SHORT COMMUNICATION

Epidemiology of surgically treated patient in road traffic accident with lower extremity vascular injury from a single centre in Kelantan

Koh Siang Chai, MD[1], Wan Faisham Nu'man Wan Ismail, MMed(Ortho)[2], Siti Fatimah Noor Mat Johar, MSurg(Plastic)[1], Wan Azman Wan Sulaiman, MSurg(Plastic)[1], Mohammad Paiman, MMed(Ortho)[2], Arman Zaharil Mat Saad, MSurg(Plastic)[1]

[1]Reconstructive Sciences Unit, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia, [2]Department of Orthopaedic, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

ABSTARCT

Introduction: Lower extremity vascular injury can result in either temporary or permanent disability.

Methods: This is a clinical audit involving all patients admitted to our institution from January 2008 to June 2018 of those who had undergone revascularization surgery for lower limb trauma.

Results: Fifty-nine patients were in this study with a mean age of 28.1 years. Most of the patients were motorcyclist involved in road traffic accidents with cars (n=30, 50.8%). The popliteal artery was most commonly seen injury (n=41, 69.5%). The mean duration of ischaemia was 14.1 hours. The limb salvage rate was 89.8%.

Conclusion: Lower extremity vascular injury caused by RTA treated in our institution predominantly involved young patients aged between 18–30 years associated with long bone fractures causing contusion and thrombosis of the popliteal artery.

INTRODUCTION

More than 1.35 million people died each year due to road traffic accidents (RTA) in the world and is now the leading cause of death among children and young adults between 5 to 29 years olds. Among those most vulnerable people are pedestrians, cyclists and motorcyclists.[1] Another 20-50 million people suffered non-fatal injury that results in temporary or permanent disability that limit their daily activities.[2]

According to data published by Ministry of Transport Malaysia, there were a total of 533,875 cases of RTA recorded in year 2017, with 13.5% involving motorcyclists.[3]

Vascular injury of extremities occurs in 4-6% of all major traumas that are often accompanied by long bone fractures, extensive soft tissue injuries, nerve injury, leading to poor outcomes and amputation.[4,5]

This clinical audit aims to analyse the epidemiology, mechanism and the pattern of lower limb vascular injury of those patients treated in our institution between January 2008 and June 2018.

METHODS

Patients were obtained through electronic operative database and medical records were retrieved. Those with missing medical records were excluded from the audit. All the data were retrieved from the medical record and operative notes of patients. Information about the mechanism of RTA was based on the police reports attached in the medical records or verbal account of patients, witnesses and emergency response team personnel documented during the initial presentation.

RESULTS

Fifty-nine patients were included in this audit and of these 50 (84.7%) were males while others (15.3%) were female, with a mean age of 28.1 years (range 10 – 83 years).

Majority of the patients were motorcyclists involved in road traffic accidents with cars (n=30, 50.8%). Thirteen patients (22.0%) who were riding motorcycles at the time of accidents did not have valid driving licenses.

Of the 59 patients, 25 (42.3%) sustained open fractures; 22 (37.7%) sustained closed fracture of long bones of lower extremities. Nine patients (15.3%) had other concurrent severe injuries.

The popliteal artery was most commonly injured vessel (n=41, 69.5%). The most common type of vascular injury sustained was contusion (n=31, 52.5%) (Table 1). The mean length of vascular segmental loss or length of vessel required to be resected due to intimal injury was 6.0 cm (range 0 – 20.0 cm). The mean duration of ischaemia (from the time of injury till the time of revascularization surgery) was 14.1 hours (range 6.0 to 37.0 hours). Limb salvage rate was 89.8% (n=53).

DISCUSSION

Lakhwani et al. reported that in the year 2002 that most of the vascular trauma referred to the Penang and Kuala

This article was accepted: 21 March 2020
Corresponding Author: Arman Zaharil Bin Mat Saad
Email: armanzaharil@gmail.com

