ORIGINAL ARTICLE

Agricultural Machine Injuries - A Significant Cause of Morbidity

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ABSTRACT

Aim: To assess rate and pattern of agricultural machine injuries and to recommend safety measures.
Study Design: Retrospective Observational.
Setting: Surgical Unit-I, Allied Hospital, Faisalabad.
Duration: From October 01, 2013 to April 30, 2015.
Methods: All patients with agricultural machine injuries presenting in surgical emergency Allied hospital, Faisalabad were included. Data included patients profile, date of admission, mechanism of injury, type of machine causing injury and type of injury.
Results: Total number of cases in period under study was sixty nine. There were 63(91.3%) male and 6(8.9%) females. Mean age of patients was 24.4 years. 45(65%) cases were due to Fodder chopper (toka), 6(8.7%) due to Rotavator, 6(8.7%). Thresher and 3(4.3%) due to Sugarcane juice extractor Maize thresher, tractor ,and harrow blade each .Upper limbs were involved in 30(43.5%), perineum in 21 (30.4), lower limbs in 15(21.7%) and scalp in 3(4.3%).
Conclusion: Young males were the usual victims of agricultural machine injuries. Fodder chopper followed by threshure and rotavaterwere the cause of injury in most of the patients. Upper limbs were mostly injured in such cases followed by perineal injuries and injuries to lower limbs.
Keywords: Agricultural machines, Agricultural injuries, Farm Injuries, AgriculturalAccidents.

INTRODUCTION

Injuries related to agricultural machines are a significant cause of morbidity and mortalityboth in high-income as well as in low-income countries and have been an important health risk in rural population[1]. Pakistan is an agricultural country and a large proportion of the workforce is involved in agriculture or related occupations.Like all other fields of life, farming has also become mechanized .Farmers are using different machines which are specialized for different works. Although these machines have revolutionized farming but these are not risk free and cause serious injuries, even kill many farm workers.However most of these injuries are preventable if one adheres to safe operating practice.But unfortunately most of our farm workers being illiterate do not follow safety instructions. No age group is immune to agricultural injuries and farmers work in farms irrespective of age and sex[2]. Farm work is one of the most hazardous occupation for both men and women[3].

Injuries to children are also prevalent because agricultural work place overlaps homes in rural areas. In Pakistan like number of other countries farming is an unorganized sector.Different types of machines commonly used in our farms are fodder chopper (Fig 1), Rotavator (Fig 2), wheat thresher (Fig 3), sugarcane juice extractor (Fig 4), harrow blade (Fig 5), maize thresher (Fig 6) etc.

The work environment on afarm is distinct from the work environment in the industry. In many industrial settingslearning is a formal process, whereas, on the farm learning is mostly informal as farmerslearn from their own families or by personal experience.Unlike industrial machines ,there is no system of regular checkup, repair or maintenance of agricultural machines and these machines lack safety features as well[4] . So farming is a neglected field both at government as well as social sector as compared to industrial sector.Purpose of this study is to highlight this serious issue, which is the cause of significant morbidity and mortality in our young population and to give recommendations for prevention of such injuries.

Fig1 .Fodder Chopper (TOKA)

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Fig 2. Rotavator

Fig 3.Wheat Thresher

Fig 4.Sugarcane juice extractor

Fig 5: Harrow blade

Fig 6.Maize thresher

MATERIAL AND METHODS

It was a retrospective observational study conducted at Surgical Unit-I, Allied Hospital, Faisalabad from October 01, 2013 to April 30, 2015. Sixty nine consecutive patients, both male and female, with agricultural machine admitted to surgical emergency Allied hospital Faisalabad during the above period were analyzed. Data included patient's profile, date of admission, mechanism of injury, type of machine causing injury and type of injury. Patientshaving traumatic injuries due to other causes were excluded. All the patients were resuscitated according to ATLS principals by trained doctors. Tetanus prophylaxis, broad spectrum antibiotics and analgesics were administered to all the patients while preparing for definitive surgical procedure. Most of the patients had dirty wounds. Thorough wound debridement and saline lavage was done. Refashioning of the stump, in cases of limb injuries, was planned keeping in view the subsequent need for prosthesis and in consultation with the orthopedic surgeon.

In cases of degloving injuries of scalp viable skin was saved to cover the underlying bone. All patients with the degloving injuries of perineum were male. Through wound debridement and saline lavage was routinely done. Exposed testes were either covered in preserved scrotal skin or buried in medial side of thigh. It was not possible, testes were covered with tulle guaze and wet dressing for subsequent wound grafting. Data analysis was done using SPSS 11.

RESULTS

Total number of cases in period under study was 69. There were 63(91.3%) male and 6(8.9%) female (Ratio 10.56 6:1). Mean age was calculated to be 24.4 years. Forty five (65%) cases were due to Fodder chopper (Toka), 6(8.7%) due to Rotavator, six (8.7%) Thresher and 3(4.3%) due to Sugarcane juice extractor, Maize thresher, tractor and harrow blade each (Table II). Upper limbs were involved in 30(43.5%), perineum in twenty one (30.4%), lower limbs in 15(21.7%) and scalp in 3(4.3%) (Table I).

