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Research Article

**INJURIES OF SUBCLAVIAN & AXILLARY VESSELS AND  
THEIR SURGICAL MANAGEMENT**<sup>1</sup>Dr Muhammad Arshad Ilyas, <sup>2</sup>Dr Muhammad Shoaib Khan, <sup>3</sup>Dr Adnan Iqbal<sup>1</sup>Lahore General Hospital, <sup>2</sup>Allied Hospital Faisalabad, <sup>3</sup>DHQ / Allied Hospital Faisalabad.**Article Received:** February 2019**Accepted:** March 2019**Published:** April 2019**Abstract:**

**Objective:** The complicated operational coverage to severe injuries needed for the conventional method of surgeries associate with the high rate of mortality & morbidity. We demonstrated our outcomes with respect to the conventional way of surgeries following the axillosubclavian injuries.

**Methodology:** The surgery of twenty-nine patients suffering from axillosubclavian injuries carried out at the emergency department of Lahore General Hospital from December 2014 to April 2019. The methods of treatment and detection of disease, related injury of organ, rates of morbidity and mortality in the patients were under evaluation.

**Results:** The reason of the injuries were wounds because of stab in 37.90% (n: 11) patients, wounds of gun firing in 31.0% (n: 9) patients, iatrogenic injuries were available in 17.20% (n: 5) patients & blunt trauma was present in 13.70% (n: 4) patients. Total 8 (27.50%) patients found with separated injuries of arteries while 72.40% (n: 21) found with injuries of coexisting organs as veins, bones, nerves and soft tissues. The main important surgical procedures were primary repair & utilization of the saphenous vein. Myocardial infarction causes the death of 1 patient. Rate of mortality was 3.40%.

**Conclusions:** Injuries of subclavian and auxiliary vascular have a close association with the neurogenic, injuries of the soft tissues & osseous and early intervention are very necessary to recover these injuries. The better choice of the surgery is conventional method which has a poor status and fulfills the condition of emergency.

**Keywords:** Axillosubclavian, Injury, Intervention, Methodology, Mortality, Stab, Gunfire, Detection, Soft Tissues, Bones, Iatrogenic, Complicated.

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**INTRODUCTION:**

The injuries of the peripheral vascular are the vital complication of health and these are the main reasons of loss of limbs as well as high rate of mortality. These injuries can lead to serious traumas which are lives threatening & these traumas are out of control. The loss of limbs is the outcome of the results of inappropriate therapy of these vascular traumas. This issue can lead to loss of function of the organ because of failure of the organ, graft thrombosis & pseudo aneurysm [1]. It is very hard to control such complications of the subclavian artery because these arteries have very complicated anatomy structure & the coexistence of very important body organs [2]. These injuries have the ability to increase the rate of mortality & morbidity and it can be reason of sudden death [2, 3]. There is requirement of early detection with the combine efforts of physical checkup and different imaging methods and this complication should be rectifying as soon as possible because of the adverse outcomes of the delay in these complications. In this research work, the evaluation of the patients who had to underwent conventional methods of operations due to injuries of subclavian & auxiliary vessels carried out.

**METHODOLOGY:**

Before operation, during operation & after surgery information of twenty-nine patients who had faced surgery for axillosubclavian injuries vessels in a result of wounds of stabbing, iatrogenic injury, wound by gun fire & blunt trauma from December 2014 to April 2019 at the emergency ward of Lahore General Hospital were under evaluation. The diagnosis carried out with the outcomes as hemorrhage, no pulse & limb's ischemia. Direct

graphy was in use for further assessment when there were suspicious factors with computerized tomography scanning when there was accompanying of associated body organ. The patients who found stable hemodynamically with unsure injury of artery had faced duplex ultra-sonography & angiography before the start of operation. The operation carried out under the impact of anesthesia.

Catheter of Foley was in use for the inhibition of bleeding in 48.20% (n: 14) patients.

