

# Evaluation of Endovascular Intervention Therapy Results in Chronic Below-The-Knee (BTK) Arterial Occlusive Disease

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## Abstract

**Objective:** To evaluate the results of endovascular intervention therapy in Below-The-Knee (BTK) arterial disease.

**Methods:** Retrospective descriptive series of cases. We had researched from January 2015 to December 2015 at Vascular Surgery department in Cho Ray hospital.

**Results:** The study sample of 09 patients. We had counted 55.6% female rates, average ages  $74.56 \pm 9.7$ . Chief complain symptom was a painfully, 66.6% sample. Percutaneous transluminal angioplasty (PTA) performed by 77.8%, PTA and stent replacement combination accounted for 22.2%. BTK intervention simple accounted for 66.7%, other combination was 33.3%. The procedure times had  $161 \pm 38.7$  minutes. The time of hospitalization average was  $6 \pm 1.85$  days. Thrombosis artery complications had got into 11.1%, hematoma had got 11.1% and mortality rate had got 1 case in our research. Technique and short-term results success rates were 88.9% and 88.9%, respectively.

**Conclusions:** The intervention endovascular therapy of chronic arterial occlusion of the lower extremity less invasive method which is safe, effective, shorter hospital stays and faster recovery of patients. Results of short-term achieve a high success rate.

**Keywords:** Endovascular therapy; Blood vessel; Peripheral vascular disease

## Introduction

Below-The-Knee (BTK) arterial occlusive disease with small-diameter blood vessels, blood should have low flow from far the way. The disease is often detected when there appear signs of critical limb ischemia. Previously, BTK arterial occlusive disease treatment is often bypass of veins, this is serious surgery that efficiency is not high. Especially in older patients, many factors increase the risk of coordinated operation, poor distal blood vessel, vein or less difficult to bypass. Following the success of endovascular interventions for peripheral vascular disease, BTK intervention initially brought positive signs.

Cho Ray hospital, 2012 our department initially treated chronic lower limb arterial occlusion by endovascular intervention: percutaneous transluminal angioplasty (PTA), stent replacement initial positive results. The number of patients with chronic arterial occlusion lower limb to be treated with this technique is increasing, from 39 cases in 2013 increased to 197 cases in 2015. However, at present in our country is still research's efficacy technical BTK intervention. Therefore, the objectives of our research were: To evaluate the results of endovascular intervention therapy in Below-The-Knee (BTK) arterial disease.

## Research Methods

- Study design: Retrospective.
- Time study: Sampling from January 2015 to December 2015, follow May 2016.
- Research area: Cho Ray Hospital.
- Study subjects [1].

## Standard sampling

All these cases had chronic Below-The-Knee (BTK) arterial

occlusive disease treatment with endovascular interventions in Vascular Surgery department.

## Exclusion criteria

- Revascularization surgery alone (bypass).
- Surgery combined endovascular intervention (hybrid procedures).
- Narrow the floor on upper has not been revascularization or not revascularization enough (intravascular diameter after revascularization have upper 70%).

## Evaluating the results of treatment

- Evaluation of a successful outcome based interventions: clinical, subclinical [2] (Table 1).
- Evaluate the results at 2 times intervention: immediately after surgery and after 01 month.

## Results

The sample had 09 cases of patients met the inclusion criteria (Tables 2-9 and Figures 1-5).

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Clinical (Rutherford category)	Improvement in baseline symptoms by at least 1 category
Ultrasound	>70% reduction in luminal diameter suggested by PSVR $\geq 3.0$
ABI	Increase of >0.15

Table 1: Evaluating the results of treatment.

	N (%)	Mean
Age	74 (100%)	74.56 $\pm$ 9.7 (62-86)
Smoking	4 (44.4%)	
Hypertension	3 (33.3%)	
Diabetes	2 (22.2%)	
Dyslipidimia	8 (88.9%)	
CAD	1 (11.1%)	
Stroke	1(11.1%)	
Renal failure	1 (11.1%)	
Heart failure	0 (0%)	
Cirrhosis	0 (0%)	

Table 2: Age, gender and risk factors, diseases combinations.

Stages	Grade	N (%)
0	0	0 (0%)
	1	0 (0%)
	2	2 (22.2%)
	3	0 (0%)
II	4	1 (11.1%)
III	5	2 (22.2%)
IV	6	4 (44.5%)
Total		9 (100%)

Table 3: Rutherford category.

	IC	CLI
A	0 (0%)	0 (0%)
B	0 (0%)	0 (0%)
C	1 (11.1%)	3 (33.3%)
D	1 (11.1%)	4 (44.5%)
Total (%)	2 (22.2%)	7 (77.8%)

Table 4: The relationship between TASC II with clinical symptoms.

