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CAN GENERAL SURGEONS SUBSTITUTE VASCULAR SURGEONS IN EMERGENCY!!

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Abstract:
The increasing cases of road traffic accidents and firearm injuries have increased the incidence of vascular injuries. There is huge burden of vascular surgical diseases and general surgeons are helping vascular surgeons to reduce surgical workload.
Objective: *To determine the various factors leading to poor outcome of vascular repairs done by general surgeons*
Study Design: *Retrospective study*
Setting: *General Surgery Emergency Department, Allied Hospital, Faisalabad.*
Duration Of Study: *From Jan, 2014 to May, 2019*
Methodology: *All patients of all age groups who required emergency vascular surgery, diagnosed by consultant surgeon at surgical emergency were included. Operations were performed after pre-anesthetic evaluation by consultant general surgeons. Variables including injury type, vessel injuries, injury severity score (ISS), surgical repair done, hospital stay, complications and mortality, were recorded from old data. Various complications after the surgery were compared with the type of repair done, age group and time till presentation after injury. The p-value <0.05 was considered significant. Limb amputation or mortality was taken as poor outcome.*
Results: *Retrospective data showed 135 patients with mean age 28.8 ± 11.5 years (14 -63) most of which were males (127 of 135). Limb salvage rate and mortality was 74.8% and 4.4%, respectively. Complications occurred in 38/135 (28.1%) cases with wound infection (18%) and myonecrosis (6.7%) on top. No complications were seen in 71.9% cases. Factors leading to poor outcome/complications were GCS ≤12 (p=0.01), referred case (p=0.04), significant bleeding (p=0.004), Hb ≤9 at presentation (p=0.001), bone fracture (p=0.01), involvement of lower limb and late presentation (p=0.003).*
Conclusion: *Late presentation in hospital is the major modifiable factor improvement of which can lead to better outcome, apart from the early and proper surgical intervention. In shortage of vascular surgeons, general surgeons can substitute vascular surgeons.*
Keywords: *Vascular surgery, artery repair, venous graft, vascular anastomosis,*

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INTRODUCTION:

The increasing cases of firearm injuries and invasive medical/surgical procedures have increased the incidence of vascular injury in the United States alone. Besides, road traffic accidents, natural calamities and civil war have increased cases worldwide.

Diabetes being the commonest precursor for vascular problems, and Pakistan being 7th ranked country with highest diagnosed diabetic cases with 11% diabetic patients in the world, our country is susceptible to various vascular problems. Excessive burden of vascular surgeries in countries where there is no proper vascular surgery training institute and program to meet these huge number of cases. [3]

The proportion of general surgeons pursuing fellowship training has increased from > 55% to > 70% since 1992. The introduction of fellowship opportunities in newer content areas as subspeciality is increasing day by day. The number of vascular applicants with US medical degrees decreased by 36% (107 in 1997 to 68 in 2004) during this time. The number of training positions available in vascular surgery programs accredited by the Accreditation Council for Graduate Medical Education has increased by 34% but the total number of active applicants to these programs decreased by 21%. In a 6th most populous country with 200 million people, Pakistan has only 2 vascular surgery programs. Which are why, general surgeons are handling vascular surgery cases as well. [4,,]

Some studies have shown a rise in mortality after vascular procedures done by general surgeons rather than a vascular surgeon. [5,] Although infections are the leading causes of mortality and morbidity after vascular repairs. [,,]

General surgeons have to build up proficiency in many other surgical procedures as a result they have minimal time to expand skill in vascular procedures. [8] In our country, there is huge burden of vascular surgical disease and large numbers of general surgeons are helping minimal number of vascular/ cardiac surgeons to reduce surgical workload. The rationale of our study is to measure the outcome of emergency vascular surgery performed by general surgeons in terms of rate of mortality, duration of hospital stay, need of reoperation and to reveal preventable cause of mortality to improve prognosis.

MATERIAL AND METHODS:

This retrospective study was done in the General Surgery Department, Allied Hospital, Faisalabad. Total 135 cases were studied from admission till discharge starting from Jan, 2014 to May, 2019. Cases who had emergency vascular exploration and repair; and those who required emergency vascular surgical intervention admitted through general surgical emergency department were included in the study.

The primary objective of the study was to determine the various factors leading to poor outcome of vascular repairs done by general surgeons. Outcome in this study was measured by calculating duration of hospital stay and rate of mortality. Hospital stay was measured in terms of duration from date of admission to date of discharge from ward. All patients either gender or any age group who presented in the surgical emergency of Allied Hospital, Faisalabad and emergency vascular exploration and repair was done, was included.

