Original Article

Amputation of Upper Extremity

Frequency of Traumatic Amputation of Upper Extremity Presenting at Tertiary Care Hospital in Southern Punjab Pakistan

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ABSTRACT

Objective: The purpose of this study was to provide a comprehensive perspective on the epidemiology and causes frequently seen in upper limb amputation.

Study Design: Descriptive / cross sectional study

Place and Duration of Study: This study was conducted at the Department of Orthopaedics, Bahawal Victoria Hospital, Bahawalpur, Punjab Pakistan from 1st March 2017 to 15th August 2017.

Materials and Methods: All the cases presenting with traumatic upper limb amputation were included in this study. Their age, gender, mode of injury, level of amputation and laterality was recorded.

Results: A total of 93 cases with traumatic upper limb amputation were reported. 75 of them were due to Tokka / Fodder Cutter. Other major sources were Bailna/Sugarcane Machine and Thresher. Most of the patients were in their second and third decade of life with mean age 28 years. Male to female ratio was 1:1. 62 patients had amputation at the level of hand. 63 patients had right side amputated.

Conclusion: Tokka / Fodder Cutter was the major source of traumatic amputation seen in Southern Punjab, equally seen in men and women with highest incidence in second and third decade of life.

Key Words: Upper limb, traumatic amputation, frequency, Tokka/ Fodder Cutter

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INTRODUCTION

Limb Amputation is one of the most ancient of all surgical procedures with a history of more than 2500 years dating back to the time of Hippocrates.[1] Limb amputation is considered the last resort when limb salvage is not possible or when the limb is dead or dying, viable but not functional or endangering the patient's life.[2]Man relies on his upper limbs for finer functions. Its loss is a potentially devastating incident in a person's life making him liable to physical, psychological and vocational consequences. Upper limb amputation can include finger amputation, hand amputation and arm amputation either below or above elbow.[3]Its frequency and cause varies from region to region. Traumatic amputations of hand and wrist are common injuries in rural, agriculture related areas around the globe.[4] In Southern Punjab agriculture is one of the largest primary industries consuming most of the labour force.

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Since the introduction of machine in agriculture, incidence of upper limb trauma has increased drastically. There is lack of knowledge regarding its incidence and severity in Southern Punjab.

The primary objective of this descriptive cross-sectional study was to investigate major factors leading to upper limb amputation and their frequency presenting in Bahawal Victoria Hospital Bahawalpur. Secondary aims were to determine age, gender, level of amputation, laterality and their in-hospital management.

MATERIALS AND METHODS

This study was conducted in Department of Orthopaedics, Bahawal Victoria Hospital, Bahawalpur from 1st March 2017 to 15thAugust 2017. All the patients referred to Orthopaedics Department after initial resuscitation in the Emergency Department with traumatic upper limb amputation were included in this study. The patients who suffered amputation due to vascular disease and road traffic accidents were excluded from this study. All the cases were documented according to their age group, gender, mode of amputation, level of amputation and laterality. Statistical data entry and analysis was done by using SPSS version 20.

RESULTS

During the above mentioned time period 93 cases of traumatic amputations were received. Male amputees were 49.5% (n=46) and female amputees were 50.5%

(n=47). Age distribution was from 4 years to 78 years. Highest percentage of amputation was seen in second (32.3% n=30) and third (28.0% n=26) decade of their life. Mean age of the patients was 28 years.

Of the 93 cases Tokka/Fodder Cutter was the major source of amputation of upper limb accounting 80.6% (n=75) of the total. Other major modes recorded were Bailna/Sugarcane machine (6.5% n=6) and Thresher (6.5% n=6). Cases from other minor sources i.e. Vermicelli making machine, Mince making machine, wood cutter machine, Saylan Machine/Rice Miller accounted for 6.5% (n=6) in total.

All the patients presented with different level of amputation; 66.7% (n=62) of them had amputation at the level of hand. This shows the importance of usage of hand in manual work and incidence of injury it is prone to. 74.2% (n=46) of the hand amputees involved right hand and 25.8% (n=16) had left hand amputation. 17.2% of the amputees had amputation at the level of forearm; 5.4% (n=5) at the level of wrist; 2.2% (n=2) at the level of elbow; and 4.3% (n=4) at the level of arm.

Laterality was also recorded. 66.7% (n=62) had right sided amputation and 29.0% (n=27) had left sided amputation. 4.3% (n=4) had bilateral amputations.

