

Fodder Cutter (Toka) Injuries, a Preventable Tragedy. Our Experience at Jinnah Hospital Lahore

Dr. Muhammad Jibrán Rabbani, Dr. Ata Ul Haq, Dr. Farrukh Aslam,
Dr. Husnain Khan, Dr. Moazzam Nazeer Tarar.

ABSTRACT

The fodder cutter machine (*Toka* in local dialect) is one of the most common agricultural machines used in the farms. We receive quite a significant number of agriculture machine injuries at the Jinnah Hospital Lahore and Toka injuries are at the top of list. Although any part of the body may be injured but upper limb is the most commonly injured region. We conducted a study to see the spectrum of Toka related injuries referred to our department and their management. Study included the patients referred to plastic surgery department with Toka injuries from Jan 2009 to Oct 2012. We received 74 patients over the period of 34 months. We found that most commonly involved age group was 4 yrs to 45 yrs. Hand injuries are at the top of list followed by scalp degloving. Out of these 47 patients required microsurgical intervention. Majority of the microsurgical work was replantation.

Key words: Fodder cutter machine, agricultural injuries, hand injuries, replantation.

INTRODUCTION

Pakistan is an agricultural country and Lahore is the second largest city of Pakistan with vast agricultural lands in its periphery. Most people use powered agricultural machinery in their fields to expedite their work but a majority do not practice safety measures either due to lack of knowledge or due to willful neglect¹. Fodder cutter machines (Toka) are used every day by the farmers and their families for the preparation of fodder for their livestock². There are two broad categories of Toka machines, manual and electric motor driven. Injuries are more common and more severe with electric motor driven machines³. The mechanization of agricultural practices has resulted in increased agricultural productivity in Pakistan but at expense of higher incidence of traumatic injuries among agricultural workers. Toka injuries are emerging as a leading cause of morbidity in agricultural workers. It affects both genders of all age groups with male predominance⁴. Most of these injuries are in the form of complete amputation of either digits or the hand and their management requires microvascular services. Management of such patients

poses a burden on our already stressed health care delivery system⁵. Majority of these untreated injuries end up in the compromised upper limb function leading to lifelong disability^{6,7,8}.

After starting micro vascular/replantation service at the emergency department of Jinnah Hospital Lahore, we realized the magnitude of problem and decided to conduct a study to collect data and awareness of this issue at national level. Because we strongly believe that prevention of such injuries is the only way forward.

MATERIAL AND METHODS

We conducted the study in Plastic Surgery Department of Jinnah Hospital, Lahore from Jan 2009 to Oct 2012. All patients referred to plastic surgery through emergency department with Toka injuries were included in the study. The patients who sustained injuries due to other agricultural machine injuries were excluded. All the injuries were recorded with respect to the age and sex of the patients, site and severity of injury. All the patients were managed in emergency department. Patients having multiple injuries were managed by adapting multidisciplinary approach. All the replantations and revascularizations were done in emergency department and were shifted to indoor service. After discharge, patients were followed in outpatient department for rehabilitation. All the data was recorded on a Performa and data was analyzed by using SPSS v17.

Dr. Ata Ul Haq

Senior Registrar
Department of Plastic Surgery,
Allama Iqbal Medical College/Jinnah Hospital,
Lahore
Phone: - 03215847076
Email: ata_mr@yahoo.com

RESULTS

We received calls for 74 patients for Toka injuries during the above mentioned time period. Out of these 49 (66.2%) were male and 25 (33.7%) were female. Age ranged from 4 yrs to 45 yrs. Mean age was 25yrs. Seven (9.45%) patients were below the age of 6 yrs. Total 53 (71.6%) patients sustained injuries to the upper limb, 14 (18.91%) to scalp, 5 (6.75%) to genital area and 2 (2.7%) patients to lower limb.

