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FREQUENCY OF FACTORS CONTRIBUTING TO THE LIMB SALVAGE AFTER ARTERIAL RECONSTRUCTION IN TRAUMA PATIENTS

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Abstract:
The treatment of the peripheral arterial injuries may be associated with significant morbidity like amputation. In this study highlights patient related factors which contribute to limb salvage or loss in our population.
***Objective**: To determine the frequency of factors contributing to the limb salvage after arterial reconstruction in trauma patients.*
***Design**: Descriptive case series.*
***Setting and duration**: Surgical floor of Mayo Hospital, Lahore, two years from 15/9/2016 to 15/9/2018.*
***Methods:** In this study included 100 patients of both gender and age more than 12 years with peripheral arterial injuries. Patients were observed for different contributing factors like revascularization in < 6 hours, associated bony injury, venous injury and penetrating trauma. Treatment options included primary repair, end to end anastomosis and reverse venous grafting.*
***Results:** Duration of revascularization < 6 hours was seen in 65 (65%) patients, penetrating injury in 82 (82%) patients, associated bony injury in 31 (31%) and associated venous injury in 42 (42%) patients. Primary repair was done in 27 (27%) patients, end to end anastomosis in 42 (42%) patient and reverse venous graft in 31 (31%) patients.*
***Conclusion**: It is concluded that penetrating injury was the most common contributing factor preceding revascularization < 6 hours.*
Keywords: *Peripheral arterial injury, arterial reconstruction, patient factors, limb salvage.*

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INTRODUCTION:

Vascular injury is a major complication in trau- ma patients and account for 4-6 % of these injuries [1]. fte majority of extremity vascular injuries are due to penetrating trauma , followed by blunt injuries which account for 6-10% of extremity vascular trauma. Are often associated with musculoskeletal and nerve injuries [2,3].

Vascular injury has two main consequences: hemorrhage and end organ ischemia [4], and these can be limb and/ life threatening. Studies show that 73 % limbs are salvaged while 27 % sustain either primary or secondary amputation. Patient factors like mode of injury - blunt (49% limb sal- vage), penetrating (97 % limb salvage), time to revascularization > 6 hours (16 % limb salvage), and < 6 hrs (92 % limb salvage) associated in- juries (No venous injury 63 % limb salvage, venous injury 37 % limb salvage). Time is the critical factor in the final outcome of the patient with vascular repair. Vascular repair performed within 6 hours results in near normal return of function while delay of 12 hours or more leads to unacceptable high rate of morbidity in terms of amputation [5].

fte successful management of patients with arterial injuries is aimed towards saving the life and limb. fte limb salvage rate following un- complicated penetrating arterial injuries is over 95%. Associated skeletal injury may still result in amputation rates as high as 70%, despite successful arterial repair. ftese results are more pronounced in the lower extremity than upper limb [6,7]. Various treatment options include pri- mary repair, end to end anastomosis, venous grafting and synthetic grafts like Dacron and poly tetra flouro ethylene (PTFE). Limb loss fol- lowing lower extremity arterial injury has been variously contributed to extent of tissue dam- age, duration of ischemia prior to revasculariza- tion associated venous injuries, popliteal artery involvement, development of compartment syndrome, injury mechanism, anticoagulation and failed revascularization [8]. Where as penetrating injury, low velocity injuries, ischemia time of less than 6 hours, upper limb trauma account for a better prognosis.Fasciotomy,for decompres- sion, may also increase the limb salvage [9].

METHODOLOGY:

Study was conducted on 100 patients admit- ted in surgical floor of Mayo Hospital, Lahore in a period from 15 september2016 to 15 sep 2018 (2 year). It was a descriptive case series by de- sign and patient selection was non probability consecutive sampling. All patients whose limbs had been salvaged after treatment of arterial in- juries aged more than 12 years and both genders were included in the study.

Demographics like name, age, gender and ad- dress were recorded.fte patients were assessed clinically and relevant investigations like CBC, blood sugar,urea&creatinine, electrolytes, dop- pler/duplex scan etc,were done as per usual protocol.Patients were evaluated for contribut- ing factors and investigations were recorded on a questionnaire.All these patients were operated by the experienced surgeon.fteir postoperative management and follow up was done as per rou- tine. SPSS version 17 was used to analyze data. Quantitave data like age was presented in the form of mean + S.D. Qualitative variables like gender and contributing factors i.e. mode of injury (penetrating), time to revascularization (< 6 hrs) and bony injury were presented in the form of frequencyand percentages. Effect modi- fiers like mode of treatment (i.e. primary repair, end to end anastomosis, and interposition of reverse venous graft) were controlled through stratification.

