

Original Research Article

Pattern and management of bear maul injuries in tertiary hospital in Kashmir

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ABSTRACT

Background: Bears are very powerful and strong animals that defend themselves and their young ones if they feel insecure once disturbed by humans. Encroachment of forest land and haphazard construction has led to increase in the conflicts between humans and animals. Our valley is surrounded by forests all around and lush green forest area is habitat of black bears (*Ursus thibetanus*). The aim of this study was to report and manage these complicated injuries.

Methods: This study was conducted for a period of two years and all the patients were received in the surgical casualty in Government Medical College Srinagar. A total of 32 patients were registered in the two years period.

Results: A total of 32 patients were studied, majority of patients were males. Maximum number of patients was in the age group of 31 to 40 years. All patients had soft tissue injuries; bone involvement was seen in 13 patients. Deep lacerations were seen in 22 (68.75%). Primary suturing was done in 12 (37.5%) of patients, split skin grafting in 7 (21.87%). All 32 patients had ugly scar in follow up with loss of vision in one eye in 3 (9.37%) patients. Four patients were advised psychiatric consultation and further treatment.

Conclusions: Conflicts between humans and bears are common in bear-prevalent areas of the world. Bear maul injuries should be evaluated in detail as some patients may have serious injuries which need multispecialty treatment to maintain cosmetic and identity of a person.

Keywords: Black bear, Facial injury, Multimodality treatment

INTRODUCTION

Wild animal injuries though rare may sometimes lead to serious consequences which may lead to both human and property loss especially in Himalayan belt of India.

¹Three types of bears known are black bears, grizzly and polar bears. Black bears (*Ursus thibetanus*) are the only variety found in Kashmir and are less aggressive. Bear encounters are categorized as sudden, provoked or predatory. Bear aren't very aggressive animal unless they are surprised or provoked with threat to themselves or their young ones or when they are in search of food.²

Injuries to person occurs in defensive, provocative or predator mode. Our valley of the habitat of black bears (*Ursus thibetanus*) only and the incidence of such frequent attacks is due to uncontrolled construction in forest area and deforestation.³ Patients are sometimes mutilated with disfigurement of face and avulsion of scalp from the head and many have been killed by these animals.⁴ There should be a high index of suspicion of serious injury when treating these injuries, as serious underlying bone or soft-tissue damage can be overlooked. Worldwide 50%-90% of all animal injuries are related to dog but in Kashmir, victims of bear injury constitute the

majority of the patients requiring medical attention.⁵ This study was conducted to evaluate and manage the various injuries inflicted by bear maul.

METHODS

The present prospective study was conducted in the department of General Surgery and Plastic Surgery, Government Medical College Srinagar for a period of two years from April 2016 to March 2018. In this study 32 patients were studied with detailed history with special emphasis on location of bear–human encounter (habitat of bear), circumstances which led to the encounter, nature and duration of attack. All the patients were received in the causality, with proper resuscitative measures with special attention to breathing and life threatening complications if any. A thorough clinical examination from head to toe was made to evaluate the site and type of injury inflicted. Details of wounds were recorded. All the wounds including any bony fracture were examined in detail. All baseline investigations including radiographs, ultrasonography (USG), computed tomography (CT) scan were done as per required. All the patients were managed with multispecialty approach. In our study all patients irrespective of age or sex with history of bear maul injury were included in our study. The data were assessed using complementary-descriptive statistical method. The categorical variables were expressed as percentage (%) value.

RESULTS

Most of patients were males with maximum number of patients in the age group of 31 to 40 years (Table 1). Majority of the patients were from rural area with soft tissue involvement in all 32 patients (100.00%), bony involvement in 13 (40.62%) and visceral involvement in 4 (12.5%) of patients (Table 2). Maximum number of patients had head and neck injury and minimum number of patients had chest and abdominal injuries (Table 3) (Figure 1). Zygomatic fracture was seen in 10 (31.25%) of patients (Table 4). Primary suturing was done in 12 (37.5%) of patients, split skin grafting in 7 (21.87%), flap closure in 3 (9.37%), and fracture fixation in 8 (25%) of patients (Table 5). In the follow up all the 32 (100%) patients had ugly scar, facial deformity in 19 (59.37%) of patients with permanent loss of vision in one eye in 3 (9.37%) of patients (Table 6).

Table 1: Age distribution with percentage.

Age (years)	Number of patients
0-10	0
11-20	1
21-30	3
31-40	21
41-50	5
>50	2



Figure 1: (A) Lacerated wound sutured over scalp; (B) Multiple lacerations over chest; (C) Multiple lacerations over thigh; (D) Multiple lacerations over abdomen with herniation of transverse colon along with small bowel mesentery; (E) Necrosis of flap with suture line along with loop ileostomy bag insitu.