Exclusion Criteria:

Patient who required emergency vascular surgical intervention admitted through all departments other than general surgical emergency department who were referred to cardiac or vascular surgery department per operatively or postoperatively.

Data of all patients of all age group who required emergency vascular surgery, diagnosed by consultant surgeon at surgical emergency bay admitted at General surgery department.

All the surgeries in this study were done by consultant surgeons or under direct supervision of consultant surgeons of general surgery department.

Data from all these emergency vascular surgical cases which fulfilled inclusion criteria were assessed for associated bleeding disorder, coagulation disorder and other associated medical or surgical illness and included in study accordingly. With this we were able to check the rate of mortality, duration of hospital stay and guided us to acknowledge preventable cause of mortality.

Collected data from Performa was entered to SPSS version 20 and was analyzed. All the qualitative variables were analyzed to see the frequency and percentages. And all the quantative variables were analyzed to see the mean and standard deviations. Frequencies of various post-operative complications, limb amputations and mortality after emergency

vascular repairs were calculated. Tables and graphs were used to represent the results.

RESULTS:

In this retrospective study, data of 135 patients was analyzed. Mean age of these patients was 28.8 ± 11.5 years (range 14 – 63 years). Majority of the patients were of male gender (127 of 135, rest were females). Etiologies leading to emergency presentation was road traffic accidents (blunt trauma) in 56.3% cases, 19.3% in gunshot/firearm injuries (penetrating) and 25% sharp object injuries (stab injury, glass injury, and machine injury). Only 6% patients presented within 30 mins of injury and 49.6% patients reached within 3 hours of injury. (Table 1)

Three major peripheral arteries injured were brachial 38%, popliteal 40% and femoral (21%) with more than half with complete transection (55%). Vascular repairs done were primary anastomosis (33%), reverse saphenous vein graft (RSVG) 50.4%, embolectomy (3%) and amputation (13%). Limb salvage rate and mortality was 74.8% and 4.4%, respectively. (Table 1)

Table 1: showing the data documented at presentation in the surgical emergency

VARIABLES		No.	%
Duration of injury	**<30min**	8	5.9
	30min to 1 hour	34	25.2
	1 hour to 3 hours	33	24.4
	3 to 6 hour	25	18.5
	6 to 12 hour	19	14.1
	>12 hour	16	11.9
Mode of presentation	Referred Case	61	45.2
	Local City Population	74	54.8
Injury Severity Score (ISS)	**Mean ± SD**	17 ±	9.59
Vessel Injured	**Brachial Artery**	52	38.5
	Femoral Artery	28	20.7
	Popliteal Artery	55	40.7
Type of injury	Complete transection	75	55.6
	Partial Transection	38	28.1
	Intimal Injury	15	11.1
	Spasm	7	5.2
Associated injuries	**Soft Tissue Only**	38	28.1
	Soft Tissue + Bony Fracture Only	58	43.0
	Soft Tissue + Venous Injury	6	4.4
	Soft Tissue+Bony Fracture+Vein	20	14.8
	Soft tissue +Bony Fracture+nerve	5	3.7
	Soft Tissue +Vein+Nerve	4	3.0
	Soft Tissue +Bony Fracture +Vein +Nerve	4	3.0
Concomitant body injured	Abdomen+Pelvis	9	6.7
	Thorax	8	5.9
	Head and Neck	5	3.7
	Polytrauma	15	11.1
Hemoglobin on Presentation	**>12g/dl**	7	5.2
	10-12g/dl	36	26.7
	8-9g/dl	66	48.9
	<8g/dl	26	19.3
GCS at presentation	**Mean ± SD**	12.2 ±	2.1
	<9	4	3.0
	9-12	73	54.1
	13-15	58	43.0

Table 2: showing the various surgical procedures done in the emergency by general surgeons

Variable		No.	%
Surgical Procedure Done	Primary Anastomosis	45	33.3
	RSVG	68	50.4
	Primary Amputation	18	13.3
	Embolectomy	4	3.0
Complication after surgery	**Wound Infection**	24	17.8
	Myonecrosis	9	6.7
	Graft Failure	4	3.0
	Bleeding/Hematoma	1	.7
Limb salvage	Limb Salvaged	101	74.8
Amputations	Amputated (Primary+Secondary)	34	25.2
Patient outcome	**Discharged**	129	95.6
(mortality)	**Expired**	6	4.4
Hospital stay in days (mean $\pm$ SD)	11 $\pm$ 3.92	**range:**	4 - 22 days

Complications occurred in 38/135 (28.1%) cases with wound infection (18%) and myonecrosis (6.7%) on top. No complications after vascular repairs done by general surgeons were seen in 71.9% cases. (Table 2)

Factors leading to poor outcome/complications were GCS $\leq$12 (p=0.01), referred case (p=0.04), significant bleeding (p=0.004), Hb $\leq$9 at presentation (p=0.001), bone fracture (p=0.01), involvement of lower limb and late presentation (p=0.003).