Figure 1: Vascularization after reconstruction

RESULTS:

There were one hundred patients included in this study. fte age range of the patients in study was from 14-59 years with the mean of 29.98 + 8.89(Table 1). ftere were 71 (71%) male patients and 29 (29%) female patients with a male to female ratio of 2.5:1. As per frequency of contributing factors is concerned, majority of the patients had penetrating injury 82(82%). Other factors noted were duration of injury in <6 hours in 65(65%) and end to end anastomo- sis in 42(42%) for limb salvage. Moreover there were 31(31%) patients who had bony injuries, 27(27%) had venous injuries and reverse ve- nous grafting in 31(31%) patients. (Table-2)

Post stratification of 82 patients who had pen- etrating injury, primary repair was done among 24 (29%) patients, end to end anastomosis in 39 (48%) patients, and reverse venous graft in 19 (23%) patients. Similarly when mode of treat- ment was controlled for revascularization <6 hours it was noted that 25(39%) patients were subjected to primary repair, 38(58%) for end to end anastomosis and reverse venous graft was carried out on 2(3%) of patinets. In patients with blunt trauma; primary repair was done in 3 (17%) patients, end to end anastomosis in 3 (17%) patients, and reverse venous graft in 12 (66%) patients. Among 31 patients who had bony injury, reverse venous graft was done in all of them (100%). fte 69 patients who did not had a bony injury; primary repair was done in 27 (39%) patients and end to end anastomosis in 42 (61%) patients.Among 42 patients who had associated venous injury, primary repair was done in 0 (0%) patient, end to end anasto- mosis in 17 (40%) patients, and reverse venous graft in 25 (60%) patients. fte patients who did not have associated venous injury; primary re- pair was done in 27 (47%) patients, end to end anastomosis in 25 (43%) patients, and reverse venous graft in 6 (10%) patients. (Table-3)

Table 1: Age distribution

Age in years	**No. Of patients**	**Percentage**
13-20	18	18%
21-30	45	45%
31-40	27	27%
41-50	7	7%
51-60	3	3%
Total	100	100%
Mean age Mean + S.D = 29.98 + 8.89		

Table 2: Patient factors contributing to limb salvage

FACTORS	**No. of Patients**	**Percentage**
Penetrating injury	82	82
Duration of injury <6 hours	65	65
End to end anastomosis	42	42
Other Factors		
Bony injury	31	31
Associated venous injury	42	42

Table 3 : Mode of treatment

Variables	Primary repair	**End-to-end anastomosis**	**Reverse venous graft**
Time of revascularization < 6 hrs (n=65)	25 (39%)	38 (58%)	2 (3%)
Penetrating injury (n=82)	24 (29%)	39 (48%)	19 (23%)
Bony injury (n=31)	**0**	**0**	31 (100%)
Associated venous injury (n=42)	**0**	17 (40%)	25 (60%)

DISCUSSION:

Once diagnosis of arterial injury is made, the patients require surgical exploration and repair. fte management of complex injuries involving vascular and skeletal elements of the injured extremity remains challenging and still incurs a high incidence of limb loss and morbidity. ftis study highlighted various patient factors which were present among our patients. fte age characteristics of our study showed that mostly the young patients were involved in the vascular trauma. fte mean age of the patients was 29.98 ± 8.89 years and approximately 72% patients were in the age range of 20 – 40 years. ftis is similar to the finding of study by Rana SH et al [1], who found that the peak occurrence was noted between 21-40 years of age (69.5%). Ma- jority of patients in our study were male (71%). fte study by Topal AE [6], and Shalabi R et al showed similar results [10].

According to mode of injury, penetrating injury was the most frequent in our study effecting 82% patients of our study population. Aduful HK et al [11] observed a similar finding that 82.7% patients of their study population suffered penetrating injuries. Rana SH et al [1] also observed that vascular trauma in their study was caused by the penetrating trauma in 86.94% patients. In our study, the majority of patients got revascularization done in less than 6 hours i.e. in 65% patients. In a study at military hospital of Pakistan, most of the patient reached hospital within 6-12 hours (47%) [1].