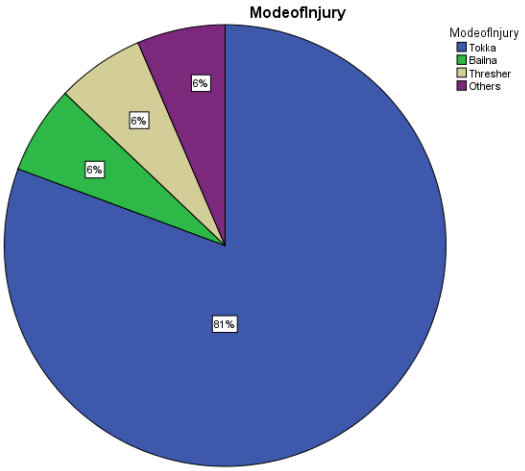

Figure No.1: Frequency of mode of injury documented

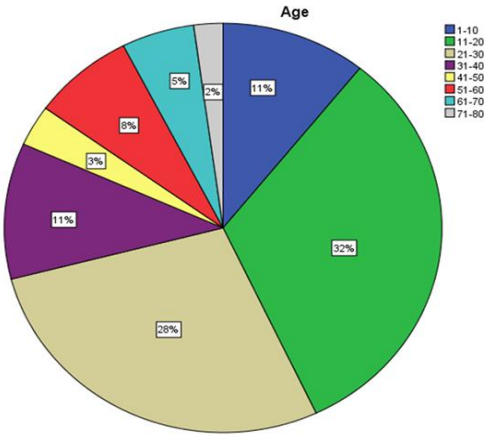

Figure No. 2: Age Distribution

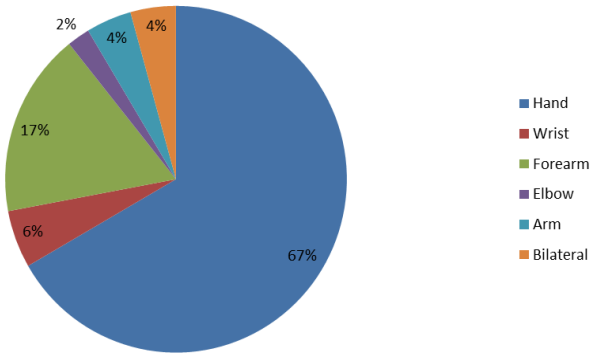

Figure No.3: Level Of Amputation

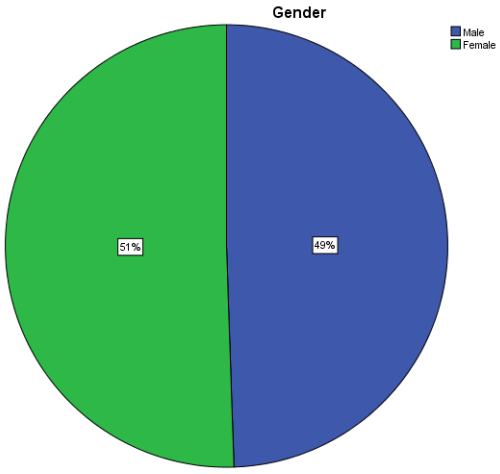

Figure No.4: Male to Female Ratio

Figure No.5: Electrical Tokka/ Fodder Cutter

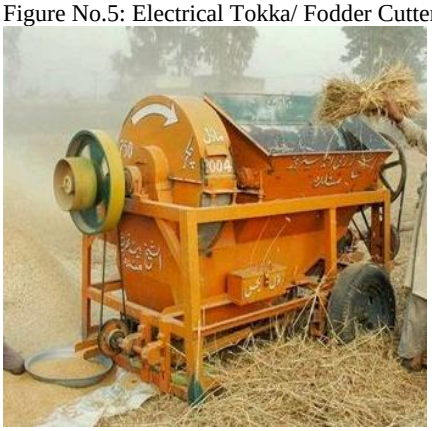

Figure No.6: Thresher Machine

Table No.1: Age * Modeofinjury Crosstabulation

			ModeofInjury				Total
			Tokka	Bailna	Thresher	Others	
Age	1-10	Count	8	1	1	0	10
		% within Age	80.0%	10.0%	10.0%	0.0%	100.0%
		% within ModeofInjury	10.7%	16.7%	16.7%	0.0%	10.8%
		% of Total	8.6%	1.1%	1.1%	0.0%	10.8%
	11-20	Count	25	2	0	3	30
		% within Age	83.3%	6.7%	0.0%	10.0%	100.0%
		% within ModeofInjury	33.3%	33.3%	0.0%	50.0%	32.3%
		% of Total	26.9%	2.2%	0.0%	3.2%	32.3%
	21-30	Count	22	2	0	2	26
		% within Age	84.6%	7.7%	0.0%	7.7%	100.0%
		% within Mode ofInjury	29.3%	33.3%	0.0%	33.3%	28.0%
		% of Total	23.7%	2.2%	0.0%	2.2%	28.0%
	31-40	Count	6	0	3	1	10
		% within Age	60.0%	0.0%	30.0%	10.0%	100.0%
		% within ModeofInjury	8.0%	0.0%	50.0%	16.7%	10.8%
		% of Total	6.5%	0.0%	3.2%	1.1%	10.8%
	41-50	Count	3	0	0	0	3
		% within Age	100.0%	0.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	4.0%	0.0%	0.0%	0.0%	3.2%
		% of Total	3.2%	0.0%	0.0%	0.0%	3.2%
	51-60	Count	5	0	2	0	7
		% within Age	71.4%	0.0%	28.6%	0.0%	100.0%
		% within ModeofInjury	6.7%	0.0%	33.3%	0.0%	7.5%
		% of Total	5.4%	0.0%	2.2%	0.0%	7.5%
	61-70	Count	5	0	0	0	5
		% within Age	100.0%	0.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	6.7%	0.0%	0.0%	0.0%	5.4%
		% of Total	5.4%	0.0%	0.0%	0.0%	5.4%
	71-80	Count	1	1	0	0	2
		% within Age	50.0%	50.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	1.3%	16.7%	0.0%	0.0%	2.2%
		% of Total	1.1%	1.1%	0.0%	0.0%	2.2%
Total		Count	75	6	6	6	93
		% within Age	80.6%	6.5%	6.5%	6.5%	100.0%
		% within ModeofInjury	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	80.6%	6.5%	6.5%	6.5%	100.0%

