Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(8D):3043-3047 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2015.v03i08.058

Research Article

Bull Horn Injuries-Rural problem in Urban India

Dr. Ankur Maheshwari, Dr. R S Raikwar, Dr. Siddharth Dubey
Dept. of Surgery, MGM Medical College& MY Hospital, Indore (M.P.)-452001, India.

***Corresponding author**
Dr. Siddharth Dubey
Email: siddharthdube0905@gmail.com

Abstract: Bull horn injuries are defined as lesions resulting from collision with bull/cow horns. Bull horn injuries though not so commonly seen in cities are commonly observed in rural areas. The injuries produced by bull goring can be classified into blunt wounds, or contusions, and penetrating, or open, wounds. A retrospective study of patients admitted to department of General Surgery in MY hospital, Indore which is tertiary care hospital in central India with the diagnosis of wound by bull horn, between January 2010 and October 2015 was done. The management of patients depends on the site of injury and general condition of the patient. Bull horn wounds have special characteristics. In country like India which is agrarian economy and cattle are reared in rural areas, such injuries and their management is still relevant. Because of their special character they deserve a special mention in cases of trauma and wound management.
Keywords: Bull horn injury, lance, puntazo, cornada, vascular injury.

INTRODUCTION

Bull horn injuries are defined as lesions resulting from collision with bull/cow horns. Bull horn injuries though not so commonly seen in cities are commonly observed in rural areas[1-2]. The injuries produced by bull goring can be classified into blunt wounds, or contusions, and penetrating, or open, wounds. Open wounds are called goring wounds they are classified based on the bullfighting terminology in spain[3].

a. **Lance:** contusion resulting from the horn's transversal collision;
b. **Puntazo(**a light horn puncture wound or scratch): structural continuity of skin and subcutaneous cellular tissue caused by the tip of the horn and not involving the muscles;
c. **Cornada**(goring): small entry, lacerated contused wound involving the muscles or body cavities;
d. **Cornadadespistante**(misleading goring): entry wound is far away from the most significant trauma area;
e. **Cornadaenvainada**(penetrating goring): deep injury with severe internal lesions without structural continuity in the skin.

Most of these injuries in due to bull occurs (63%) involve the lower extremities, whereas those involving face and neck amount to barely 2-3 percent. Given the characteristics of these animals, any patient who has been gored by a bull must be considered as a patient with multiple injuries and treated as such from the first time he is seen[4]. In addition, the patient must receive specific treatment for the injured region and organs affected. These wound have special characteristics (muscular tearing, several wound paths, introduction of foreign bodies, discrepancy between the apparent and actual wounds, massive inoculation of germs, and others) that make them singular in terms of their proper examination and treatment. These characteristics differentiate them from other types of penetrating injuries, such as knife and gunshot wounds. Vascular trauma caused by bull horn injuries can be regarded as a subgroup of vascular traumatology, due to its particular etiology, mechanism of action, associated injuries and surgical management

MATERIALS AND METHODS

A retrospective study of patients admitted to department of General Surgery in MY hospital, Indore which is tertiary care hospital in central India with the diagnosis of wound by bull horn, between January 2010 and October 2015 was done. Those patients were excluded from this study in which no wounds occurred other than impact of bull horn (bruising, crushing, bone fracture, etc. Among the data collected included: patient name, medical record number, age, sex, marital status, origin, date of admission, discharge date, location of the main wound, presence of visceral disease, type of

surgery, type anesthesia, use of drains, antibiotics, tetanus vaccination, presence of fever during admission, need for blood transfusions, need for surgery, days of hospitalization in intensive care unit (ICU), immediate complications (during admission) or late (after hospital) and reoperations..

