

A Clinical Audit of Management of Peripheral Vascular Injuries

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This is a retrospective analysis of the management of 21 cases with vascular injuries who presented in the Casualty Department of Mayo Hospital in the period from September 1993 to September 1995. Evaluation of results and comparison with other studies is presented. The mean age of the patients was 26 years with a male to female ratio of 20:1. Femoral vessels were the most frequently involved and gun shot was the commonest mode of injury. Ligation of vessel was done in six where as 15 cases underwent repair. Disruption of repair occurred in 4 cases out of which two underwent amputation. There is one mortality in 21 cases. Successful management depends on meticulous surgical technique, team work and prompt repair.

Key words : Vascular injuries, Peripheral vascular trauma.

Although injuries to the peripheral vascular system date back to prehistoric era but these were mainly restricted to battle fields. There has been a tremendous rise in the incidence of peripheral vascular injuries in the last 15 years in the civilian population. Mode of injury has also undergone change, knives and other sharp edged instruments used to be the mode of injury in the past. Fire arms have now become the major culprit in peripheral vascular injuries alongwith road traffic accidents¹. Hospital records of patients with peripheral vascular trauma were reviewed in order to improve care of these patients.

Material and methods

This is a retrospective study of patients treated for peripheral vascular injuries in the East and West Surgical Units of Mayo Hospital, Lahore from September 1993 to September, 1995. After admission, each patient was initially seen by a Senior Registrar before exploration.

Upon diagnosis of vascular injury, intravenous access was secured and blood sample was taken for CBC, grouping and cross-matching. Site of bleeding was covered with pressure bandage. Patients were resuscitated with crystalloids and colloids till blood was available. Every effort was made to start the operation as early as possible. Preoperative antibiotics were given. If the patient was in shock, no time was wasted in x-ray investigations.

A team of surgeons scrubbed up while one resident maintained manual compression at the site of injury. All peripheral injuries were explored by longitudinal incisions. Both proximal and distal control was obtained and then the site of haemorrhage was identified.

External fixation of fractures was performed simultaneously where indicated. Our aims remained the control of haemorrhage, wound debridement, lavage and then restoration of continuity of the vessel. Round body Prolene 5/0 or 6/0 was used for continuous repair. Post operative third generation cephalosporins were

administered and patients were routinely heparinized. All patients were discharged after removal of stitches.

Results

Twenty- male and one female patients with age range of 13-45 years (a mean age of 26 years) were treated for vascular injuries in the study period.

Table 1: Distribution of vascular injuries.

Arteries	n=
Common femoral	3
Sup. Femoral	8
Popliteal	2
Axillary	1
Brachial	4
Radial	3
Total:	21

Superficial femoral artery was the most commonly injured vessel and in two cases it was associated with concomitant venous injury. Table 1 shows the distribution of peripheral vascular injuries. More than 80% of the cases were due to fire arms. Table 2 shows the mode of injury to the peripheral vessels.

Almost all the cases had either transaction or laceration of the vessel. Table - 3 shows the type of injury. End to end anastomosis remained our primary aim. Case of AV fistula was referred to vascular surgery department.

Table 2: Mode of injury

Penetrating	n=
Fire arm	17
Stab	1
Non penetrating	
RTA	2
Fall	1
Total:	21

Table 3: Type of injury

Type	n=
Laceration	15
Transaction	4
Subintimal flap	1
Axillary AV fistula	1

Concomitant venous injuries were ligated in case of femoral vein but repaired in case of popliteal veins. Fasciotomy was always performed in these cases. Table - 4 shows the mode of treatment. Absence of distal pulses 12 hours after the repair was taken as failure of the repair until proved otherwise. Table - 5 shows the complications of repair and ligation

Table 4: Various Treatment Options

procedure	n=
Ligation	6
End to end anastomosis	14
Fasciotomy	4
Amputation	2

Table 5: Complications

Complications	Remarks
Failure of repair(n=4)	2 popliteal artery (ligation resulted in amputation). 2 brachial artery (ligation uneventful)
Secondary haemorrhage(n=2)	Ligation without any ill effect.
Wound infection(n=2)	wounds opened and irrigated with Saline
Amputations(n=2)	concomitant popliteal artery and vein injury
Mortality(n=1)	Table death due to irreversible shock.

Discussion

Currently accepted principles regarding management of acute vascular injuries are largely based on military experience. In the classic report of vascular injuries in world war II by DeBakey and Simeone demonstrated superiority of vessel repair over ligation.² The other recognised factors influencing the outcome of traumatic vascular repair are³: 1. Time lag, 2. Availability of proper instruments and experienced surgeon, 3. Associated injuries specially venous, 4. Mode and type of arterial lesions e.g. laceration, transaction etc.5. Infection. In the mean time, the phenomenon of oedema following restoration of arterial flow was precisely documented and the value of incision in the fascia to decompress muscle was recognized.

The application of concepts derived from military experience in treatment of patients with civilian vascular injuries has improved results notably^{3,4}. The increasing use of sophisticated weapons in civilian violence, the civil wars, the terrorist activities has recently changed the mode of vascular trauma which is now almost at par with that reported in military experience⁵. The high speed automobiles also have added to the gravity of the situation.

While deciding about exploration of vascular injury we did not take the help of arteriography because of lack of availability in emergency department. Although the

decision to undertake operative vascular exploration is relatively easy when pulse discrepancy or vascular insufficiency is present but it is clear that a significant arterial injury may exist without a detectable change in the distal pulses or evidence of ischaemia⁷.

We found that brachial artery is a very safe vessel to ligate as in none of our cases distal ischaemia occurred after ligation. Moreover, primary ligation should be considered as a life saving measure.

We did not repair the associated venous injuries except when popliteal vein was involved. In cases of two isolated femoral vein injuries we ligated the vessel without any untoward effect. This practice is in contrast to that mentioned by Perry, MO, and Shires, G.T., who stressed restoration of major venous continuity whenever possible. Otherwise, venous stasis and swelling of the limb may contribute to failure of arterial repair. In addition, the incidence of phlebitis and post-phlebotic sequelae are increased when major venous injuries are not repaired⁷.

Amputation was done in two of the fifteen cases who underwent repair. In both cases popliteal artery was involved with associated venous injury. This is consistent with other studies⁸. We conclude that for popliteal artery repair autogenous vein graft straight away would have been a better option in retrospect.

Only two cases got infected inspite of extensive injuries. One table death was due to torrential haemorrhage and non-availability of blood. Tri-compartment fasciotomy is indicated for combined arterio-venous injuries⁷. In cases with delayed presentation we did fasciotomy but we found that in cases with delay of more than 24 hours, fasciotomy would lead to infection hence we waited for demarcation of the ischaemia instead of offering fasciotomy. Main reasons for mortality or limb loss following vascular injuries in our experience are severity of injury, inadequate facilities and inexperienced surgeon.

References

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