Figure No.7: Sugar Cane Machine

DISCUSSION

Traumatic upper limb amputation is a common case managed by Orthopaedics Surgeons. It has a debilitating effect on patients and their families. Its indications and patterns differ within different regions of countries and between countries. This study was done to highlight indications and patterns observed in our tertiary care unit and to do its comparison with other regions. It would help in devising effective management and meaningful preventive measures.

Tokka/Fodder Cutter was observed as a major source of upper limb amputation. Akram M. ET all studied the incidence of agriculture machine injuries and found that 67.5% injuries were due to Fodder Cutter

machine.[5]They also found 90% of hand injuries were due to Tokka/ Fodder Cuter. According to Annual Report of CIWCE & IRI, Lahore, Pakistan during the survey of just two villages of Punjab Pakistan they found five people with severe injuries to upper limb due to Tokka/ Fodder Cutter. Out of these five people two had amputation at arm level and three had amputation of digits.[6] These findings are in line with our findings. This implies that agriculture mechanization is still in its infancy in most of the Asian countries. This leads to substandard manufacturing of agricultural machinery ignoring safety of the operator. Removal of safety shields and the use of machinery that does not conform to be manufacturer or safety-sigh standards is also a common contributing factor.[8]Awareness regarding safe usage of agriculture equipment becomes inapplicable in our setting where literacy rate is low. In agriculture related injuries trauma to hand and upper extremity are extremely common representing from 40% to 70% of total admissions that occur on a farm yard.[9] In a study conducted in Canada, injury pattern observed was tractor trauma 10.2-54%, power take off device (5.4%), grain augers (6.4-22%), balers and thrashers (3.9%) and harvest combines (8.6% to 16%).[10]

The majority of patients were in their second and third decade of life. In Nigeria, median age for limb amputation was 27 years.[11]This age group makes the most productive part of our society. Disability of this age handicaps them and makes them a social burden. Almost equal ratio of male and female were seen. It is in contrast to previous conducted studies where male preponderance was observed.[12-14]It is due to home usage of most agricultural machinery and equal participation of women in farms.

Traumatic amputations require proper surgical management and post-operative rehabilitation. Most injuries require revision amputation and postoperative prosthesis fitting. Care should be taken to preserve maximal length of the limb and mobility of the remaining joints. For preservation of length skin grafting or free tissue transfer may be necessary. Early prosthetic fitting within 30 days of surgery should be performed so that amputee can start rehabilitation while the wound is healing and the stump is maturing.[15]These interventions at present are unavailable in most tertiary care units of Pakistan. Therefore prevention of such injuries is the best available option. It can be achieved by redesigning agricultural machinery considering safety of the operator."Safeguards" or protectors prior to the sharp blades should be added to the machines. In manufacturing machine should follow safety criteria as follows: disengage gear, conveyer belt, distance detector, emergency brake, increase rollers, flesh sensor, automatic switching, and retractable rollers.[16] Proper education of the operator regarding safe and vigilant usage of the machine holds equal importance. Government should take proper steps for regulations of safety criteria of agricultural machinery. Concept of prosthesis is underdeveloped in our country. A rehabilitation centers for amputees is the dire need of this region.

CONCLUSION

Tokka /Fodder Cutter is the major source of traumatic amputation in Southern Punjab. Its preponderance is highest in the second and third decade equally seen in both genders. Preventive cautionary measures are the best way to avoid amputation. Educational campaigns regarding safe usage of form machinery should be intensified throughout the year and directed more towards younger population. Multidisciplinary care is necessary for the complete care of the patient with traumatic limb amputate.

Author's Contribution:

Concept & Design of Study:	Zobia Zulfiqar
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Revisiting Critically:	Zobia Zulfiqar, Saad Zulfiqar Bubak
Final Approval of version:	Zobia Zulfiqar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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