Among the hand injuries 42 (79.24%) were male and 11 (20.75%) were female patients. 6 (11.32%) patients were below the age of 4 years. Most of the injuries were to the digits 21 (39.62%) followed by palm 13 (24.5%), distal forearm 12 (22.64%), proximal forearm 4 (7.54%) and mid arm 3 (5.66%). Ten (18.9%) patients were not offered replantation due to late presentation, multilevel injuries or element of avulsion. These patients underwent stump formation or wound closure by fasciocutaneous flap. Rest of 37 (69.9%) patients were managed by replantation and 6 (11.32%) were offered revascularization. Out of 37 replantations, 28 (75.6%) were successful. All the revascularized hands/digits survived.

Fourteen (18.91%) patients sustained scalp avulsion injuries due to entrapment of long hairs in machine belt leading to partial or total scalp avulsion. All patients were females. One (7.12%) patient was offered revascularization that was successful. All other patients were not offered replantation as there was late presentation or sever avulsion. Soft tissue reconstruction was done by split thickness skin graft in 9 (64.29%) patients and by free tissue transfer in 4(28.57%) patients.

Five male patients sustained injuries to genital area resulting in penile and scrotal skin degloving due to entrapment of cloths in machine belt. One (20%) patient got concomitant injury to penile urethra that was repaired by urology department. All 5 patients underwent soft tissue reconstruction by split thickness skin graft.

Lower limb amputation was seen in 2 (2.7%) patients. The adult patient had unilateral amputation just proximal to ankle. The other patient was below age to 7 years got bilateral amputation proximal to ankle. Both patients were offered replantation. There was complete

survival of replanted foot in unilateral amputation patient. While in case of bilateral replantation, the left foot completely survived but the right foot ended up with midtarsal amputation.

TABLES AND FIGURES

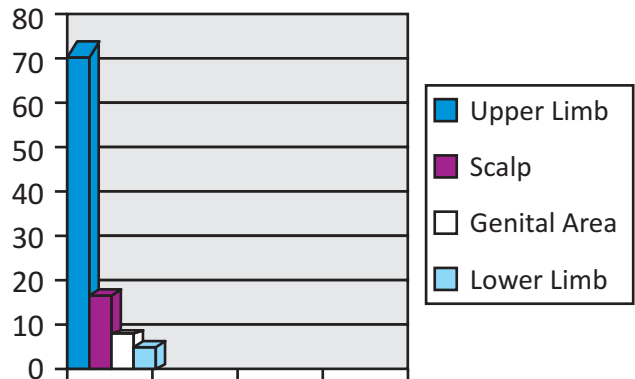


Figure - Spectrum of Injuries

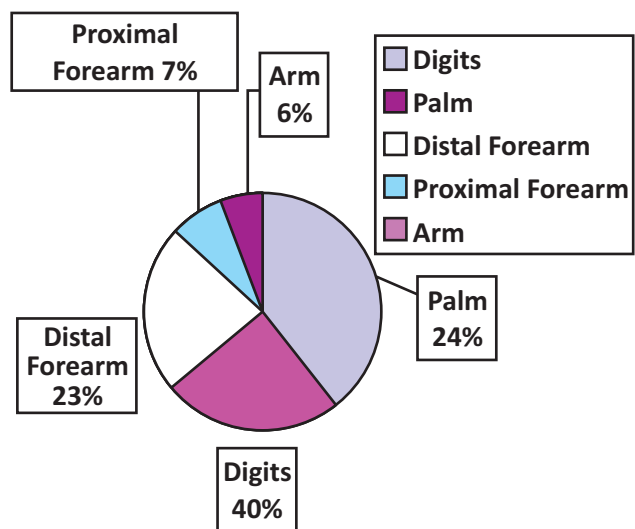


Figure : Spectrum of Hand Injuries

	Total	Survival
Stump Formation	10	-
Replantation	37	75.6%
Revascularization	6	100%

Figure : Management of Upper Limb Injuries

Management of Scalp Degloving Injuries	
Total patients	14
Revascularization	1
SSG	9
Free Flap	4

Figure : Management of Scalp Degloving Injuries



5(a)



5(b)

Figure 5: Electric motor driven Fodder Machine

Case 1:

18 year male, right dominant hand, laborer by occupation presented primarily to Jinnah Hospital Lahore with toka machine injury causing amputation of right thumb through mid-metacarpal level. Successful replantation was done in emergency.