RESULTS

Between January 2010 and October 2015, 48 patients were treated in our hospital for the diagnosis of bull horn injuries. 27 patients, showed multiple wounds by a bull horn in number from 2 to 6. All these patients were directly referred by the primary health centre and secondary health centre from the rural area. The vast majority of patients were male (90%), with only 5women,.With regard to marital status, 85% were single, 13% married and 2% of cases did not contain this information. The mean age was 28 years for men and 35 years for women, The Table 1. In 25 cases (52%) injury occurred during March, April and May. The average hospital stay was 9.9 days, with minimum and maximum values of 1 and 19days respectively. The main location of the wounds was as follows: head and neck 2, chest 4, upper limbs 3, abdomen 10, perineum 8, lumbar region and lower extremities 10 back 11. Intra-abdominal injuries were demonstrated in 18 patients. Organs affected , in order of frequency were, the colon and rectum in 6 patients, 4 in the small intestine, liver 3, 2 in the spleen, stomach and duodenum in 1, in the urinary tract 2 and vascular injuries occurred in 4 cases. The number of laparotomy was 20, and intraabdominal visceral affection was demonstrated in 18 patients. The repairs consisted of visceral: 3 splenectomy, liver suture 2, 4 small bowel resection 1 loop ileostomy of small intestine, 5 colostomies for anal injuries, one reconstruction with Billroth type II for duodenal injuries, 2 repairs in urinary bladder, 2 iliac artery ligation, , 1 ligation of the left femoral vein and 1 saphenous vein ligation internally.

Surgical treatment, and repair for extremity wound, was followed in by washing with plenty of saline and hydrogen peroxide, with debridement of all devitalized tissue. Repair with monofilament non absorbable 2 / 0 or 3 / 0 sutures could be done with local anesthesia, General anesthesia was required in 28patients. All patients had complete tetanus immunization and broad-spectrum antibiotics covering aerobic (Gram positive and Gram negative) and anaerobic bacteria were given. The combination most commonly used antibiotic was metronidazole + amoxicillin-clavulanic acid. Other frequent combinations were: metronidazole + tobramycin and metronidazole + ampicillin + tobramycin.

Fever was observed (> 38 ° C) in 29patients and 17cases required the transfusion of red blood cell concentrates. The most frequent immediate complication was wound infection in 27 patients, and the most frequent late complication wasinscisional hernia, with 10 cases, which required surgical repair scheduled on all occasions. Other complications and treatment of each is detailed in Table 2. Mortality during these years was 2 patients as a result of of septic shock post laprotomy.

Table-1:Location of injury

Number of cases	Location
2	Head and neck
4	Chest
3	Upper Limb
16 - 6 - 4 - 3 - 2 - 1	Abdomen - Colon-rectum - Small intestine - Liver - Spleen - Stomach & duodenum
8	Perineum
10 - 2 - 1 - 1	Lower limb and Lumbar region - Iliac artery - Femoral vein - Saphenous vein
11	Back

Table-2:Management & Complication

Location	**Management**	**Complication**	
		Early	**Late**
Head and neck	Primary repair	Fever	-
Chest	Primary repair	Respiratory distress	-
Upper Limb	Primary repair	-	-
Abdomen - Colon-rectum - Small intestine - Liver - Spleen - Stomach & duodenum - Urinary bladder	Laparotomy - Colostomy - Resection and anastomosis - Repair - Splenectomy - Billroth type II repair - Primary repair	- Wound infection - Fever	- Incisional hernia
Perineum	Colostomy	Wound infection	
Lower limb and Lumbar region - Iliac artery - Femoral vein - Saphenous vein	Exploration - Ligation - Ligation - Ligation	Fever	-
Back	Primary repair	-	-

DISCUSSION

The wounds produced when a person is gored by a bull or other horned animal are a frequent type of injury in Spain and South American countries, where different events related with bullfighting and fighting cattle (e.g., fighting young bulls, play fighting with calves, the running of bulls, bullfights, and other) are common. Other professionals who handle bulls also can suffer goring injuries, such as veterinarians, cattle owners, slaughterers, etc. which is our study in description.

The largest series of bull-goring injuries published to date have been from spain and latin American world by Chambres *et al* (1450 patients)[5], Martínez-Ramos *et al*. (387 patients)[6], Monferrer *et al*. (204 patients)[7], Hernández *et al*. (96 patients)[8], Navarro-Roland J *et al*. (31 patients)[9]. All these authors agree that most of the multiple injuries caused by goring occur in men with a mean age of 30 years. This is also reflected in data of our study. The age range with the highest frequency of bull horn injuries is between 20 and 30 years. In our study the summer months are common for such injuries in contrast to the towns and cities of Spain where there is a clear predominance of incidence in the months of July, August and September, when bullfighting events are being held. Victims were usually rural farmers and bystanders.