		PTA	Stent	Both
TASC II	A	0 (0%)	0 (0%)	0 (0%)
	B	0 (0%)	0 (0%)	0 (0%)
	C	3 (33.3%)	0 (0%)	1 (11.1%)
	D	4 (44.5%)	0 (0%)	1 (11.1%)
Total (%)	7 (77.8%)	0 (0%)	0 (22.2%)	

Table 5: The relationship between TASC II with interventions.

## Discussion

In the study, we found a high proportion of women than men. Our sample reported smoking 04 cases (44.4%), lipid metabolism disorders has 08 cases (88.9%). According to other documents [2,3], smoking and lipid metabolic disorders becomes a factor accelerating the process of pathological blood vessels, increases the severity of the disease and significant impact on disease chronic arterial occlusion of the lower extremities.

## The main symptom

The main symptom is pain in hospitalized patients, accounting

for 66.7% with severe clinical manifestations, recorded most cases classified under Rutherford 5, 6 degrees, 66.7% accounted for, and of these, 04 cases accounting for 44.5% of the samples studied were ulcers or gangrene. In the study sample, only recorded lesions TASC II C and D accounted for 44.5% and 55.5% respectively. As recommended by the 2nd update TASC (Transatlantic Inter-Society Consensus) [4], those to TASC II C may be surgery or intervention, while the TASC II D lesions should be surgery. However, in this group older patients combining multiple severe medical conditions, are at high risk cannot perform surgery. Therefore, we carried out interventions for this patient population, initial positive results.

## The method of anesthesia

Local anesthesia of all 09 cases, these are the advantages of

	N	%
PTA	7	77.8
Stent	0	0.0
PTA+ Stent	2	22.2
Total	9	100

Table 6: Anesthesia.

Time	Mean
Intervention time(min)	161 $\pm$ 38.7 (105-230)
LOS (day)	6 $\pm$ 1.85 (5-10)

Table 7: Endovascular methods.

Postintervention complication	N	%
Occlusion	1	11.1
Hematoma	1	11.1
Amputation	1	11.1
Fistula	0	0
Pseudoaneurysm	0	0
Penetrated	0	0
MI	0	0
Died	0	0

Table 8: Postintervention complication.

Results	Success	Fail
Post (n=9)	88.9% (8)	11.1% (1)
Short-term(n=9)	88.9% (8)	11.1% (1)

Table 9: Intervention results.

