

Study of Bear Bite Injury and Management in Tribal Belt of Chhattisgarh, India

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ABSTRACT

BACKGROUND

Bear injuries are unusual, but a trend is often observed in areas of bear habitats. Northern part of Chhattisgarh, a tribal belt is surrounded by bear habitat dense tropical moist deciduous forest. Industrialization and human invasion in their habitats resulting in frequent attacks by bear and victims present to the health care center with grievous injuries and psychological trauma.

METHODS

Present study included 50 victims of bear attacks admitted in the Department of Surgery, Government Medical College, Ambikapur, Surguja, Chhattisgarh, from 2016 to 2018. Data included are age, sex, precision time of attack, seasons, body parts involved, types of injuries and activity of victims during attack including the course of management.

RESULTS

In our study of 50 cases, most of the victims were attacked early in the morning and most of the attacks were in winter and monsoon. Common age group encountered was young adults to middle age ranging from 21-40 years. Out of 50 cases studied, 31 (62%) were males and 19 (38%) were females with a male: female ratio of 1.63:1. Attacked victims were usually engaged in cattle grazing activity (40%) and common tendency of attack observed was on face in 46%, followed by scalp in 24% and upper limb in 14%. Commonest injuries made in chronological order were laceration 76% followed by punctured wound in 48%, and avulsion injuries in 16%. Common major complications observed were wound infections 26%, followed by wound dehiscence 10%, with a fatality rate of 4%.

CONCLUSIONS

Human and bear interactions are accidental and unusual, but frequency is found to be increasing due to encroachment of forest by humans. Victims are usually villagers of near forest. Face and scalp are most commonly attacked body parts but no part is spared and the attack is sometimes fatal. Laceration injury was most common, and mostly on the face and scalp. Management of bear injury required multispecialty approach due to the variety of injuries with involvement of eye, ear, fractures, head injury including reconstruction surgery, to minimise complications.

KEYWORDS

Bear, Injury, Attack, Human, Confrontation, Wound, Habitat

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BACKGROUND

Bear injuries are unusual, but are often encountered in their habitats due to industrialization and human invasion resulting in increased confrontation between bear and human. In Surguja majority of population are residing in rural areas, which is surrounded by dense tropical moist deciduous forest, a favoured habitat for bears. In India bear maul injuries constitute only 0.1% of animal attacks.¹ Bear usually attacks on standing posture with paws, claws and teeth causing varying patterns of injury on all over the body, mostly affected parts being face and scalp. Injury involves minor soft tissue injury to deep laceration, including bony and organs injuries. Sometimes permanent disfigurement and loss of organs are leading to death of the victims.

We wanted to evaluate the pattern of injuries, the management and outcome of bear bite injury.

METHODS

The study was conducted in 50 admitted patients of bear attacks. These victims were treated in Department of Surgery, Government Medical College Ambikapur, Surguja, Chhattisgarh. The tenure of study extended from December 2016 to December 2018. This study includes all age groups of patients, including history recorded in detail as time of incidence, seasons, attacked site, types of injuries and activity of victims including the course of management. Thorough clinical examination from head to toe was done and injuries recorded with prompt primary aid and subsequent management including anti rabies vaccine and antibiotics. The wounds were irrigated with normal saline and debridement of devitalized tissue done. In all patients treated in our center presented with multiple injuries and some injuries in each patient required primary suturing which was followed by dressing. Routine investigations were performed, including x-ray, ultrasonography / CT scan. In case of severe tissue loss which required grafting, the split thickness skin grafting was done. Two patients had severe laceration over face and associated with salivary gland and facial nerve injury. One patient had eye injury with fracture of maxilla and required reconstruction surgery. Hence the patient was referred to Faciomaxillary super speciality hospital. One patient had grievous head injury died during course of treatment.

Inclusion Criteria

Bear attack injuries of all types were included in this study.

Exclusion Criteria

All traumatic injuries and other animal bite injuries were excluded.

RESULTS

In the present study 50 cases of bear attacks victims were included. Majority of victims were male 31 (62%) and, 19

(38%) were female with a male: female ratio of 1.6:1. Predominant age group encountered was between young adult to middle age ranging from 21-40 years including 17 (34%) male and 8 (12%) female (Table-1). Most of the cases reported within 12 hrs except 10 cases, which were reported after 48 hours of bear mauling (Figure-1). Majority of the attacks were noted during winter 21 (42%) and monsoon seasons 16 (32%) (Figure-2). All attacks were defensive in mode and usually took place during cattle grazing or routine outdoor activity at early morning between 6 am to 10 am.