According to all the series reviewed, the most frequent wound is the goring wound (81% in the study of Monferrer *et al*.[7], although bull horn wounds can occur anywhere on the body, the most frequent location in all the series reviewed is the lower limb, especially the thigh, although any region can be involved. The anatomic regions that could be affected are the abdomen, perineum pelvis, chest, and upper limbs. The cervicofacial region is one of the least affected in all the series, except in the study by Chambres and colleagues[5], in which it was the third most frequent location in 1450 patients (16% versus 64% in the lower limb). In our series also lower extremity and back were commonest of the region amounting to nearing 45% of the injuries.

In a study from Christian Medical College Hospital, Vellore, India. Idikula J *et al*,[1] during a 12 year period from 1977 to 1988, 101 patients required inpatient treatment .The ages of these patients ranged from two years to 90 years and the male to female ratio was 4:1. Sixty-one per cent of the injuries occurred either to the perineum or abdomen and wounds were directed obliquely upward. Thirty-five per cent required extensive surgical intervention. The over-all wound infection rate was 12.9 per cent. Of wounds that were primarily closed, 42.9 per cent had wound infection, while only 6.3 per cent that were secondarily closed developed infection. Two patients died as a consequence of the injury.

Knowledge of the mechanism of injury of horn injuries is of particular interest for understanding the magnitude of these wounds. When the bull charges, it flexes its neck and then extends it, pressing one or both horns into the body of its opponent. This produces the first upward wound path. The bull continues the movement, raising the victim several centimeters from

the ground, while tossing its head with a circular movement. The horn acts as a fixed axis while the circular movement of the bulls head turns the victim on its horn(s), lowering the victims head and raising the feet. This causes new wound paths to open and produces massive tissue damage. After the initial goring, the person's body may shift position and the bull may charge again, goring the person anywhere in the body. At the time of impact, the kinetic energy is transformed into potential energy. The depth of the wound depends on the speed at which the bull was moving at the time of impact and the animal's weight. The position of the person being charged also is important (the points of support of the subject determine how much resistance is offered against the force of the horn), as well as the presence of any elements of counter resistance. This subjects resistance to the charge, together with the mechanism of injury described, explains why various wound paths and wounds may be present but not identified in the initial examination. In order to understand the force that a fighting bull can bring to bear when goring a person, it suffices to say that a four-year-old bull weighing four hundred kilograms and in movement develops a force of 470 kilograms that is transmitted to its horns, where a lever mechanism also comes into play. Aside from the bull's weight, many other factors intervene in the origin and severity of the injuries .

Regardless of its size, the animal exerts great power through the so-called charge, which is transmitted to the horns by means of a set of levers originating in the animal's posterior third of with an upward trajectory . Furthermore, the horn edanimal tries to fight its rival by rotating the neck, thus involving several tissues. Severe injuries may seem scarcely evident due to their external appearance. Thus, those suffering from bull horn injuries need to be addressed as polytrauma patients and must undergo imaging tests (X-rays, ultrasound, CAT).The wound needs to be washed with an aseptic solution, subsequently undergoing debridement and subjected to thorough examination . Once surgery has been completed, the surgeon should be the one to determine whether to leave the wound open or else perform a primary closure with the appropriate margin adjustment and interrupted suture, while placing drainage is a must when dealing with deep anatomical wounds, as long as its stability can be ensured. Bull horn injuries are highly polluted due to the presence of germs along the horns and natural environment, and consequently it is crucial to complete tetanus prophylaxis and to use broad spectrum antibiotics at therapeutic doses .Finally, success when treating this type of injury is based on early diagnosis, appropriate surgical handling as soon as possible from the time of the bull trauma and antibiotic and tetanus prophylaxis.

The general management of these patients must include:

- Preoperative and postoperative antibiotic therapy and tetanus vaccination: bull horn injuries are very dirty and should be considered contaminated and likely to develop serious infective complications from the time of occurrence. The tetanus vaccination and gammaglobulin administration are imperative and should be given systematically to all patients with this type of wound. Horns carry aerobic and anaerobic bacteria, so antibiotic prophylaxis and treatment are a high priority in these patients . Martínez-Ramos *et al*. [6] indicate that the antibiotic combination most often used is metronidazole and amoxicillin-clavulanic acid, with good results. Other combinations used with good results are metronidazole and tobramycin (or amikacin) or metronidazole with tobramycin (or amikacin) and ampicillin. Chambre also accepts ceftriaxone and metronidazole as a suitable combination[5]. Whatever antibiotic combination is used, it is indispensable that it cover aerobic, gram-negative and gram-positive, and anaerobic microorganisms.
- Wounds must be cleaned exhaustively with saline solution and an antiseptic solution (hydrogen peroxide and/or povidone-iodine) and all foreign bodies (horn splinters, stones, dirt, and remains of clothing, glass, and others) must be removed.
- Devitalized tissues must be debrided thoroughly, although we should be as economic as possible on skin planes and follow Friedrich in refreshing the margins.
- Bleeding should be controlled carefully and the area should be reconstructed by planes. If loss of substance occurs, reconstruction should be deferred according to most authors.

