

VASCULAR SURGERY

SHORT REPORT

Functional outcomes after successful lower extremity arterial injuries repair

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Abstract

The study was conducted to measure functional outcome of patients who had successful lower extremity arterial reconstruction after vascular injury at a tertiary care centre in Karachi over 5 years from January 2008 to December 2013. In this descriptive cohort study, the functional outcomes were assessed with lower extremity functional scale (LEFS). The mean age the 75 patients in the study was 32±11 years. Limb salvage was successful in 72(96%) cases. The most common injured artery was superficial femoral artery 30(40%) followed by popliteal artery 19(25%). The most common method of repair was end-to-end using either polytetrafluoroethylene (PTFE) graft 43(57%) or vein interposition grafting 19(25%). Two (2.66%) patients with delayed presentation had secondary amputation. One (1.33%) patient had graft infection. Acceptable good functional outcome was noted with a mean LEFS of 72±8.

Keywords: Lower limb, Vascular injury, Limb loss, Functional status.

Introduction

Prompt diagnosis and early repair is the mainstay of successful outcome after vascular injuries. Little literature is available documenting functional status of limbs which are salvaged. One of the tools to assess the functionality of those salvaged limbs is the Lower Extremity Functional Scale (LEFS).¹

The current study was conducted to assess salvage rate and functional status of patients who had lower extremity arterial repair at a tertiary care hospital in an urban setting.

Methods and Results

The retrospective, descriptive cohort study was conducted at the Department of Surgery, Aga Khan University Hospital (AKUH), Karachi, and comprised

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patients >15 years of age treated between January 2008 and December 2013. Medical records were retrieved according to International classification of Diseases (ICD-9) coding system.² Major arterial injury to lower limb was defined as injury to common femoral, superficial femoral, popliteal and multiple infrapopliteal arteries. The data was collected on a predesigned proforma and salvage rate and other parameters were noted. Functional outcome was assessed in the clinic or via telephone using LEFS.¹ It is a questionnaire containing 20 questions inquiring about a person's ability to perform everyday tasks. It has a total of 80 marks. The minimum acceptable score is 40 and 40-60 is considered good, while 60-80 is taken as better (Table). Patients who had undergone primary amputation, had torso or head injuries, incomplete record or follow-up

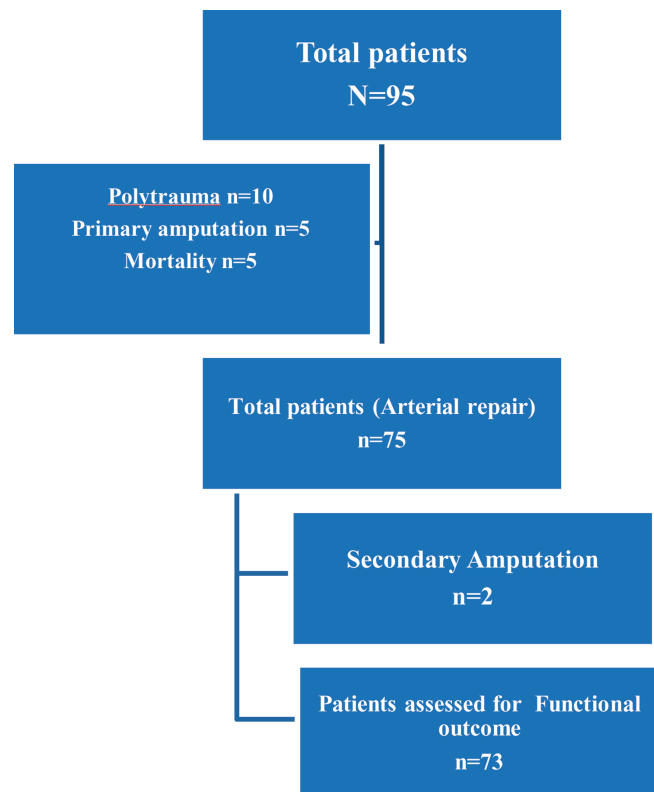


Figure: Study Flowchart.

Table: Lower Extremity Functional Scale (LEFS).

