Pattern of Animal-Related Injuries in Iran

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Abstract- Animal related injuries as most common causes of human morbidity have different pattern by geographical zones. We aimed to explore the main descriptive epidemiology of animal-related injuries in both rural and urban areas in Iran. Between 2000 and 2004, we collected the data of all the cases of animal related trauma hospitalized for more than 24 hours in eight cities (Tehran, Mashhad, Ahwaz, Shiraz, Tabriz, Qom, Kermanshah, and Babol). Further evaluations were conducted on 17753 eligible subjects. Of 17753 traumatic patients, 40 subjects (0.2%), had animal-related injuries. The highest rate was seen in Tabriz with 11 cases. Upper and lower extremities were the most frequent sites of trauma and they were injured in 13 and 11 cases respectively. Dog bite and cow-related injuries were responsible for 40% and 32.5% of injuries respectively. Amputation of the phalanx was done in 2 cases due to dog bite and bull gore occurred. One thoracotomy, one laparatomy and one craniotomy were done. One patient needed fasciatomy due to snake bite. Educating the patients could decrease the incidence of morbidity of these injuries.

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Introduction

Animal related injuries defined as bite or claw wound from a pet or wild animal are most common causes of morbidity and mortality particularly in the rural tropics and discussed as neglected public health problems throughout the world. Animal-related injury is known to be common in rural regions (1-3) however; studies in urban centers are only related with equestrian trauma due to its frequency and association with serious injuries (4-6). Every type of injury may lead to characteristic consequences and causes specific problems for the treatment. The saliva of animals contains a wide range of potentially infectious bacteria cause to an simple infection as a most consequence of animal bite. The World Health Organization (WHO) estimates the range of between 35,000 and 50,000 individuals worldwide die of rabies each year. The highest incidence of rabies occurs in Asia, where in 1997 over 33,000 deaths were noted, most occurring in India (3). Animal bite injuries are main leading causes of considerable morbidity and also mortality in the worldwide. Previous studies on animal bites and related injuries have generally been limited to local areas, and have not evaluated the problem on a national level. We aimed to explore the main descriptive epidemiology of animal-related injuries in both rural and urban areas in Iran.

Patients and Methods

During a 4-year period (2000 to 2004), a cross-sectional study was performed as a part of the National Trauma Project in eight cities (Tehran, for 13 months; Mashhad and Ahwaz for 7 months; and Shiraz, Tabriz, Qom, Kermanshah, and Babul each for 4 months). The study was set up in accordance with the American College of Surgeons National Trauma Registry System (TRACS) and the National Trauma Data Bank (NTDB) using a valid questionnaire (7-9). During the study period, a group of trained physicians visited traumatic patients at first 24-hour of emergency ward admission and completed the questionnaires (9). A total of 17753 patients were treated and hospitalized for more than 24 hours in the trauma centers due to animal related injuries. Data gathering was done based on patients' demographics, pre hospital care, diagnosis, Glasgow

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Coma Scale (GCS) and vital signs at the time of presentation to emergency departments, therapeutic measures, outcome, and source of reimbursement. Type of injuries and mechanism of accidents were coded according to the International Classification of Diseases, 10th revision (ICD-10) (9,10). The ISS was used to provide an overall score for patients with multiple injuries. Each injury is assigned an Abbreviated Injury Scale (AIS) score and is allocated to one of the six body regions (head, face, chest, abdomen, and extremities and pelvis) (9,11). The first 3 most severely damaged body regions have their score squared and added together to produce the ISS score (9).

The collected data were analyzed using SPSS software (Statistical Package for the Social Sciences, version 10.0, SPSS Inc, Chicago, Ill, USA).

Results

Of 17753 subjects, 40 cases (0.2%), included 25 male and 15 female with a mean age of 37.20 ± 21.94 had animal-related injuries (Table 1). The highest rate of the injuries was seen in Tabriz with 11 cases (Figure 1). Mean duration of transportation to the emergency room was 13.04 ± 25.12 (Mean ± SD) hours. Mean duration of staying in emergency room was 1.24 ± 1.51 (Mean ± SD) days. Pre hospital cares had been taken for 26 patients. Blunt and penetrating traumas were the mechanism of injuries in 24 and 16 patients respectively. Housewives (n=11) and farmers (n=10) were the most affected groups. Upper and lower extremities were the most frequent sites of trauma and were injured in 13 and 11 cases respectively. Accident in 14 cases was occurred at home while 10 patients had been injured at work.

