



RETROSPECTIVE STUDY OF 124 PATIENTS WITH MAJOR PHERIPHERAL VASCULAR INJURIES WHICH HAVE REACHED 6 HOURS AFTER THE TRAUMA.

Plastic Surgery

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ABSTRACT

This is retrospective study of 124 patients from with major peripheral vascular injuries Jan 2012 to August 2106, majority of patients came to our centre with significant delay, as our centre is a referral centre for villages and small towns of north Karnataka, south Maharashtra and Goa , approximately the radius of 200kms and that is the reason for average delay for more than 8 to 12 hours.

In Casualty Once the other life threatening injuries were ruled out, vascular injuries were diagnosed by clinical examination and with help of hand held Doppler, CT Angiogram was not done as there was already significant delay and immediately patient was taken to OT with minimal waste in time, Fasciotomy of all the compartments were done and good wash was given to drain the toxic fluid to prevent reperfusion injury, than muscle were inspected to look for colour and stimulated to know the viability of muscles. If the muscles were viable then proceeded for definitive vascular reconstruction with interposition reverse saphenous vein graft in patients without unstable fracture, in patients with unstable fractures temporary shunt was used to perfuse the limb and after fracture stabilization, definitive interposition saphenous vein graft was used for vascular reconstruction.

Results: 37.90 % of patients (47 patients) were having upper extremity vascular injuries and 62.09 % of patients(77 patients) were having lower extremity vascular injuries 64 % (79 patients) of patients were having stable fractures ,out of which 8.8 % (11 patients) were treated by doing end to end repair and 54 % were treated using interposition vein graft preceded orthopaedic fixation .

In 36% of patients (45 patients) with unstable fracture revascularisation was done with temporary shunt , definitive vascular repair was done after fracture fixation.

Limb salvage rate in this study is 82.25 %.

Conclusion: Plastic surgeons should treat the pheripheral vascular injuries primarily as they can assess the soft tissue injuries better than other surgeons ,plastic surgeon should not be a last resort. There is no need of wasting time in doing CT angiography.For combined vascular and bony injuries first priority should be given to revascularisation when patients reaches after 6 hours of injury.

KEYWORDS:

Peripheral vascular injuries, fractures, interposition vein graft, fasciotomy

Introduction:

Trauma has become a major problem all over the world, however mechanism of injury is different in different parts of the world, in developing country like India there is significant rise in number of road traffic accidents.

In managing vascular injuries there is always debate in sequence of management of injury, whether revascularisation should be done first or bony fixation. There is also confusion between general practioners that to whom patient should be referred from primary health care centre, either orthopaedic surgeons or vascular surgeon or plastic surgeon.

In this study we have studied detail clinical profile of vascular injury patients and outcome of vascular repairs.

Patients & Methods

In this study we have included all the patients presented with peripheral vascular injury with or without fractures between the time periods of Jan 2012 to August 2016. Patients who had severe crush injuries, who required limb amputations were excluded from the study.

110 patients were having injury due to road traffic accidents (88.7%) and rest were having injury due to sharp objects like knife or sharp weapon during assault or due to cutting machines.

All the patients reported late to us, as they were initially referred to orthopaedic surgeons or general surgeons where they lost their golden hours of revascularisation i.e. 6 hours.

The peripheral vascular injuries were diagnosed in emergency room by clinical examination and with the help of hand held Doppler. Detail clinical examination of all the wounds was done considering mode of trauma and site of injury.

Patients were subjected to surgery as early as possible (within 30-40

min) under appropriate anaesthesia.

Depending upon the stability of fractures and dislocations we have divided patients into two groups.

Group I – Patients having only vascular injury without long bone fractures or having stable long bone fractures.

Group II – Patients having vascular injury with unstable fractures.

Group I patients were treated by end to end primary repair of vessel or repair using interposition vein graft after doing embolectomy using fogarty's catheter.

Group II patients were treated using interposition temporary shunt insertion between two cut ends of vessel. After inserting shunt, fracture stabilisation was done by orthopaedic surgeon followed by which definitive repair was done using interposition vein graft.

Fasciotomy was carried out in all the patients to relieve existing compression or to avoid compartment syndrome. Other advantage of fasciotomy is that muscle viability can be accessed through these fasciotomy wounds in post operative period.

All the patients required IV antibiotics for 7-10 days.

Intraoperatively 1000 IU Heparin was given after embolectomy, before repair. In postoperative period patients were started on Low Molecular Weight Heparin.

OBSERVATION AND RESULTS

There were 110 males (88.7%) and 14 female patients (11.3%) included in this study having age group between 20-55 years.