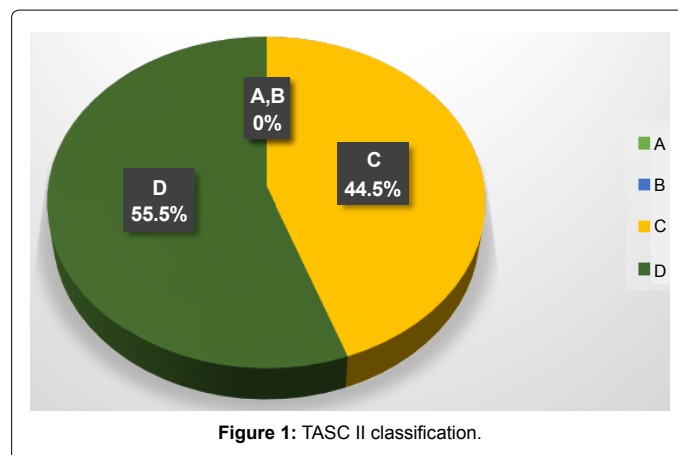
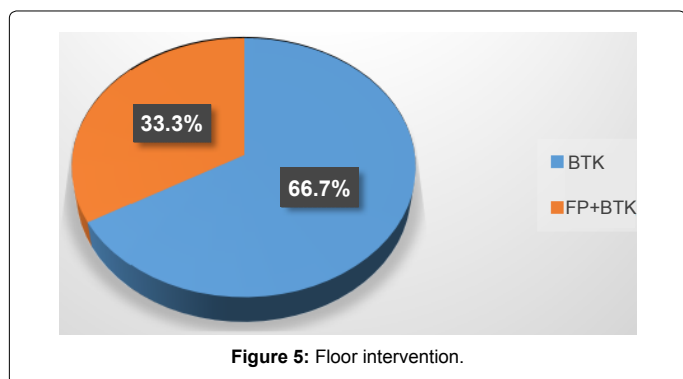
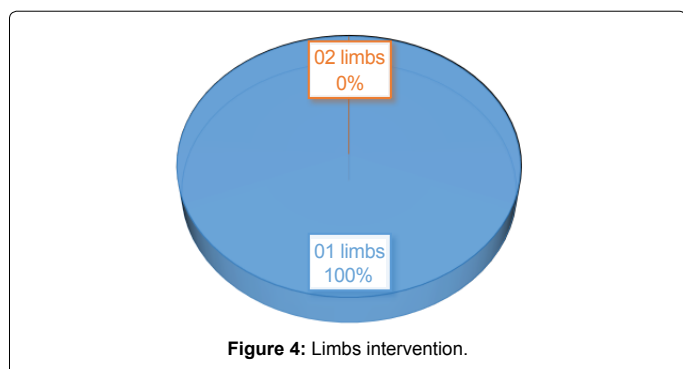
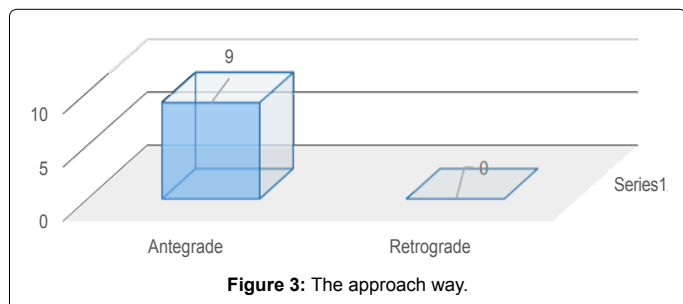
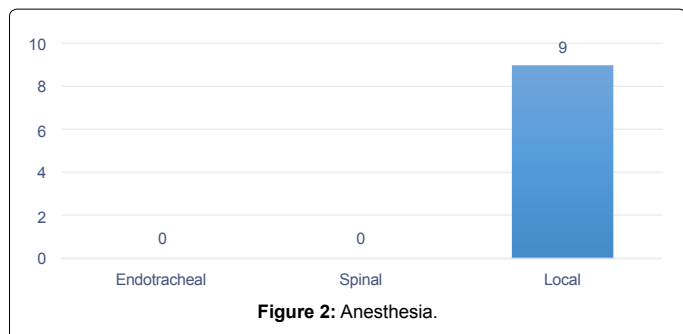


Figure 1: TASC II classification.



endovascular interventions. After the intervention, the patient recovers faster and avoids complications of anesthesia. This is very heavy on older patients, patient coordination.

### Interventions

Mostly PTA method, accounting for 77.8% of the sample studied. In particular, PTA with lesions TASC II C and D accounted for 33.3% and 44.5% respectively. PTA combined stent replacement a low percentage, 22.2% of the sample studied. We have not recorded any

case in stent replacement simply. This shows that the question is not the first choice for stent replacement in BTK intervention. Because of the characteristics of blood vessels BTK is the small blood vessels, extend stenosis lesions, low flow are at risk or restenosis after stent replacement. However, because the study sample was small, the study design was not strong enough so we thought we need to study in more detail on this issue because there is evidence that stent replacement still effective [5,6]. On the other hand, according to other authors [7-9], PTA with balloon drug is also showing positive results in the form that this study does not have to be.

We intervene mainly BTK floor, accounting for 66.7%, coordinating BTK occupied 33.3% femoro-popliteal floor. All the cases we intervene 1 limb. Intervention time average 161 minutes, the average length of hospital stay 06 days.

### Complications intervention

We had 02 cases with 22.2% sample studied. Including 01 cases of hematoma at the needle position, we must proceed hematoma surgically removed; and 01 cases of embolism after intervention leg to amputation of the lower 1/3 of the left thigh.

### Evaluate the results

Endovascular intervention method merely succeeds lower limb reperfusion to achieve good results, with success rates of 88.9% technically. Results in the period accounted for 88.9% short term. We found that the intervention time and length of hospital stay in our study sample longer than the other authors [4,8]. However, this is the first phase we performed to intervene which should not have much experience and equipment's used were limited. Endovascular interventions have significantly improved clinical symptoms, subclinical in the short term. Once again confirms the effectiveness of this approach to patients with chronic below-the-knee arterial occlusive diseases. Especially older patients, with severe medical conditions and high risk factors.

### Conclusion

By studying 09 cases of chronic below-the-knee arterial occlusive diseases were treated with endovascular interventions, we have concluded the following:

- Patients who are almost same between men and women, elders have many risk factors and diseases coordination.
- Patients with severe clinical presentation with symptoms of critical limbs ischemia, TASC II C and D classification.
- Shorter length of hospital stay and faster recovery of patients.

Endovascular intervention is having less invasive methods, technical success accounted for 88.9% and short-term results accounting for 88.9%.

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