

PATTERN AND OUTCOME OF VASCULAR TRAUMA MANAGEMENT AT UNIVERSITY OF CALABAR TEACHING HOSPITAL, CALABAR, NIGERIA

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ABSTRACT

BACKGROUND: Vascular trauma is a significant cause of morbidity and mortality following trauma. Injury to a major blood vessel may worsen the prognosis of trauma. Avoidable mortality may result from massive haemorrhage. Available data in Nigeria is scanty.

AIM: This retrospective study was carried out to review the pattern and outcome of vascular trauma patients in the University of Calabar Teaching Hospital.

METHODOLOGY: The Hospital records of all patients managed in the facility for vascular injuries during the study period were retrieved and data collected retrospectively.

RESULTS: Forty – two patients, with a male: female ratio of 5:1 and a mean age of 31.15 years were studied. The age range 21 – 30 years were most affected. Mean interval between injury and presentation at the hospital was 7.05 hours. The mean duration between presentation to the hospital and surgical intervention for the rest of the patients was 13.32 hours. The most commonly injured vessel was the brachial artery. Prompt presentation and intervention are critical to successful outcome.

CONCLUSION: Most vascular trauma in Calabar occur predominantly in young males who lead an active life.

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INTRODUCTION

Vascular trauma is a significant cause of morbidity and mortality following trauma. Data on the incidence of vascular trauma in Nigeria is scanty.^{1,2} The common presentation is bleeding, which could be overt or covert. Vascular trauma could arise from blunt or penetrating injuries resulting from accidents or assault. Iatrogenic injury from invasive procedures is also a notable cause. Avoidable mortality results from massive haemorrhage, hence the need for early resuscitation and haemostasis.^{1,3} Targeted damage-control surgery and goal – directed resuscitation maybe indicated in unstable trauma patients with haemorrhagic shock. Definitive surgical care would restore function and allow successful rehabilitation.³

Patho-physiologically, vascular injuries maybe spasms, thrombosis, contusion/intimal flap, laceration/transection, arterio-venous (A-V) fistula, aneurysms/pseudo-aneurysms or, arterial emboli. Principles of management of vascular injuries are determined by the presence or otherwise of hard signs, soft signs and, the haemodynamic status of the patient.

Treatment options include ligation or primary repair done as end-to-end anastomosis or use of graft which maybe an autogenous vein graft or a synthetic graft.⁴

The aim of this study was to document our experience with management of vascular trauma with emphasis on the socio-demographic profile, anatomical distribution, mechanism of injury, management options and outcome.

MATERIALS AND METHODS

This retrospective descriptive study reports the pattern, management and outcome of vascular trauma that presented to University of Calabar

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Teaching Hospital, Calabar, Nigeria, from March 2013 to February 2018. Following presentation to our hospital, all patients were promptly resuscitated, while evaluation for source of bleeding was carried out. Vascular compromise of the injured limb was assessed clinically and with the use of hand - held Doppler. Regional anaesthesia was used unless considered contraindicated by the anaesthetist. All wounds were copiously irrigated with normal saline, debrided explored and when indicated additional incisions were placed to identify the proximal and distal ends of the injured vessels. Treatment was either by repair of the injured vessels; direct end - to - end anastomoses; autogenous vein interposition graft, autogenous vein on - lay graft or ligation when collateral circulation was assessed to be adequate. All patients received appropriate antibiotics and anticoagulation where indicated. Hand held Doppler ultrasound was used to confirm distal pulsatile flow after each treatment option.

RESULTS

The records of 42 patients who were managed during the study period were retrieved. This comprised of 35 (83.3%) males, and 7 (16.7%)

females (M: F 5:1). The mean age of the patients was 31.15 \pm 2.25 years with a range of 8 to 74 years. Commonest age group affected was 21 - 30 years (31.0%, n=13), followed by 31 - 40 years (28.6%, n=12). Mean interval between injury and presentation at the hospital was 7.05 hours (range: 30 minutes to 24 hours). The predominant mechanism of injury was assault, with knife / machete being the commonest weapon of injury. Three patients presented after 24 hours of injury. Among the patients who presented within 24 hours, the mean duration between injury and presentation to the hospital was 6.67 hours (\pm 1.79 SD 8.96).