Table 2: Involvement of various parts of body.

Tissue involved	Number	Percentage (%)
Soft tissue	32	100.00
Bone	13	40.62
Viscera	4	12.5

Table 3: Regional distribution of body with percentage.

Region	Number of patients (%)
Head and Neck	31(96.8)
Scalp	15 (46.8)
Face	30 (93.7)
Eyes	14 (43.7)
Chest and abdomen	7 (21.87)
Upper limb	12 (37.5)
Lower limb	9 (28.1)

Table 4: Sites of fracture.

Site of fracture	No. of cases	Percentage (%)
frontal	3	9.37
Zygoma	10	31.25
Nasal bone	4	12.5
Temporal	2	6.25
Upper limb	5	15.62
Lower limb	2	6.25

Table 5: Types of operations.

Operations	No. of patients (%)
Primary suturing	12 (37.5)
Secondary suturing	4 (12.5)
SSG	7 (21.87)
Flap closure	4 (12.5)
Free flap	1 (3.12)
Fracture fixation	8 (25)

Table 6: Postoperative outcome.

Permanent damage	No. of patients (%)
Minor ugly scar	32 (100.00)
Facial deformities	19 (59.37)
Eyelid	4(12.5)
Nose	3 (9.37)
Cheek	9 (28.12)
Lips	3 (9.37)
Loss of vision in one eye	3 (9.37)
Contour deformity	5 (15.62)

DISCUSSION

The rise in the bear maul injury especially in the Kashmir valley is due to deforestation and frequent movements of these wild animals into the habitant areas. Himalayan area is the natural habitat of Asiatic black bear and all the reported cases are due to black bear. In contrast, bear mauls were more commonly by the grizzly in the west, as found in Alaska and Alberta. Bear is a large and powerful animal with average weight of about 130 kg, average height of about 3 feet and body length of 4 feet.⁶ It attacks with paws, claws and teeth. The pattern of injuries is crushing injuries due to forceful impact, penetrating injuries due to powerful paws and claws and cutting injuries due to teeth.⁷ Middaugh reported that 80% of the injuries were caused by Grizzly bears, 18.1% by the black bears and 0.9% by polar bears.⁸ In the present 21 patients were young to middle aged and extremes of age were very less. This is because middle aged people are more engaged in outdoor activities especially field and forest area to earn their live hoods. In our study most of the patients were from far flung all the attacks were defensive, due to sudden encounters between victim and bear which followed in response to perceived threat to food, individual space or cubs by bear. Our results were consistent with the other studies.^{8,9} In our majority of

patients were males 25 (78.12%) which was consistent with other studies.^{3,10,11} In the current study all patients had soft tissue injury with head and neck area involved in 31 (96.8%) of patients, face in 30 (93.7%), chest and abdomen in 7 (21.87%) and upper and lower limbs in 12 (37.5%) and 9 (28.1%) of patients respectively, while the study conducted by Jethani et al showed most of the injuries to the head and face only.¹³ Frequent involvement of head and facial injuries in bear mauling can be explained due to bony projections on face which becomes easy target for their claws of forelimbs in standing position and high intelligence of these animals. In our study deep lacerations were seen in 22 (68.75%) of patients while flap lacerations were seen in 4 (12.5%) of patients. The study conducted by Rose SE showed soft tissues involvement in 10 patients and found deep lacerations to predominate with no tissue loss in any of the patient in his study.¹¹ In the present study chest and abdomen was involved in 7 (21.87%) patients. Among abdominal injuries two patients had multiple mesenteric tears and colonic injuries with spillage of colonic contents which were repaired immediately with loop ileostomy in one and loop transverse colostomy in another patient. Wound in all the patients were thoroughly irrigated with normal saline with primary suturing done in 12 (37.5%) of patients, secondary suturing done in 4 (12.5%), SSG in 7 (21.87%), flap closure in 4 (12.5%) and fracture fixation 8 (25%). After fixation patients were shifted to orthopedic department for further management. In our series one patient had necrosis of flap and suture line which was managed with repeated debridement and split skin grafting as there was extensive loss of abdominal wall tissue and damage to lower ribs on left side. In our series 23 patients underwent multiple surgeries especially head and neck group. Mortality in our series was 0.00% which was against other studies where mortality was 2.39%.³ In study conducted by Middaugh, mortality was 21% in victims of black bear attacks and 18.8% in those attacked by grizzly bears.⁸ Most of the patients were followed for one year; four patients were advised psychiatric consultation and further treatment.

CONCLUSION

In conclusion with rise in deforestation and encroachment, conflicts between bear and humans has led to increase in the fatal injuries especially over face and eyes which needs extensive debridement, multistage surgeries to prevent disfigurement and disabilities.

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