Data regarding the experience and skills of general surgeons who performed these vascular repairs showed that 2/3rd of them were having experience of more than more than 2 years after their specialization/fellowship and mostly were of age between 30 to 40 (97%) and 91% showed interest in performing vascular surgeries.

DISCUSSION:

Vascular surgery is a complex and skillful job. It varies from minor vessel repair to the repair of the large aneurysms. Multiple causes leading to peripheral vascular injuries include road traffic accidents, firearm injuries, cut throat injuries; accidents leading to sharp injuries, and rupture of major artery aneurysm. Many patients present in our accidental emergencies on daily basis with minor or major vascular injuries who need arterial repairs; vascular surgeons are not available in all emergencies round the clock. Most of these cases are seen by general surgery consultants with some experience of vascular repairs. This study was done to study factors related to surgeon skill and experience, leading to these complications.

Patients in need of vascular repairs are commonly seen in the ER department. A 12 months study analyzed patients of emergency presentations and reported data of 41.9% of trauma cases they experienced. Among these 79% of the consultations, needed urgent vascular repairs including ischemia cases of the limbs, aortic disease, and some iatrogenic injuries.[11] In a similar study, some cases were done to help out the general surgeons and other minor surgery specialty. Most of these consultations were to do vascular repairs and control bleeding.

A local study reported after collecting data from 21 non-vascular surgeons, which showed that only 14% had exposure of vascular repairs. A workshop was conducted and knowledge was accessed. Gain-in-knowledge was seen in 21% participants, and conclusion was made that properly designed workshops on vascular repairs can improve the knowledge and skill of non-vascular surgeons.

After a meta analysis of 57 studies extracted from 859 reports. Structure asan indicator of quality of care was described in 19 reports, process in 7 reports and outcome in 31 reports. Most studies based on structural measures considered the introduction of a clinical pathway or a registration system. Reports based on process measures showed promising results. Outcome as clinical indicator mainly focused on identifying risk factors for morbidity, mortality or failure of treatment.[9]

In a study, data of vascular surgeries done in emergency from 2005 to 2010 was analyzed. They conclude that the outcome of these surgeries was significantly related to the skill of the surgeon and

mortality and worsening morbidity was easily predicted.[10]

Similar to our results, another study on lower limb vascular repairs reported that vascular repairs after popliteal injuries were mostly due to blunt injury in 55%, penetrating in 45 % cases; and amputation rate was of 28%, with more than 80% in blunt trauma cases; this was close to our study. Analysis of follow-up data after one year showed that 35% cases had limitation in activity.

In a study done on limb vascular repairs, data of 135 patients was analyzed; penetrating injuries were seen in 73% and blunt 27% cases; laceration after glass injury was most common 26%. Only 1 patient had primary amputation. Among the patients with vascular repairs, 4% cases had major and minor amputations with no mortality.

Another 5 years study showed similar results as those of our study, data of 65 cases was analyzed showing majority of young patients, with mean Injury Severity Score of 15.2. Around half of these cases were gunshot wounds 47%; penetrating injuries in 56% and blunt trauma cases in 44%. Amputations were done in three patients (4.6%), fasciotomies were done in 38% cases. Three patients (4.6%) expired during hospital stay.

A study showed data of 81 patients with mean age of 28.6±14.5 years of the patients were males. Partial laceration was being the most common arterial injury (64%) with venous grafting the common repair done (60%); Fasciotomy done in more than half of the cases (68%). The limb salvage rate was 82.7% and amputations were more in blunt trauma patients and the mortality was 8.6%. These results were also close to those we reported.

Vielgut I, et al reported after analyzing data of 36 cases of arterial injuries. Mean age was 28.4 ± 10.3 years with more of male patients 89%. Most common injury was Gunshot injuries (37.8%), second was assault (27%). Mean time of presentation was around 20 hours; more than half of the cases 64% presented within 12 hours. The overall limb salvage rate was 65% and those with presentation after 12 hours had poor outcomes.