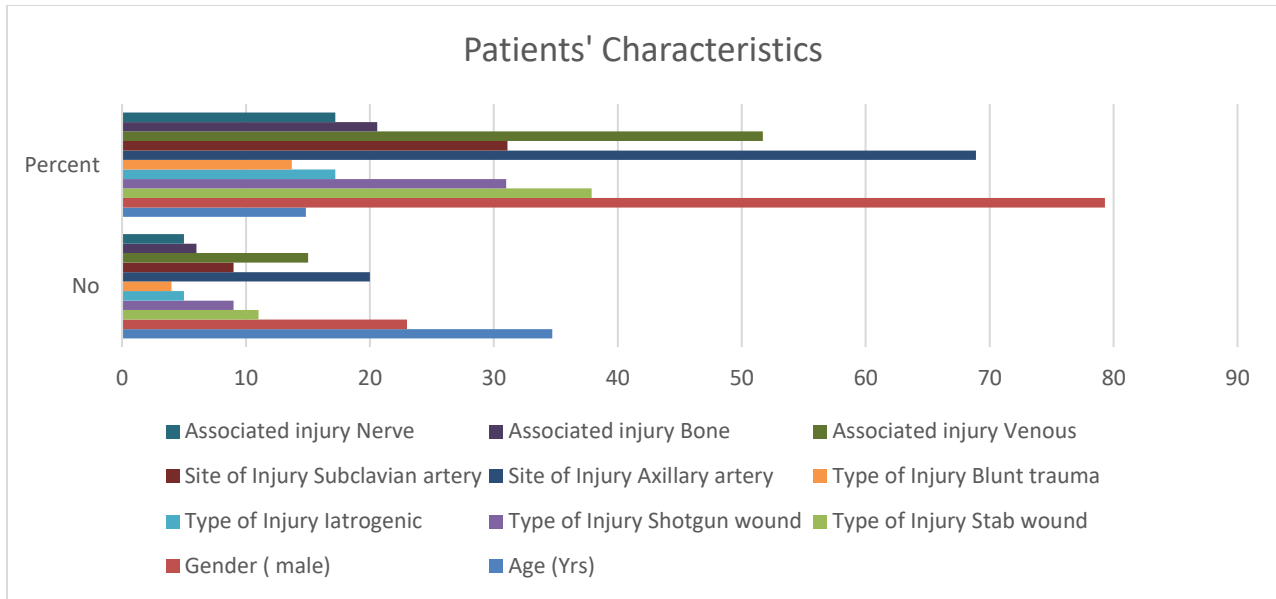
This is very secure and safe method to prevent the bleeding. In the process of surgery with the application of clamps on the distal as well as proximal ends of the structures of vessels, the control of the hemorrhage carried out. The available additional injuries of nerves, muscles and bones management carried out during the process of surgery. When there was consideration of the hemothorax pneumothorax the application of tube thoracotomy carried out. Injections of heparin were in use for each patient prior to the clamping of the vessels. Thrombectomy carried out before the start of operation if needed. In the case of crush trauma, the application of fasciotomy carried out. The patients were under medication after the completion of surgery.

**RESULTS:**

Total 79.30% (n: 23) patients were men & 20.70% (n: 6) were women. Most of the patients were fifteen to thirty year of age (n: 14). The average age of the patients was  $34.710 \pm 14.830$ . Before surgery data and information of demography are available in Table-1.

**Table-I: Preoperative Demographic Data and Clinical Characteristics**

Characteristics	No	Percent
Age (years) Mean SD	34.71	14.83
Gender ( male)	23.0	79.30
Type of Injury	Stab wound	11.0
	Shotgun wound	9.0
	Iatrogenic	5.0
	Blunt trauma	4.0
Site of Injury	Axillary artery	20.0
	Subclavian artery	9.0
Associated injury	Venous	15.0
	Bone	6.0
	Nerve	5.0