In this study, arterial injury was associated with bony injury among 31 % patients. ftis was present in 51% patients in study by Shalabi et al[10] and 15.4% patients in study by Aduluf et al [11]. Asso- ciated venous injuries were present among 42% patients of our study, while in study by Shalabi et al [10] associated venous injuries was present among 37.5% patients. In another study by Sub- asi M et al [12], the associated venous injuries were seen among 46% patients. However Rana SH [1] documented a very low frequency of associated venous injuryi.e. 6.5%.

Majority of our patients were treated with end to end anastomosis (42%) followed by reverse venous grafting (31%) and then primary repair (27%). In study by Rana SH, et al [1], end-to-end anastomosis was most common (78%) others being interposition reverse vein graft (13%) and direct suturing of vessel wall (8.7%). In study by Shalabi et al [10], arterial repair performed by inter- position vein graft in 53% patients. ftis was the single most used technique of arterial repair.

Majority of patients with penetrating trauma received end to end anastomosis 39(48%) followed by primary repair 24(29%). Approximately 19(23%) patients also needed the re- verse venous graft interposition, but this was due to another contributing factor i.e. bony in- jury. Majority of the patients in whom revascularization was achieved <6 hours received end to end anastomosis 38(58%) followed by primary repair 25(39%).

Patients with associated venous injury received reverse venous graft interposition i.e. 25(60%) followed by end to end anastomosis 17(40%) [13]. ftis was due to the concomitant venous injury involved in patients with bony injury. Venous injuries have been disregarded mostly and venous repair is still not much of a concern. fte importance of venous repair in limb salvage has been emphasized as it may in- crease the success of arterial repairs [14].

CONCLUSION:

It is concluded that penetrating injury is the most frequent contributing factor. If revascu- larization is done early (before 6 hours), limb salvage can be done. fte procedures for arterial reconstruction include end to end anastomosis (being the most frequent), primary repair and reverse venous graft.

REFERENCES:

1. Rana SH, Farani TM, Jamal Y, Afzal M. Peripheral vascular injuries: epidemiology and management. Professional Med J 2008;15;54-60.
2. Wali MA. Upper limb vascular trauma in the Asir region of Saudi Arabia. Ann ftorac Cardiovasc Surg 2002;8:298-301.
3. Hunt CA, Kingsley JR. Vascular injuries of the upper extremity. South Med J 2000;93:466-468.
4. Kohli A, Singh G. Management of Extremity Vascular Trau- ma: Jammu Experience. Asian Cardiovasc ftorac Ann 2008;16:212-214.
5. Khan MAQ, Khaliq T. Peripheral vascular trauma and its nanagement. Ann Pak Inst Med Scl 2005;1:58-61.
6. Topal AE, Eren MN, Celik Y. Lower extremity arterial injuries over a six-year period: outcomes, risk factors, and manage-ment Vasc Health Risk Manag 2010;6:1103-1110.
7. Subramanian A, Vercruysse G, Dente Ch, Wyrzykowski A, Erin K, David VF. A decade's experience with temporary in-travascular shunts at a civilian level I trauma center. J Trauma 2008;65:316-326.
8. Brown KV, Ramasamy A, Mc Leod J, Stapley S, Clasper JC, Phill D. Predicting the need for early amputation in ballistic mangled extremity injuries. J Trauma 2009;66:93-98.
9. Ritenour AE, Dorlac WC, Fang R. Complications after fasciotomy revision and delayed compartment release in combat patients. J Trauma 2008;64:153-162.
10. Shalabi R, Amri YA, Khoujah E. Vascular injuries of the upper extremity. J Vasc Bras 2006;5:271-276.
11. Aduful HK, Hodasi WM. Peripheral Vascular Injuries and fteir Management in Accra. Ghana Medical Journal 2007;41:186-189.
12. Subasi M, Cakir O, Kesemenli C, Arslan H, Necmioglu S, Eren N. Popliteal artery injuries associated with fractures and dislocations about the knee. Acta Orthopedic Belgica 2001;67:259-266.
13. Küçükarslan N, Oz BS, Ozal E, Yildirim V, Tatar H. Factors af- fecting the morbidity and mortality of surgical management of vascular gunshot injuries: missed arterial injury and disre- garded vein repair. [Article in Turkish] Ulus Travma Acil Cer- rahi Derg 2007;13:43-48.
14. Nitecki SS, Karram T, Hoffman A, Bass A. Venous trauma in the Lebanon War-2006. Interact Cardiovasc ftorac Surg 2007;6:647-650.