Age Groups	Male	Female
	No. (%)	No. (%)
< = 20 (7)	2 (4%)	5 (10%)
21 - 40 (25)	17 (34%)	8 (16%)
41 - 60 (16)	10 (20%)	6 (12%)
> 60 (2)	2 (4%)	0
Total	31 (62%)	19 (38%)

Table 1. Age and Sex Distribution

Body Parts Involvement		Male (No. %)	Female (No. %)	Total (No. %)
Scalp	Y	19 (38%)	13 (26%)	32 (64%)
Face	Y	17 (34%)	8 (16%)	25 (50%)
Upper limb	Y	9 (18%)	10 (20%)	19 (38%)
Back & Buttock	Y	7 (14%)	3 (6%)	10 (20%)
Salivary gland injury	Y	3 (6%)	0	3 (6%)
Eye injury	Y	2 (4%)	0	2 (4%)
Facial nerve injury	Y	2 (4%)	0	2 (4%)
Maxilla fracture	Y	2 (4%)	0	2 (4%)
Neck	Y	1 (2%)	0	1 (2%)
Lower limb	Y	0	0	0
Genitalia	Y	0	0	0
Body Parts Involvement During Defense				
Head injury	Y	2 (4%)	0	2 (4%)
Forearm bone fracture	Y	1 (2%)	1 (2%)	2 (4%)

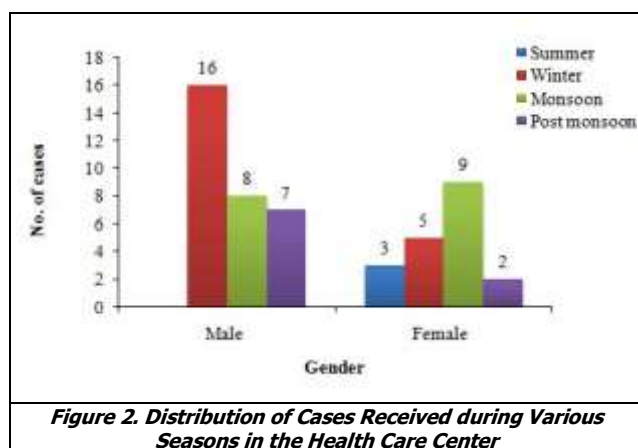
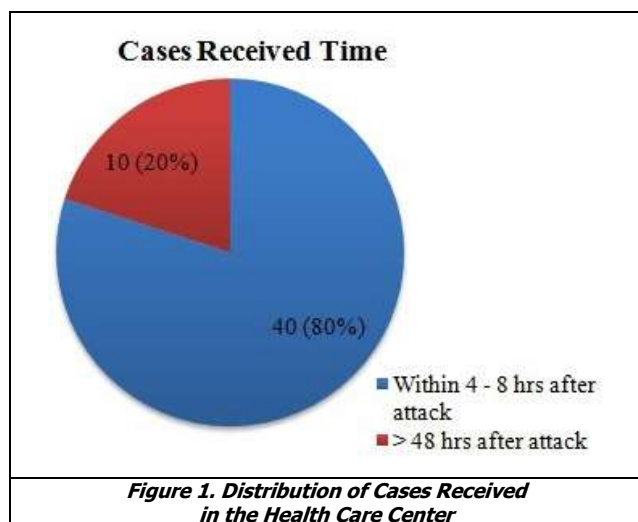
Table 2. Gender Wise Distribution of Cases as per Body Parts Involvement during Bear Attack as Well as Following Defense

Characteristics			Male (No. %)	Female (No. %)	Total (No. %)
Type of Injury	Laceration	Y	25 (50%)	13 (26%)	38 (76%)
	Puncture wound	Y	14 (28%)	8 (16%)	22 (44%)
	Avulsion	Y	5 (10%)	3 (6%)	8 (16%)
Treatment	Wound irrigation with NS & Betadine	Y	31 (62%)	19 (38%)	50 (100%)
	Dressing	Y	31 (62%)	19 (38%)	50 (100%)
	Debridement	Y	31 (62%)	19 (38%)	50 (100%)
	Suturing	Y	31 (62%)	19 (38%)	50 (100%)
	Skin grafting	Y	0	1 (2%)	1 (2%)
	Plaster application	Y	1 (2%)	1 (2%)	2 (4%)
Complications	Wound infection	Y	8 (16%)	5 (10%)	13 (26%)
	Wound dehiscence	Y	3 (6%)	2(4%)	5 (10%)
	Disfigurement	Y	3 (6%)	0	3 (6%)
	Alopecia	Y	0	1 (2%)	1 (2%)
	Loss of vision	Y	1 (2%)	0	1 (2%)
	Death	Y	1 (2%)	0	1 (2%)