Besides two patients who had unusual delay appropriate referral/consult, the mean duration between presentation to the hospital and surgical intervention for the rest of the patients was 13.32 hours (\pm 3.26 SD 12.19)

The most commonly injured vessel was the brachial artery (19.1%), closely followed by the ulnar artery (16.7%). Majority of the patients were treated by ligation of the bleeding vessel (54.8%, n=23). Others had repair (28.6%, n=12), end to end anastomosis (11.9%, n=5), and use of reversed autogenous cephalic venous graft (4.8%, n=2).

Figure 1: Age Distribution

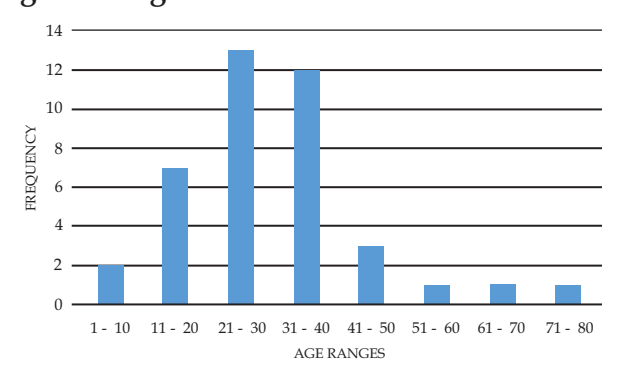


Figure 2: Gender Distribution

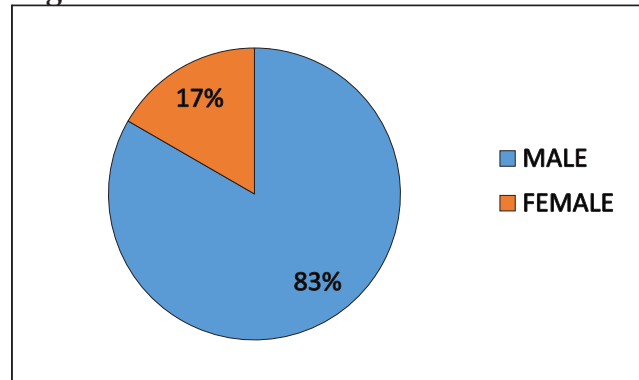


Figure 3: Mechanism of Injury

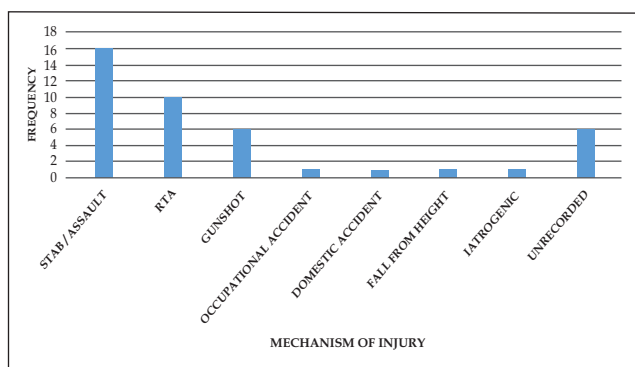


Figure 4: Agent of Trauma

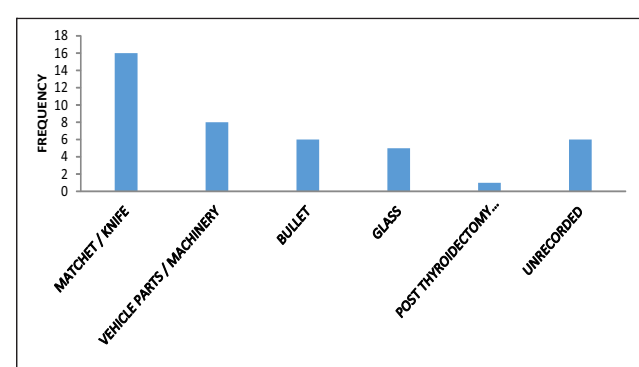
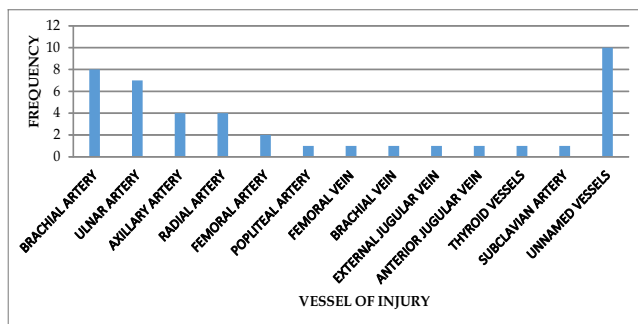


