesthesia with or without intravenous sedation. Patients were placed prone and an ultrasound scan was used to identify the popliteal artery and its relation to the popliteal vein. The popliteal artery was punctured just above the knee joint line, a standard 0.035 inch 1.5 mm J guide-wire and a 5Fr Van Andel

catheter were then introduced retrograde into the popliteal artery. The lesions were attempted to be crossed either transluminally or subintimally with the guide wire-catheter combination. After successful crossing, balloon dilatation with an appropriately sized balloon was performed. Postoperative angiogram was then performed after the completion of balloon dilatation in order to confirm proper recanalization. Technical success was defined as restored patency with no stenosis greater than 30% as per reporting standards [3].

Results

A total of 27 procedures were performed through RPA access. The patient demographics were reported to be as such:

Number of procedures=27

Number of patients=25

Median age=63,2

Sex (M:F)=64:36

In 100% of 27 subjects successfull RPA was achieved. The initial success of balloon angioplasty was noted as 96%,296. During the regular follow ups claudication, rest pain and toe ulcers were noted to improve significantly. Ankle-brachial index changed from 0.52 ± 0.11 to 0.93 ± 0.2 at 1 year after intervention (p <.001), although patency rates at 1, 6, 12 months after the procedure were 96%,296,92%,593,88%,89 respectively.

Discussion

Through the results produced, popliteal access has already been proven to be a useful alternative to femoral access, especially in iliofemoral lesions. Despite that popliteal access is a relatively underutilized approach mainly due to puncture site complication concerns or the apprehension due to its different access method. This study demonstrates the RPA access as a method that offers positive results that is easily comparable to the conventional SFA access. It also arguably shows that intraluminal reentry in distal vessels are easier in RPA access, though a larger study with SFA access cases included in it would be concrete evidence for such a hypothesis. Regardless of comparative success, this study has shown that with proper steps taken, RPA access offers good prognosis and high rates of technical success.

As previously mentioned, local puncture site complications were raised as serious concerns over RPA. Formation of arteriovenous fistulas, puncture site arterial dissections, thrombosis, peroneal nerve palsy secondary to hematomas were noted as serious complications RPA could bring onto the table. Popliteal access was performed under Doppler ultrasound guidance in our study, which raised none of the listed complications in our 27 cases, which denote the safety of such approach.

Gathering what we observed and the results of previously completed studies, RPA and SFA approaches are good alternatives to each other in the short term. Though a prospective long term outcome study using both approaches in a randomized clinical trial would be in order to advance the literature [4].

Conclusion

Our comprehension from this study gathers that RPA is a useful alternative access method that offers better intervention options in distal iliofemoral lesions. We also observed that proper care during puncture (Doppler ultrasound guidance in our case) notably prevents the complications that were reported in prior studies.

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