Table I: Demographic data, mechanism of injury, pattern of vascular injury and other associated injuries

	n	Percentage
Age group (years)		
7 – 12 (primary school)	4	6.8
13 – 17 (secondary school)	12	20.3
18 – 30 (young adults)	25	42.3
31 – 40	7	11.9
41 – 50	5	8.5
51 – 60	1	1.7
> 60	5	8.5
Total	**59**	**100**
Mechanism of injury		
Motorcycle vs car	30	50.8
Motorcycle vs heavy vehicle	3	5.1
Motorcycle vs motorcycle	5	8.5
Motorcycle self-injury	10	6.9
Pedestrian	11	18.6
Total	**59**	**100**
Skeletal and soft tissue injury		
Open fracture	25	42.3
Closed fracture	22	37.7
Knee dislocation	4	6.8
No skeletal injury (only soft tissue)	8	13.2
Total	**59**	**100**
Vessels involved		
Common femoral artery	2	3.4
Superficial femoral artery	11	18.6
Popliteal artery	41	69.5
Proximal part of posterial tibial artery	5	8.5
Total	**59**	**100**
Types of injury		
Complete transection	22	37.3
Partial transection/laceration	1	1.7
Contusion/Thrombosis	31	52.5
Compression by fracture fragments	5	8.5
Total	**59**	**100**
Other associated injuries		
Traumatic brain injury	7	11.9
Bowel injury	1	1.7
Liver injury	1	1.7
Total	**9**	**15.3%**

Lumpur Hospital involved individuals less than 40 years of age with lower limb trauma. Majority of these patients were motorcyclists with open fractures and extensive soft tissue injuries caused by significant force of impact.[6]

From our series of patients we noticed that those who suffered lower extremity vascular injury following RTA were predominantly males, with a male to female ratio of 5.5:1. The mean age of our patients was 28.1 years, consistent to those reported by studies in Malaysian and reports from other countires.[4,6,7] Thirteen patients (22.0%) in our series were riding motorcycles without valid driving licenses. The lack of valid driving licenses also implied that these road users were incompetent in handling the vehicles and not compliant to the traffic laws. Young adults aged from 18 – 30 years (n=25, 42.3%) of our patients were the most vulnerable group compared to other age groups. Due to logistic issues, all patients in arrived at our institution more than 6 hours after the injuries (mean = 14.1 hours, SD = 6.1, range 6.0 – 37.0 hours).

We noticed a higher number of vascular injuries due to supracondylar fracture of the femur (n=4), tibial plateau fracture (n=25), midshaft of femur fracture (n=2) or combinations of these fractures (n=12), suggesting a high energy impact. The popliteal artery (n=41) was the most injured vessel in our patients due to its anatomy, which is located posterior to the knee joint, lying on the popliteal fossa with proximal part held by the adductor hiatus and soleus arch distally.[8] Unlike those reported in other studies where the transection of the vessel was the main pattern of vascular injury, contusion and thrombosis were common in our series.[4,5,9]

CONCLUSION

Lower extremity vascular injury caused by RTA treated in our institution predominantly involved young patients aged between 18–30 years associated with long bone fractures causing contusion and thrombosis of the popliteal artery.

REFERENCES

1. World Health Organization. Global status report on road safety 2018: Summary [cited Nov 2018]. Available from: https://apps.who.int/iris/bitstream/handle/10665/277370/WHO-NMH-NVI-18.20-eng.pdf?ua=1
2. World Health Organization. Road traffic injuries 2018 [cited Nov 2018]. Available from: http://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries.
3. Ministry of Transport Malaysia. Transport Statistics Malaysia 2017 [cited Nov 2018]. Available from: http://www.mot.gov.my/en/Statistik%20Tahunan%20Pengangkutan/Transport%20Statistic%20Malaysia%202017.pdf.
4. Li Z, Zhao L, Wang K, Cheng J, Zhao Y, Ren W. Characteristics and treatment of vascular injuries: a review of 387 cases at a Chinese center. Int J Clin Exp Med 2014; 7(12): 4710.
5. Sciarretta JD, Macedo FIB, Otero CA, Figueroa JN, Pizano LR, Namias N. Management of traumatic popliteal vascular injuries in a level I trauma center: A 6-year experience. Int J Surg 2015; 18: 136-41.
6. Lakhwani MN, Gooi BH, Barras CDJ. Vascular trauma in Penang and Kuala Lumpur Hospitals. Med J Malaysia 2002; 57(4): 426-32.
7. Perkins ZB, De'Ath HD, Aylwin C, Brohi K, Walsh M, Tai NRM. Epidemiology and outcome of vascular trauma at a British Major Trauma Centre. Eur J Vasc Endovasc Surg 2012; 44(2): 203-9.
8. Mavrogenis AF, Panagopoulos GN, Kokkalis ZT, Koulouvaris P, Megaloikonomos PD, Igoumenou V, et al. Vascular injury in orthopedic trauma. Orthopedics 2016; 39(4): 249-59.
9. Jaipuria J, Sagar S, Singhal M, Bagdia A, Gupta A, Kumar S, et al. Paediatric extremity vascular injuries–Experience from a large urban trauma centre in India. Injury 2014; 45(1): 176-82.