Figure 5: Vessel of Injury



The outcome of vascular surgery was satisfactory in all but one patient who subsequently required an amputation due to late diagnosis of vascular injury, and consequent late revascularization. No mortality was recorded. Where post-operative doppler ultrasound was done post vascular surgery, it revealed good blood flow.

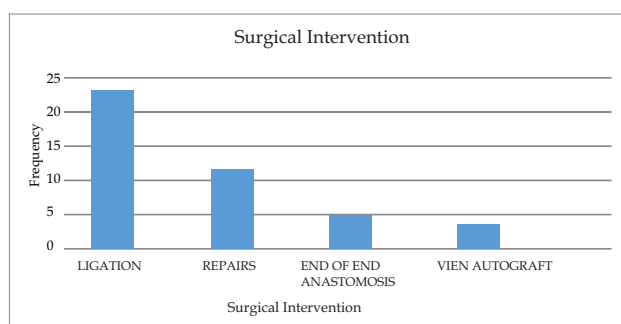
DISCUSSION

The true incidence of vascular trauma in most centres in Nigeria is under-reported. Most studies are retrospective hence may be affected by incomplete data collection. The incidence of vascular trauma presenting to University of Calabar Teaching Hospital is comparable to the incidence in other Nigerian centres. There is a male preponderance in the presentation of patients with vascular trauma. This is corroborated by several other studies. – This male predominance may be explained by the comparatively higher risk-taking behaviour of the males. Males are more likely to be involved in social vices and civil unrest, with likelihood of gunshot wounds, stab wounds, machete cuts, e.t.c.

The age range most affected was 21 – 30 years, similar to other reports in Nigeria. This is the age at which most youth are likely to be involved in social vices and risky lifestyles. As identified, machete cuts and stab wounds were the commonest mechanism of injury, alluding to the fact that a rising incidence of civil unrest, and social vices would lead to a higher incidence of vascular trauma, with associated strain on limited resources for its management. This is similar to other reports in Nigeria.

Ligation, which is one of the earliest methods of securing haemostasis, still remains an option in the management of vascular injuries especially following trauma to unnamed small vessels, or

Figure 6: Surgical Intervention



vessels with adequate collateral circulation. Most of our patients had ligation of the vessels on exploration. These were patients with injuries to muscular branches of vessels which could safely be ligated.

The brachial artery, closely followed by the ulnar artery, were the commonest vessels involved. This may be explained by the mobility and versatility of the upper limb which is commonly used for defence following assault or accident. This is similar to the report by Nwafor et. al who recorded brachial artery injury as the commonest vascular injury in the upper limb. This was also corroborated by Okonta et. al. and other reporters. However, from available reports, it seems that the brachial artery appears to be most injured when the predominant mechanism of injury is assault and civil unrest, while the lower limb vessels are most injured when the predominant mechanism is road traffic accident. In our experience, most of these injuries were managed by repair, with five patients requiring end to end anastomosis. Failure to recognize popliteal artery injury and restore vessel continuity of flow after peri-popliteal trauma is a major cause of lower extremity amputation and morbidity. One of our patients who was initially not under the care of the vascular trauma team, had late repair of popliteal artery injury and later required amputation because the limb was not viable because of the late repair. This patient's limb, perhaps, would have been saved if a policy of mandatory exploration of all popliteal wounds was instituted early. This policy was found to reduce the incidence of amputation following popliteal injury from 72% to 32% during the Korean war. Also, in our experience, we find appropriately sized limb veins to be a good resource for repair. This may be used as an interposition or on-lay graft.

CONCLUSION

Most vascular trauma in Calabar occur predominantly in young males who lead an active life. Lifestyle modification, early treatment and legislation would help reduce the morbidity of vascular trauma among this high risk population.

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