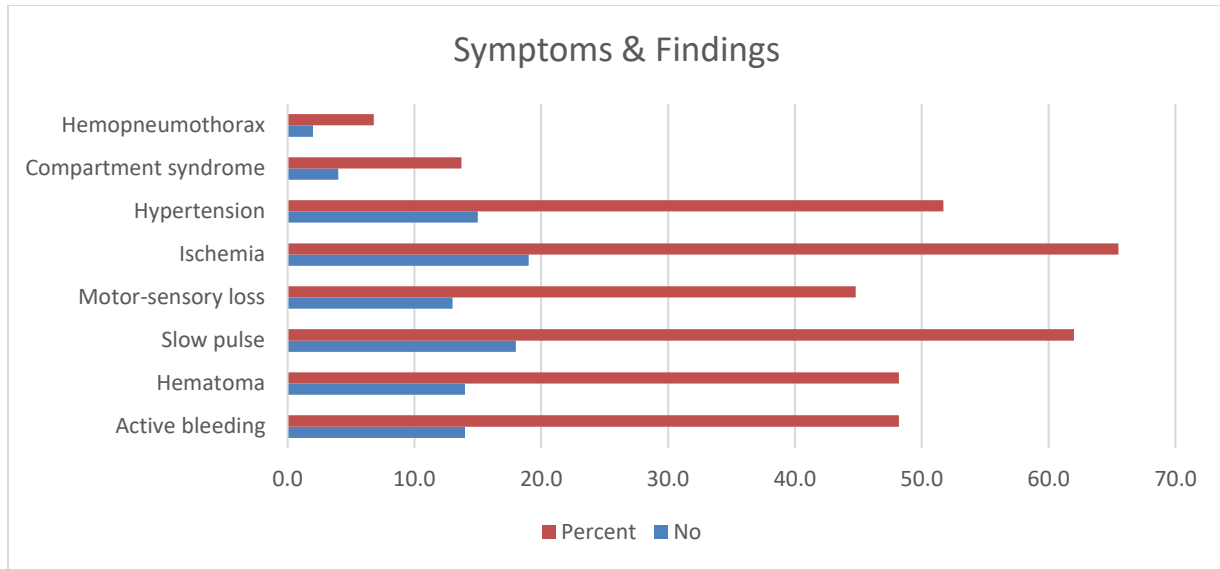


The very frequent symptoms of the injuries were severe pain & loss of the sensory motor. The very frequent outcomes were bleeding, no pulse, ischemia & hypo-tension. The signs and outcomes are available in Table-2. Thirty-one percent (9) patients found with injury to subclavian artery. Sixty-nine

percent (n: 20) were available with the injured auxiliary artery. Total 27.50% (n: 80) patients found with separated arterial injury whereas 72.40% (n: 21) found with the injuries of the coexisting body organs as veins, bones, soft tissues and nerves.

**Table-II: Symptoms and Findings**

Symptoms	No	Percent
Active bleeding	14.0	48.20
Hematoma	14.0	48.20
Slow pulse	18.0	62.00
Motor-sensory loss	13.0	44.80
Ischemia	19.0	65.50
Hypertension	15.0	51.70
Compartment syndrome	4.0	13.70
Hemo pneumothorax	2.0	6.80



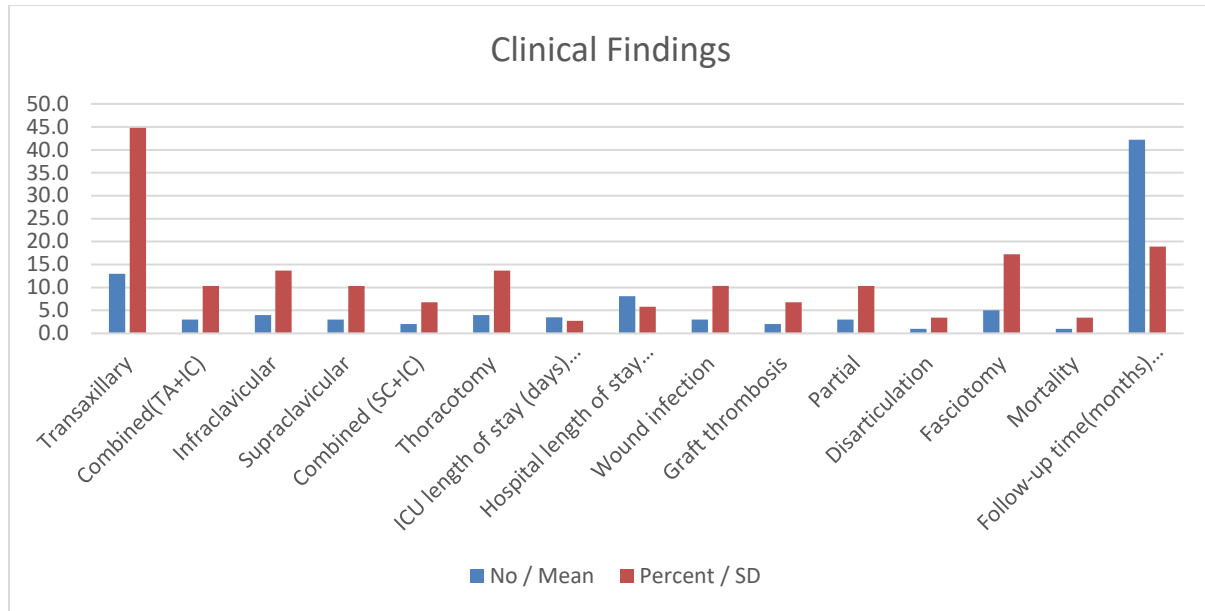
Total 55.20% (n: 16), the transection of the pathology of arteries found and diagnosis of lacerations were present in 44.80% (n; 13). The methods of the surgery are available in Table-3. The average need of the blood for transfusion was  $5.930 \pm 4.390$  IU. The death of one patient occurred due to the myocardial infarction on the very first day after operation. Per-

operative & after surgery information are available in Table-3. The average period of follow up was  $42.170 \pm 18.920$  months. Duplex ultrasound confirmed that, there was no occurrence of pathology in 58.60% (n: 17), 3.40% (n: 1) patient found with osteomyelitis and there was no vascular pathology.