Table No. 1 Anatomical Distribution of Vascular Injuries

	Upper Extremity	Lower Extremity
Group I	35	44
Group II	12	33

Lower extremity (62.09%) outnumbered the upper extremity

(37.90%)

Table No. 2 Distribution of vascular injury

Name of Artery	No. of patients	%
Femoral Artery	42	33.87%
Popliteal Artery	23	18.54%
Ant., Post. Tibial Artery	12	9.6%
Brachial Artery	22	17.74%
Radial, Ulnar Artery	25	20.16%

Table No.3 Type of injury

	No. of patients	%
Complete tear of artery	98	79.03%
Contusion and Thrombosis	26	20.96%
Side tear or hole	10	8.06%

Table No.4 Revascularisation techniques Used

Technique Used	No. of Patients	%
End to end repair	11	8.87%
Using Vein Graft	113	91.1%

Table No. 5 Secondary Amputation

	No. of patients	%
Due to Muscle Necrosis	21	16.93%
Reperfusion Injury	1	0.8%
Total	22	17.74%

Total salvage rate in this study is 82.25%.

16.93% patients were undergone amputation due to muscle necrosis. Their late presentation may be the one of the cause of muscle necrosis .

Image 1.- Compartment Syndrome.



Image 2.- Displaced knee joint



Image 3.- Embolectomy using fogarthy catheter

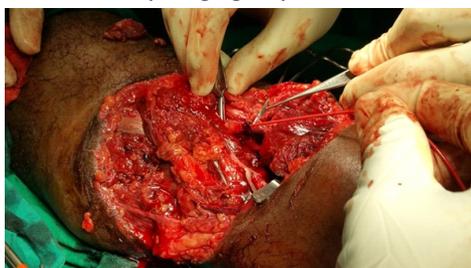


Image 4 - exploration of vessels

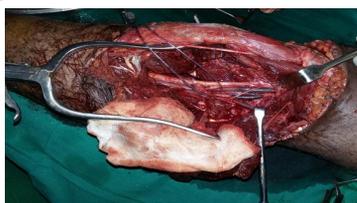


Image 5 Fasciotomy



Image 6.1 - Temporary Shunt



Image 6.2 –Temporary shunt

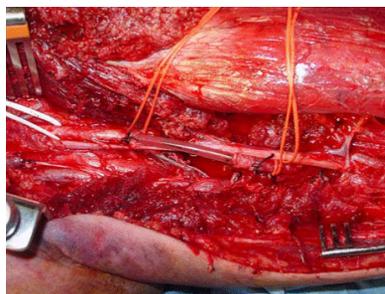


Image 7 - Salvaged Limb



Discussion

Ambrose Pares initially used ligation method for vascular injuries in 16th centuries.(1)

During Korean and Vietnamese war vascular reconstructive methods dramatically improved the limb survival . Limb survival rate was 64.2 % in world war II and it was 87 % in Vietnam war. Majority injuries were gunshot injuries.(2)

Vascular injuries are common among male ,(3,4) and male patients comprise 88.7% of the cases.

Vascular reconstruction is done in different ways depending upon the type of injury , vessels involved and anatomical site . One should also

consider the general physical condition of the patient, and the available services, including experts in vascular surgery and instruments available. In modern day surgeries, 95% of limbs can successfully saved by early surgical intervention and revascularization (5); in our study, the survival percentage was 82.25%.

The time interval between injury and treatment is very important for the outcome. In our study, we found that 8 h was the critical limit that determined the good outcome of the surgery. Patients reporting within 8 hours of injury had better overall results as compared with those presenting after 8 hr.(6)

The use of arteriography is controversial. Johansen et al, Solak et al, Anderson et al advocate arteriography for every patient with suspected arterial injury preoperatively,(7,8,9) while Razmadze, Peck and Gahtan published satisfactory results without angiography (3,10,11). Ultrasound is sensitive(95%) and specific(97%) only in experienced hands, its use reduces the spent time compared to angiography. (4,12,13).

Careful clinical examination of patients can give a reliable diagnosis with the combination of Doppler ultrasound.

It was previously suggested by other authors, that well stabilized skeleton is essential before final arterial and soft tissue repair (14) unless the limb is immediately threatened requiring urgent arterial repair. However this is contrary to the view of Hunt et al., who suggested that arterial revascularization should be followed by skeleton stabilization and nerve and tendon repair. In our study also we have achieved vascular repair first either definitive or temporary using stent which reduces the cold ischemia time and helps in limb survival.

Early fasciotomy should be considered in every case especially in cases having complex trauma. (15,16,17)

As most of the things in limb injuries having vascular injury can be managed by plastic surgeons like soft tissue debridement, vascular repair, wound cover and limb reconstruction, plastic surgeon should be the first choice to refer.

Conclusion

Plastic surgeons should treat the peripheral vascular injuries primarily as they can assess the soft tissue injuries better than other surgeons. Plastic surgeon should not be a last resort. There is no need of wasting time in doing CT angiography. For combined vascular and bony injuries first priority should be given to revascularisation when patients reaches after 6 hours of injury.

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