(a)



(b)



(c)



(d)

Figure . Case 1- Rt thumb amputation.

Case 2:

5 years female presented with accidental fodder machine injury to her left hand while playing with electric motor driven fodder machine. Little and ring fingers were avascular at presentation. Both fingers survived after revascularization.



(a)



(b)

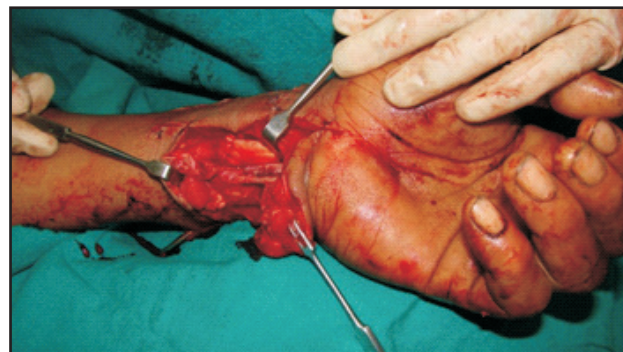
Figure : Case 2- Partial injury involving little and ring finger. Both fingers survived after revascularization

Case 3:

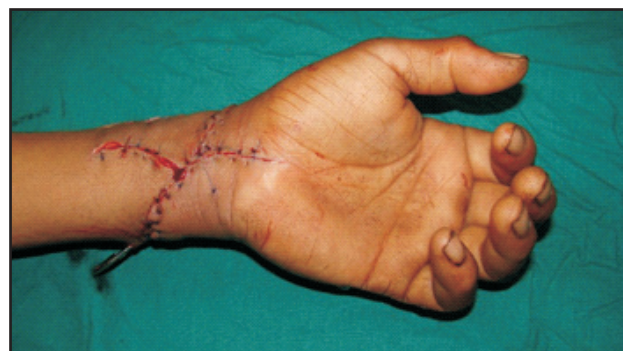
37 years male farmer presented with amputation of his left hand through wrist after sustaining injury from fodder cutter. After successful replantation, post operative results were satisfactory



(a)



(b)



(c)



(d)

Figure : Case 3- Replantation of left hand

Case 4:

41 years old female presented with scalp degloving after entrapment if her hairs in fodder machine belt. The only remaining blood supply was from left superficial temporal artery but there was no venous return. Revascularization was done by repairing two veins using vein grafts.



(a)



(d)

Figure :- Scalp Revascularization



(b)

Case 5:

29 years male sustained injury by accidental turning on of toka machine causing amputation of his right foot just proximal to ankle mortise. Results were satisfactory after replantation.



(a)



(c)



(b)



(c)



(d)

Figure : Right foot replantation

DISCUSSION

Toka injuries are devastating, often resulting in long term disability. Presentation of such injuries can range from degloving to partial or complete amputation. Surgery often involves more than one procedure and complexity of the procedure requires highly specialized skills of microsurgical reconstruction.

The incidence and severity of such injuries has been suggested by previous studies as well. Akram M et al studied the incidence of agriculture machine injuries and found that 67.5% injuries were due to Fodder cutter machine (Toka). They also found that 90% of hand injuries were due to Toka⁹. These facts support our findings that majority of Toka machine injuries involve the upper limb, especially the hand. 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 Toka machine. Out of these five people two had amputation at arm level and three had amputation of digits¹⁰. Although area visited is very small but still it highlights the fact that lot of people are suffering due to this machine.