Vital signs of the patients at the time of emergency department admission were stable and there were no cases of hypotension. All had 15/15 Glasgow Coma Scale (GCS) except two patients, one had 9/15 and the other had 12/15 GCS. Dog bite and cow-related injuries were responsible for 40% and 32.5% of injuries respectively. Characteristics, outcome and management of dog, cow and sheep related injuries which were the most common types are detailed in tables 3 to 5.

Miscellaneous

Two patients had been injured due to falling and blunt trauma by donkey. One of these patients underwent ORIF (open reduction and internal fixation) for treatment of femoral neck fracture. The other patient had no serious injury.

Leopard bite was the mechanism of injury in one patient. Laceration of head, forearm and leg was the presentation. Management included debridement, vaccination, antibiotic agents and suturing the wounds.

Bear bite in one patient resulted in open fracture of the third metacarp. Debridement, repair of fracture, prescription of vaccine and antibiotic were the therapeutic interventions.

Snake bite was the cause of injury in one patient. Forearm was the affected site and the patient presented with compartment syndrome. Fasciatomy and vaccination were done.

In addition, one patient had been injured due to wild boar attack. This case presented with chest laceration, pneumothorax and lung laceration and fracture of 5th to 7th ribs. Injured lung repaired followed by thoracotomy and observed by chest tube in ten days.

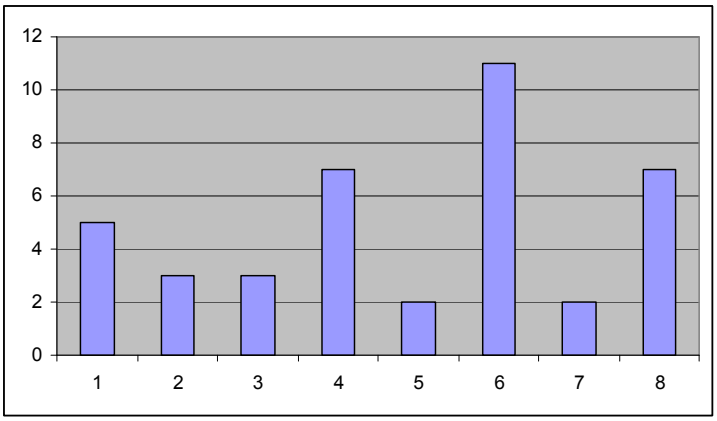

Figure 1. Frequency of animal-related trauma in different cities.
1. Tehran, 2. Gom, 3. Babol, 4. Mashhad, 5. Kermanshah, 6. Tabriz, 7. Shiraz, 8. Ahwaz

Table 1. Age and gender subgroups

Age	3-15	16-21	22-40	41-64	>65
Male	6	1	8	6	4
Female	4	0	5	4	2

Table 2. Characteristics of dog bite injuries.

No of patient	Location of bite	Presentation	Management
1	Lower extremity	Laceration and necrosis	Debridement+ vaccine + AB*
2	Lower extremity	Laceration	Debridement+ vaccine + AB
3	Lower extremity	Laceration	Dressing+ vaccine + AB
4	Lower extremity	Laceration	Debridement+ vaccine + AB
5	Lower extremity	Laceration	Debridement+ vaccine + AB
6	Upper extremity	Laceration	Dressing+ vaccine + AB
7	Back and lower extremity	Laceration	Debridement+ vaccine + AB
8	Upper extremity	Laceration	Dressing+AB
9	Scrotum and testis	Laceration and avulsion of scrotal skin	Debridement+ vaccine + AB
10	Scrotum	Scrotal laceration and injury to the epididymis	Debridement+ vaccine + AB+ repair
11	Scrotum	Laceration of scrotum	vaccine + AB + suture
12	Upper extremity	Rupture of hand tendon	Debridement + AB + repair of tendon
13	Upper extremity	Laceration	Debridement+ vaccine + AB
14	Lower extremity	Laceration	Debridement+ vaccine + AB
15	Upper extremity	Double fracture of forearm	Debridement+ vaccine + AB + ORIF**
16	Phalanx of the hand	Laceration	Amputation of the phalanx