Table I: Site of injury

Site of injury	n
Upper limb	30(43.5%)
Perineum	21(30.4%)
Lower limb	15(21.7%)
Scalp	3(4.3%)

Table II: Type Of Machine

Fodder chopper	45(65%)
Rotavater	6(8.7%)
Thresher	6(8.7%)
Sugar cane juice extractor	3(4.3%)
Maize thresher	3(4.3%)
Tractor	3(4.3%)
Harrow blade	3(4.3%)

Upper limb injuries are most common and found to be in 43.5 % cases ,one patient had even bilateral above elbow amputations(Fig 7).Perineal area was second common site of injury found in 30.4% cases. These injuries included degloving of penile and scrotal skin, penile urethral injury (Fig 8). Lower limb injuries found in 21.7% and included traumatic amputations (Fig 9). Upper limb and perineal injuries were mostly caused by fodder chopper (TOKA) while lower limb were commonly caused by thresher, rotavator and maize thresher.

Fig 7.Bilateral above elbow amputation by fodder chopper machine

Fig 8. Degloving abdominal and perineal injury

Fig 9. Traumatic amputation of lower limb

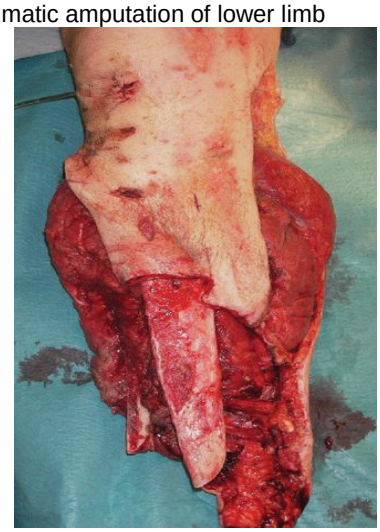

Fig.10: Degloving scalp injury due to fodder chopper machine

DISCUSSION

Pakistan being an agricultural countrymost of people are linked directly or indirectly with farming.Farming in Pakistan has been mechanized and different machines are being used for different farming procedures.Although these machines have revolutionized and made farming very easy but these machines are not hazard free.

Farm machine injuries are usually limb or life threatening. Toka machine injuries are the commonest injuries seen in our study occurring in 45 (65%) patients. This is contrast to studies conducted by Mohan and Patel[7] and Mufti Ahmad Majid[8] who report fodder chopper injurie 11% and 6% respectively. Upper limbs are involved most commonly and common injuries were amputations at different levels and toka was the commonest cause these findings are similar to the findings of Jawa et al[9] who report 89% extremity injuries, along with Jansson who state upper extremity injuries are common[10]. In our study 45(65%) patients had traumatic amputations out of these 30 patients had upper limb while 15 had lower limb amputations ,these observations are consistent with other studies[11,12] who found that farm injuries are severe and mostly cause permanent disability. Most of times carelessness is the cause of injury or they work alone in field and injury causing situation is recognized[13]. Perineal injuries second to amputations occurring in 21 patients and most of them had degloving of peno-scrotal skin. Perineal injuries were commonly caused by entanglement of dhoti in shaft of machine. The injuries recorded here are just iceberg because many of them especially minor injury patients do not come to hospital[14].

An ounce of prevention is better than pound of cure .Most of farm injuries are preventable if proper safety measures are taken. Although we have adopted modern western machines but our farmer is reluctant to use their dress.They are still using traditional very loose fitted clothes like dhoti ad kurta in male and dopatta in female. Wearing loose clothes is one of the common risk for machine injuries,however poor hearing and stress have also been reported to be important factor[5]. Most of agricultural machines have pulleys, gears and rotating shafts which can easily entangle loose clothes especially dhoti .Similarly long hair and or dopatta getting entangled in agricultural machines is cause of scalp degloving injuries in female (Fig 10). So farmers should be trained to use tight fitting clothes, keep cuffs buttoned up, similarly female having long hair should wear well fitted caps or head cover. Unfortunately farming has not been taken as industry and is being neglected both at government and social levels. Most of our farmers are uneducated and belong to low socioeconomic group.Unlike industrial workers farmers are not given any training ,they learn from their family members or from personal experience. Working at farms is not organized which also predisposes to injuries[6].Most of persons involved in farm injuries are young male with average age 24.4 years ranging from 5 to 60 years. However female are not immune to farm injuries because they work with male in fields.In our study six female had injuries and three of them had degloving of scalp and three amputation of hand.Children are also at risk, most of them go with their parents for fun and are left unattended when parents become busy in work.

CONCLUSION

Young males were the usual victims of agricultural machine injuries. Fodder chopper followed by thresher and rotavater were the cause of injury in most of the patients. Upper limbs were mostly injured in such cases followed by perineal injuries and injuries to lower limbs.

RECOMMENDATIONS

1. Farmers while operating machines must avoid loose clothes like dhoti, kurta and dopatta etc.
2. Training workshops should be arranged for the agricultural workers before each harvest season.
3. System of regular checkup and maintenance of machines should be developed.
4. Agricultural safety inspectors should be appointed to visit agricultural sites regularly to ensure proper functioning of different machines and safety precautions.
5. Children should not be allowed to come near the operating machines.
6. Agricultural and social media should be involved in educating and training of farmers.

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