Table 3. Gender Wise Distribution of Cases as per Type of Injury, Treatment and Complications

Predominant sites of injuries found on Scalp 32 (64%) and face 25 (50%) and patterns noted were mainly lacerated and avulsion type, other parts involved were upper limb in 19 (38%), back & buttock in 10 (20%), thorax & abdomen in 2 (4%) and neck in 1 (2%) respectively (Table-2). Most common injuries come across were laceration injury 38 (76%), followed by punctured wound 22 (44%), and

avulsion injury in 8 (16%) cases (Table-3). Bony injury including fracture of maxilla were found in 2 (4%) cases while forearm bone fracture in 2 (4%) which is reported during running away at the time of attacks. Special organ injuries like eye and salivary gland injury were noted in 2 (4%) cases of bear attack. (Table-2). Line of management applied for the treatment of all cases was irrigation of wound with normal saline, debridement, suturing, dressing followed by vaccine and antibiotics. Most common complications noted were wound infections in 13 (26%). Other complications were wound dehiscence in 5 (10%) disfigurement in 4 (8%), loss of vision in 1 (2%), permanent alopecia 1 (2%) during the two years follow up period and death in 1 (2%) case. (Table-3).



DISCUSSION

Most of the victims in our study were middle aged and young adult males, 62% was also observed in other studies.^{2,3} Higher incidence of injuries to middle age group population may be explained by their outdoor activity like cattle grazing, working in farmland in majority time. The outdoor activity was found to have a relationship with attacks in other studies also where hunters, hikers and campers were the victims.^{2,4}

Types of Injury

Most common injury was laceration wound 64% and punctured wound 48% in our study which is also found as 90% deep lacerations and 38.3% punctured wound in one study.² On contrary in a report, over 80% of patients had deep lacerations while no punctured wounds found in a series of study.⁵ A case is also reported with penetrating head injury with bilateral eye avulsion.⁶ In our study avulsion injury were found to be 8 (16%) and similar study is found where avulsion injury in 18.94% and tissue loss in 9.11% cases.²

Parts Involved

Our study shows commonly affected body parts as scalp and face which were also reported in a study as scalp 24% and Face 46%.^{2,5,7} In contrast head injury is encountered in 41% cases in a report while it is noted 4% in present study.⁸ In present study upper limb injury were seen in 14% cases and involvements of back and buttock in 10% cases, predominantly punctured wound produced by teeth of bear during attack. Majority of patients shown minor soft tissue injury in upper limb and two patients had associated with forearm bone fracture due to falling down during running away at time of bear attacks. No genitalia injury was observed. In contrast, a study result of injuries on legs was common in 36% patients and injuries on their back in 4% patients.⁸ Similar report shows majority of injury on legs, 17 on hands, 15 on other parts of the bodies in 137 cases studied.⁹ A study also reported lower limb injury as 32% and upper limb injury as 27% being most common.¹⁰ In our study thorax & abdomen injuries observed in 4% patients and injury of neck in 2% patients. A study result of trunk and abdominal viscera injury were seen in 4 (20%) patients.¹¹ In one study eye was found to be the most common visceral injury as 59% with permanent vision loss in four of them.¹² Majority of soft tissue injury were managed by debridement with simple closure and primary suturing. One avulsion injury of scalp, associated with severe soft tissue loss required split thickness skin grafting and two cases of fracture forearm bone (non- displaced) were managed by simple plaster cast application. Two patients had severe laceration over face associated with involvement of injury to facial nerve, salivary gland, and eye, one got fracture of maxilla, and both were referred to maxillofacial super specialty hospital for reconstruction.

Complications

In current study wound infection was observed in 13 (26%) cases. Similar report was also noticed as wound infections in 13 (27%) patients in his study.⁵ In another study similar reports of 5 (23.8%) patients out of 21 had surgical site infection.¹¹ In contrast one study reported no surgical site infections in any patients.¹³ In a study found that 41% out of 58 victims reported serious head injuries and 5% of the victims to the fatal injuries leading to death.⁸ In present study overall mortality was found to be 2% due to head injury. In contrast other some literature reported zero mortality in their studies.^{5,11}

CONCLUSIONS

Bear attack injuries are usually defensive and involve minor to deep lacerations or loss of organ, sometimes fatal. Scalp and face are most commonly affected body parts, but no part is spared. Multispeciality treatment approach is required to minimize complications and disfigurement.

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