**Table-III: Preoperative and Postoperative Clinical Data**

Clinical Findings		No / Mean	Percent / SD
Type of incision	Trans axillary	13.0	44.80
	Combined(TA+IC)	3.0	10.30
	Infraclavicular	4.0	13.70
	Supraclavicular	3.0	10.30
	Combined (SC+IC)	2.0	6.80
	Thoracotomy	4.0	13.70
Surgical techniques (artery/vein)	Primary repair	7/10	34.40/24.10
	Saphenous vein	4/8	27.50/13.70
Interposition or Repair	PTFE graft interposition	9/1	31.0/3.40
	End to end anastomosis	2/2	6.80/6.80
	Ligation	0/1	0/3.40
	ICU length of stay (days) Mean,SD	3.51	2.72
	Hospital length of stay (days) Mean,SD	8.13	5.81
Postoperative Complications	Wound infection	3.0	10.30
	Graft thrombosis	2.0	6.80
	Partial	3.0	10.30
Neurological Deficit	Disarticulation	1.0	3.40
	Fasciotomy	5.0	17.20
	Mortality	1.0	3.40
	Follow-up time(months) Mean,SD	42.17	18.90

IC: infraclavicular, ICU: intensive care unit, SC: supraclavicular, TA: trans axillary.



### DISCUSSION:

Vascular damages available in 1%-2% patients are the cause of many severe complications as the loss of function of some organ or mortal abnormalities as severe bleeding & infections [4, 5]. The injuries of upper extremity consist of 30.0% of the total injuries of vascular. The arteries of subclavian & axillary are not the infected areas because of strange localization. Most common artery with maximum chances of having injury is brachial artery [6]. The classification of the injuries of subclavian arteries can be carry out in injuries of brachiocephalic arteries or injuries of axillary arteries. This can be the reason of different occurrence rates [7, 8]. In this research work, the detection of the injury of the upper extremity was 8.10% in the series of six-year-old. The reasons of these injuries are different according to various research works [9, 10]. In this research work, the very frequent type of injury was wounds due to stabbing in 37.90% (n: 11), 31.0% (n: 9) patients found with wounds of gunfire. Total 17.20% (n: 5) patients found with iatrogenic trauma & 13.70% (n: 4) were the present with blunt trauma in the result of road accident. Physical checkup declares the presence of the injuries of the peripheral arteries [11].

Different methods can be in use for the diagnosis of proper injuries localization as imaging methods and duplex ultrasound [12, 13]. In this research work, physical checkup confirmed the presence of the injury to arteries & duplex ultrasound supported in 37.90% (n: 11) patients and angiography supported in 10.30% (n: 3) patients who found stable

hemodynamically. In the researches of the vascular traumas, for the continuity of the vessels autogenous grafts were in use [14, 15]. Autologous grafts have very hindrance to the spread of the infections [16]. Synthetic grafts were also available with excellent results in the non-availability of the autologous grafts [11]. There was damage to both arteries and veins in the peripheral vascular injuries [4]. The research work of Bishara [17] about the separated venous damages shows that transient extremity edema can be available in 35.0% in initial period after the surgery. The severe bleeding & infection of the wound are very frequent abnormalities as concluded in this subject [16]. The rates of mortality were from 1.50% to 20.0% in various research works of the vascular injuries [11, 18].

The appearance of the modalities of endovascular provides a substitute to the conventional management of surgery for the selection of subclavian & axillary artery upsetting abrasions [19]. Endo-vascular repair is preferable in the iatrogenic injuries as well as in the patients of blunt trauma [20]. Endo-vascular methods are also very useful for the treatment of the peripheral vascular damages [21]. Transection of the whole vessel reported as a frequent reason for malfunction of an endo-vascular procedure due to the complication with passing the whole transection & its related hematoma [22, 23]. There are some demerits of this technique with cause the firmness to brachial plexus [24].

**CONCLUSION:**

The results of this research work showed that the injuries of axillosubclavian arteries are the reason of high rate of mortalities & morbidities due to the damage to the nearby organs but the fast and rapid intervention can decrease the rate of this mortality as well as morbidity. In urgency and poor condition, the better choice of the treatment is conventional surgery. Hybrid methods in the surgery of vascular injuries are also common. Hybrid procedures are very effectual in the stable patients. We recommend the application of the conventional procedures in case of emergency.

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