For the assessment of possible intraabdominal injury, if the patient is stable, is recommended as a first diagnostic test, an ultrasound, followed by other tests such as thoracic and abdominal radiography, and computed tomography. The latest recommendations for the treatment of penetrating abdominal injuries are conservative, provided they can satisfactorily explore the patient, no abdominal pain and no hemodynamic instability. However, we believe that in the case of bull horn injuries this information should be taken with caution and recommend exploratory laparotomy with laparoscopy if possible prior to the course of penetration into the abdominal cavity, since, although the external wound can be small and seem with little

apparent damage, internal damage can be devastating, and may go unnoticed.We did 20 laparotomy for wounds to the abdomen. The use of intra-abdominal drains also in conjunction with other authors is advisable when you have accessed the abdominal cavity.

Generally speaking, the complications of bull goring injuries include a high rate of infections (from 9.4% in the study of 96 patients by Hernández *et al*.[8] to 54.4% in the study of 54 patients by Idikula *et al*[1]. Infection is the most frequent complication in all the series studied. In our study the infection rate was about 56 %.

Our patients' hospital stay was 9.9 days. Despite the severity of some of these injuries, the mortality rate is considered low in all the series consulted, with a maximum of 4.1%.The most frequent causes of death are hypovolemic shock, septic shock, and gaseous gangrene. In our series death was due to septic shock in post laprotomy patients with bowel injuries.

CONCLUSIONS

Bull horn wounds have special characteristics. Familiarity with these lesions is important in areas where bullfighting is practiced. Also in country like India which is agrarian economy and cattle are reared in rural areas, such injuries and their management is still relevant. Because of their special character they deserve a special mention in cases of trauma and wound management. Although bull horn wounds are severe, their prognosis is good, with few complications and a mortality rate of less than 1%.

REFERENCE

1. Idikula J, Moses BV, Sadhu D, Agarwal S, Jahan G, Thomas J; Bull horn injuries. Surgery, gynecology & obstetrics, 1991;172(3):220-222.
2. Wasadikar PP, Paunikar RG, Deshmukh SB; Bull horn injuries in rural India. Journal of the Indian Medical Association, 1997;95(1):3-4.
3. Escudero JC, Bua JA, Rey RL, García-Rozado Á, Biel JR, López-Cedrún JL, Moreno JM; Herida por asta de toro en el área maxilofacial: revisión de la literatura y presentación de un caso. Rev Esp Cir Oral y Maxilofac, 2008;30(5):353-362.
4. Rani M, Rohit SA, Dikshit PC; Injuries by bull horns: patterns and prevention protocols. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology, 2010; 11(1):1-26.
5. Chambres O, Giraud C, Gouffrant JM, Debry C; [A detailed examination of injuries to the head and neck caused by bullfighting, and of their surgical treatment; the role of the cervico-facial surgeon]. Revue de laryngologie-otologie-rhinologie, 2002;124(4):221-228.
6. Martinez-Ramos D, Miralles-Tena JM, Escrig-Sos J, Traver-Martinez G, Cisneros-Reig I, Salvador-Sanchis JL; [Bull horn wounds in Castellon General Hospital. A study of 387 patients]. Cirugia espanola, 2006;80(1):16-22.
7. Monferrer-Guardiola R. wounds from gorings. Clinical and epidemiological assisted 204 cases in the General Hospital of Castelló, during the period 1978-1988. Aspects Medical science. 1990; 7: 262-71.
8. Hernández E, Gómez-Pearl B Villaverde M; Bull horn wound. Study of 96 patients. Cir Esp, 1996; 59:156-9.
9. Navarro-Roland J, L Castell-Campesino, Escrig-Sos J; Bull horn wound, experience on 31 cases. Medical science. 1990; 7: 118-24.