In a study done to analyzed the patients of vascular repairs done by general surgeons and their exposure in their learning curve. It was reported that the exposure of vascular repairs of general surgeons is decreasing with advancement in the healthcare system. Training and practice of vascular repairs of general surgeons working in the emergencies is important to improve the surgical skills. Vascular surgeons cannot be consulted on every vascular injury on time. With involvement of skilled general surgeons on time in the surgical emergency, mortality can be reduced with better limb salvage rate with early intervention.

CONCLUSION:

With recent advancement in the healthcare system, general surgeons should also improve their skills to perform vascular repairs and become substitute of vascular surgeons, when and where not available.

REFERENCES:

1. Stewart BW, Khanduri P, McCord C, Ohene-Yeboah M, Uranues S, Vega Rivera F, et al. Global disease burden of conditions requiring emergency surgery. British Journal of Surgery. 2014;101(1):9-22.
2. Funk LM, Weiser TG, Berry WR, Lipsitz SR, Merry AF, Enright AC, et al. Global operating theatre distribution and pulse oximetry supply: an estimation from reported data. Lancet 2010;376:1055–61.
3. Caps MT The epidemiology of vascular trauma In Seminars in vascular surgery 1998;11(4):227-31.
4. Zil-E-Ali A, Rashid A Vascular surgery The Professional Medical Journal. 2017;24(05):639-40.
5. Zia Ur R, Sophie Z Vascular surgery in Pakistan: Critical issues. 2014:381.
6. Stitzenberg KB, Sheldon GF Progressive specialization within general surgery: adding to the complexity of workforce planning. Journal of the American College of Surgeons. 2005;201(6):925-32.
7. Calligaro KD, Dougherty MJ, Sidawy AN, Cronenwett JL Choice of vascular surgery as a specialty: survey of vascular surgery residents, general surgery chief residents, and medical students at hospitals with vascular surgery training programs. Journal of vascular surgery. 2004;40(5):978-84.
8. Tu JV, Austin PC, Johnston KW The influence of surgical specialty training on the outcomes of elective abdominal aortic aneurysm surgery. Journal of vascular surgery. 2001;33(3):447-52. Ploeg AJ, Flu HC, Lardenoye JHP, Hamming JF, Breslau PJ Assessing the quality of surgical care in vascular surgery; moving from outcome towards structural and process measures Eur J Vasc Endovasc Surg 2010;40:696-707.
9. Sinha S, Karthikesalingam A,Poloniecki JD,Thompson MM , Holt PJ Inter-relationship of

procedural mortality rates in vascular surgery in England 2014;7(1):131-41.
10. Choi KJ, Kahmke RR, Crowson MG, Puscas L, Scher RL, Cohen SM, et al. Trends in otolaryngology consultation patterns at an academic quaternary care center. JAMA Otolaryngol Head Neck Surg. 2017;143(5):472-7.
11. Danczyk RC, Coleman J, Allensworth J, Azarbal AF, Mitchell EL,Liem TK, et al. Incidence and outcomes of intraoperative vascular surgery consultations J Vasc Surg. 2015;62(1):177-82.
12. Rehman ZU, Moosa MA, Riaz Q. Knowledge gain of the non-vascular surgeons after attending a course on traumatic vascular emergencies. J Pak Med Assoc. 2020;70(Suppl 1)(2):S6-S9.
13. Vielgut I, Gregori M, Holzer LA, Glehr M, Hashemi S, Platzer P, et al. Limb salvage and functional outcomes among patients with traumatic popliteal artery injury: a review of 64 cases. Wien Klin Wochenschr. 2015;127(13-14):561-6.
14. Franz RW, Skytta CK, Shah KJ, Hartman JF, Wright ML, et al. A five-year review of management of upper-extremity arterial injuries at an urban level I trauma center. Ann Vasc Surg. 2012;26(5):655-64.
15. Franz RW, Shah KJ, Halaharvi D, Franz ET, Hartman JF, Wright ML, et al. A 5-year review of management of lower extremity arterial injuries at an urban level I trauma center. J Vasc Surg. 2011;53(6):1604-10.
16. Usman R, Jamil M, Anwer MF Evaluation, surgical management and outcome of traumatic extremity vascular injuries: a 5-year level-1 trauma centres experience. Ann Vasc Dis.2018;11(3):312-7.
17. Onakpoya UU, Eyekpegha JO, Ogunrombi A, Ohuche AS, Ojo TO Pattern of extremity arterial injury and outcome of repair in Southwest, Nigeria. Niger J Surg 2019;25:85-90.
18. Krafcik BM, Sachs TE, Farber A, Eslami MH, Kalish JA, Shah NK, et al. Assessment of open operative vascular surgical experience among general surgery residents J Vasc Surg 2016;63:1110-5.