* Antibiotic therapy **Open Reduction and Internal Fixation

Table 3. Summary of cow-related injuries

No of patients	Kind of trauma	Location	Complication	Treatment
1	Blunt	Upper extremity	Radial fracture	ORIF*
2	Blunt	Thorax	Clavicle fracture	Velpo bandage
3	Blunt	Chest and abdomen	-	-
4	Fall	Lower extremity	Tibial and fibular fracture	ORIF
5	Bull gore	Abdomen	Peritoneal and jejunal rupture	Laparatomy (Repair of peritoneal rupture and jejunostomy)
6	Blunt	Abdomen	-	-
7	Blunt	Head	Epidural hematoma	Craniotomy and drainage of hematoma
8	Bull gore	Thorax	Flail chest and pneumothorax	Chest tube insertion and management of flail chest
9	Bull gore	Upper extremity	Close fracture	ORIF
10	Blunt	Thorax and cranifacial	Rib and dental fracture	Conservative management
11	Bull gore	Hand	Fracture and laceration of phalanx	Amputation of fourth phalanx
12	Blunt	Thorax	Contusion	-------
13	Blunt	Abdomen	Contusion	-------

* Open Reduction and Internal Fixation

Table 4. Sheep related injuries

No of patients	Mechanism	Location	Complication	Management
1	Bite	Phalanx of the hand	Abscess	Vaccine and drainage of the abscess
2	Blunt	Lower extremity	Fracture of the lower femoral epiphysis	ORIF*
3	Blunt	Head	Occipital and temporal bones fracture	Conservative
4	Blunt	Lower extremity	Subtrochanteric fracture	ORIF
5	Blunt	Lumbar region	Burst fracture of L4	Conservative

* Open Reduction and Internal Fixation

Discussion

Epidemiological researches dealing with large populations (13,15) reported a considerably higher risk of animal related injuries, and even of death, among men and the elderly. In our series 62.5% of the patients were men that are compatible with previous reports (1). In contrast of this study in all age groups even in those had more than 65, animal-related injuries were more frequent in men.

Although our results have shown animal-related injuries as uncommon causes of trauma in Iran (0.2%), they should be considered as potential causes of injuries and physicians who work in emergency rooms should learn principles of management of these kinds of traumas. Animal attacks on people all over the world result in millions of injuries and hundreds of deaths (12-14). These attacks affect both rural and urban dwellers. Many people with less serious injuries do not contact their doctors and these cases are therefore not recorded in the statistics. It is estimated that about 60% of animal attacks lead to such mild injuries that the ambulatory treatment is sufficient, or the injured do not call for medical help at all (15).

Farmers are in most hazards, but it also includes veterinary surgeons, butchers, zoo and circus workers (16). Studies conducted by Americans reveal that animals are one of the main causes of injuries in the farming industry, and animal related injuries cause about 40 deaths in the USA annually (15, 17). Interestingly, in our study animal-related injuries were more common in house wives than farmers.

In our study dog bite was the most common cause of injuries and followed by cow related injuries. In contrast of some countries which equestrian traumas are common, (18,19) we didn't find such injuries. Principles of management of mammalian bites and cow-related injuries (blunt and bull gore) that were the most common injuries will be explained briefly.

Management of mammalian bites

Epidemiologic studies had been performed in Australia (20), Italy (21), and Bosnia (22), to collect data regarding animals especially dog and cat bite.

Harvey (1976) and Sweet and Pretty (2000) published studies finding the highest percentage of bites to the breasts. In 1983 Vale and Noguchi published the paper indicating that the most frequently bitten area was the upper extremities (23). In our series lower extremity was the most common site of bite.

Mammal bite injuries include puncture wounds, lacerations, and avulsions and crush injuries may result in infection, transmission disease, disfigurement, serious injury or death (20).

Effective management requires rapid medical evaluation and may necessitate surgical intervention and prophylactic antibiotic therapy. As bite wounds are microbiologically diverse and most often polymicrobial in nature, selection of an appropriate antibiotic regimen requires knowledge of common pathogens. Close clinical follow-up is recommended to minimize the risk of late complications (24). A patient's tetanus status and risk of rabies must also be identified and appropriate immunoprophylaxis should be administered. (25)

Management of bull gore injuries

Injuries caused by large animals, such as horses or cows, are treated as high-energy injuries. this is confirmed by a statistically significant higher percentage of hospitalizations, compared with the consequences of other animal attacks (1).

Large animal-related injuries to the abdominal area can be serious. Immediate transportation and early diagnosis of abdominal insults are important because of the frequencies of small bowel and mesenteric injuries, which are difficult to diagnose using currently available diagnostic tools (26). Primary closure of wounds must be avoided even when surgical intervention is possible soon after injury (27). Penetrating abdominal bull-gore injuries can be managed safely by a policy of selective conservatism, reserving formal laparotomy for specific clinical indications (28). In fact, ideal management of these injuries includes treatment in a regional trauma center and an educational program of preventive measures (3).

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