Activities	Extreme difficulty or unable to perform activity	Quite a bit of difficulty	Moderate difficulty	A little bit of difficulty	No difficulty
1. Any of your usual work, housework or school activities.	0	1	2	3	4
2. Your usual hobbies, recreational or sporting activities.	0	1	2	3	4
3. Getting into or out of the bath.	0	1	2	3	4
4. Walking between rooms.	0	1	2	3	4
5. Putting on your shoes or socks.	0	1	2	3	4
6. Squatting.	0	1	2	3	4
7. Lifting an object, like a bag of groceries from the floor.	0	1	2	3	4
8. Performing light activities around your home.	0	1	2	3	4
9. Performing heavy activities around your home.	0	1	2	3	4
10. Getting into or out of a car.	0	1	2	3	4
11. Walking 2 blocks.	0	1	2	3	4
12. Walking a mile.	0	1	2	3	4
13. Going up or down 10 stairs (about 1 flight of stairs).	0	1	2	3	4
14. Standing for 1 hour.	0	1	2	3	4
15. Sitting for 1 hour.	0	1	2	3	4
16. Running on even ground.	0	1	2	3	4
17. Running on uneven ground.	0	1	2	3	4
18. Making sharp turns while running fast.	0	1	2	3	4
19. Hopping.	0	1	2	3	4
20. Rolling over in bed.	0	1	2	3	4
Column Totals:	0	1	2	3	4

were excluded from the study.

Diagnosis of arterial injury was made by history, hard and soft signs for vascular injury. Surgical repair was done by applying standard vascular surgery principles and techniques. All patients were followed up in the clinic.

A total of 95 patients with lower extremity arterial injuries were managed during the study period. Of them, 75(79%)

fulfilled the criteria for assessing the functional outcome (Table-2). These include 72(96%) male patients. The overall mean age was 32±11 years. Besides, 55(73%) patients had penetrating trauma and 44(59%) had associated fracture. The most common injured artery was superficial femoral artery 30(40%) followed by popliteal artery 19(25%). Nerve injury was associated in 30(40%) patients. The most common method of repair was end-to-

end using either polytetrafluoroethylene (PTFE) graft 43(57%) or vein interposition grafting 19(25%) Repair of concomitant venous injuries was done in 27(36%) patients. Fasciotomies were performed in 45(60%) patients. One (1.33%) patient had delayed graft infection and required removal, but his limb survived with good functional outcome due to good collaterals. Within 30 days after arterial repair, 2(2.66%) limbs were amputated because of severe soft tissue damage as a consequence of trauma and reperfusion injury.

Mean functional outcome score was 72±8.

Conclusion

Open surgical treatment is the standard of care for extremity vascular trauma, especially when major arteries are affected. Limb salvage has been reported between 80% and 94%.³ Our data is consistent with these results.

It has been realised that functional outcome of the reconstructive procedure is as important as the salvage of the limb itself.⁴ A patient may be better served by a primary amputation and a good prosthesis than a non-functional extremity salvaged by multiple operations. In this series the mean LEFS was 72 which is considered a good outcome.

An important decision is whether or not to salvage a limb. Various scoring systems that numerically quantify the extent of the injury have been developed to help define which limbs should be amputated, and have been successfully applied by many studies.^{5,6} However, these have been criticised for having been derived from a small group of patients in a retrospective fashion without any prospective validation.⁷ The decision of primary amputation is based on the extent of neuronal and soft tissue injury rather than the vascular injury. In this series, limitation of Mangled Extremity Severity Score (MESS) is evident as 6 patients' limbs were salvaged who had MESS equal or greater than 7. More than half of the arterial repairs done with the PTFE graft in this series showed

comparable results with vein graft in terms of wound/graft infection and limb salvage rate. This finding has been reported in other studies also.^{8,9} In a series of civilian trauma in 188 patients with lower extremity injuries, a study reported equitant patency rates when PTFE and vein grafts were used to repair the iliac, femoral and superficial femoral arteries.¹⁰

We used fasciotomies liberally as advised by many authors. The rationale for this relatively high rate of fasciotomy in this series is the long time between the injury and reperfusion in our setup.

The retrospective nature is a limitation of our study, and it is a single-centre study in which some patients were contacted via telephone to assess their functional status.

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