According to a paper prepared for Global Agriculture Safety Forum by Dr Amitava Mukherjee & Prof. Chang Ping, the agricultural mechanization is still in infancy in most of the Asian countries¹¹. According to same report the implementation of farm machinery standards is on voluntary basis. Obviously this leads to manufacturing of agricultural machinery without proper consideration for the safety of the operator leading to accidental injuries. Same is true for Toka machine. Low level of literacy makes training and awareness about farm equipment safety a different task in our circumstances.

The main purpose of our study was to know the spectrum of Toka machine injuries so that we can highlight this issue on various forums on the basis of facts & figures. As shown by our study, most of the injuries are severe and disabling. The age group involved is from the most productive part of the society and bread earners for their families. Many of the injuries lead to lifelong disability leading to endless problem of a person and his family.

Most of these injuries require plastic surgery intervention with availability of microsurgical skills. Presently these services are not available even in most tertiary care hospitals of Pakistan. On top of that, victims of these injuries belong to far flung areas, further reducing their chances of getting timely plastic surgery intervention i.e. long warm ischemia times in case of amputation. This reduces the chances of better functional outcome.

On the basis of above mentioned facts we strongly believe that prevention of these injuries is the only solution. It can be achieved by proper designing of fodder cutting machine along with education of the operator about his safety during the use of this machine. By simply reducing the exposure of pinch and cutting part of the machine with the help of "safe guards" and "shields" can reduce the incidence of injuries. Also laws should

be formulated and implemented for the manufacturing of safer Toka machines.

The limitation of our study is that this is a single unit data with inclusion of only those patients who were referred to us for complex reconstruction. Patients with minor injuries were treated and discharged by the general or orthopedic unit on call. In order to frame the magnitude of problem a multicentre study is required with inclusion of every patient presenting to emergency department with agricultural machine injuries.

CONCLUSION

Injury caused by Toka is a serious but preventable health hazard faced by our rural population. These injuries can be prevented by modification in machine design and education of population at risk about the safe use of this machine. Regulatory control over manufacturing of such machine with emphasis on safety features is warranted to prevent such devastating injuries.

REFERENCES

- 1- Childhood agricultural injuries prevention symposium held in Marshfield, Wisconsin in 1992. Childhood agricultural injuries surveillance.
- 2- RFA-OH-00-005. Research to strengthen occupational safety and health surveillance, title, childhood agricultural trauma evaluation system, Debora Boyle, Oh.D (09/30/2000 To 09/29/2001).

- 3- Salmi LR, Weiss HB, Peterson PL, Spenger FR, Sattin RW, Anderson HA. Fatal farm injuries among young children. *Pediatrics* 1989;83:267-71.
- 4- Bureau of Labor Statistics, census of fatal occupation injuries, United States, National central for health statistics vital statistics mortality surveillance systems.
- 5- Global medium term programme. Accident prevention. Geneva, World Health organization 1988.
- 6- Horsburgh S, Feyer AM, Langley JD. Fatal work related injuries in agricultural production and services to agriculture sectors of NewZealand, 1985–94. *Occup Environ Med* 2001; 58: 489–495.
- 7- Franklin RC, Mitchell RJ, Driscoll TR, Fragar LJ. Agricultural work-related fatalities in Australia, 1989–1992. *J Agric Safety Health* 2001; 7: 213–227.
- 8- Singleton WT, Hicks C, Hirsch A, 1981. Safety in Agriculture and Related Industries (AP Report 106). University of Aston in Birmingham, Birmingham.
- 9- Akram M, Gulzar MR, Nazim M, Iqbal J. Agricultural machine injuries; Incidence. *Professional Med J*. Mar 2010; 17(1): 485-488.
- 10- Annual Report of Activities 2011. Centre for the Improvement of Working Conditions & Environment Lahore. Industrial Relations Institute Lahore.
- 11- Amitava M, Chang P. Agricultural Machinery Safety – a Perpetual Theme of Human Society. The Global Agricultural Safety (GAS) Form. Rome Italy. 25 September 2008.

