

Original Research Article

Causalities of human wildlife conflict in Kashmir valley, India; a neglected form of trauma: our 10 year study

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ABSTRACT

Background: Human wild life conflict is increasing at an alarming rate. The topography of Kashmir valley, India makes the people at risk of wild life injuries all the time. We have been seeing increasing number of victims of wild life injuries during harvesting season for many years with maximum number of injuries due to bear maul. Objective was to see the incidence and pattern of injuries due to human wild life conflict besides surgical challenges and outcome of such injuries

Methods: This was a retrospective study of 10 years duration done between 2005 to 2016. Data was collected from hospital records and records of wild life conservation department.

Results: Human wild life conflict is increasing at an alarming rate. Bear was the most common animal responsible for human animal conflict, followed by leopard. Monkey and red fox attacks were less common and less lethal. Mortality was highest in leopard attacks.

Conclusions: Human wild life conflict is certainly increasing. Most of the attacks due to bear and leopard are devastating. Most of the survivors of such attacks are left with some degree of disability and psychiatric disturbances. Maintaining ecological balance is the best way to control human animal conflict.

Keywords: Bear, Injury, Leopard, Wild life

INTRODUCTION

Human wildlife conflict occurs when the needs and behavior of wild life impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife.¹ In the last few decades human wildlife conflict is increasing at an alarming rate.² Many factors are attributed to this. Kashmir valley being a hilly area makes the people at risk of wildlife injuries all the time. There is an increased trend in wildlife injuries in Kashmir, India as well as other Himalayan regions in the last decade.³ Population explosion forces men to live in the areas closer to natural habitats of wild animals

making them vulnerable to wild animal attacks. The wild animals mainly responsible for human wildlife conflict in Kashmir, India include black bear, leopard, monkeys and red Fox. Most of the wild animals are heavy and agile and can cause serious injuries. Present study was started with an aim to find the ever-increasing causes of wildlife injuries; challenges while dealing such patients and setting some guidelines for the management.

METHODS

Present study was a retrospective study done in the orthopedic department of Sheri Kashmir Institute of

Medical Sciences Medical College, Srinagar, Jammu and Kashmir, India in collaboration with department of Plastic Surgery of Sheri Kashmir Institute of medical sciences (SKIMS) and department of wild life conservation.

The study was done with an aim to study the present scenario of wild life injuries, immediate challenges while dealing such patients, pattern of injuries in different types of wild life injuries, surgical challenges while dealing with such injuries and problems faced by the patient while undergoing treatment in our area with limited tertiary care facilities. The study was done from January 2005 to December 2016.

All the patients were received in Accident and Emergency department. ATLS protocol was followed for polytrauma patients. Required investigations were done. Ant rabies and antitetanus prophylaxis was given in all the patients. All the patients were given triple antibiotic cover for gram positive, gram negative and anaerobic bacteria. Thorough debridement and lavage of the wounds were done. Once stabilized patients were shifted to respective departments. Most of the patients needed multidisciplinary intervention.

RESULTS

Total 1067 cases of wild animal injuries were reported with 811 (76%) injuries due to bear mauling, 67 (6%) due to leopard attack, 22 (2%) due to red fox, 14 (1.5%) due to monkeys. The nature of animal was unknown in 153 (14%) patients. Males were victims in 77% and females in 20%. 15% cases were children in the age group below 10 years. Mean age of the patients was 40 years.

Table 1: Yearly breakdown of injured and dead patients due to human wild animal conflict.*

Year	No. of deaths	No. of injured
2005-2006	3	79
2006-2007	2	113
2007-2008	2	139
2008-2009	4	145
2009-2010	3	157
2010-2011	3	186
2011-2012	17	215
2012-2013	8	252
2013-2014	12	138
2014-2015	20	300
2015-2016	22	317

*Data collected from wild life department (not all the patients reported to our hospital).

Human wildlife conflict is consistently showing an increasing pattern in the last decade as shown in Table 1, with black Asiatic bear the most common animal for human attacks as shown in Table 2. Injuries due to red fox and monkeys were less severe because the animals

are less dangerous and smaller in size. None of the patient was left with any deformity or disability.

Table 2: Total number of patients, deaths and injury pattern and wild animal involved.

Wild animal	Total number of patients	Total deaths	Most common injury
Black bear	811	21	Scalp and facial injury
Leopard	67	49	Injuries around neck
Red fox	23	0	Injuries below waist
Monkey	17	0	Back and lower limb injuries
Unknown	60	7	Mixed pattern

Bear maul injuries

811 bear maul injuries were reported. 21 people died due to bear maul injuries during this period (Table 2). Out of these 7 people died before reaching the hospital, 14 died in the hospital emergency due to shock. Maximum injuries were due to sudden encounters while going to forest to collect firewood. 2nd most common were when a female bear was with her cubs and attacked to protect the cubs. 3rd most common cause of attack was when a bear was being chased by a mob. Less than 1% of the attacks were offensive where a bear entered a residential area and started attacking the people. Overall 99% attacks occurred near the foot hill. All the patients had injuries on scalp and face (Table 3).

Table 3: Injury pattern in attacks of different species.

Injury pattern	Bear maul patients	Leopard injury patients	Red fox	Monkey
Soft tissue lacerations	100	100	100	100
Facial injuries	83	21	0	0
Scalp injuries	77	17	0	0
Fractures	37	43	3	7
Eye injuries	32	21	0	0
Abdominal visceral injuries	12	17	2	1
Intracranial bleed	17	23	0	0
Major vessel injuries	27	33	0	0
Injuries around cervical spine	33	48	0	0
Major nerve injuries	34	37	0	0

The severity of these injuries varied from mild abrasions to completely damaged face. Most of the patients needed multistage procedures in various surgical departments of our hospital due to complex injuries (Table 4).

Table 4: Average number of surgeries per patient in bear and leopard injuries.

Type of surgery	Average no. per patient in bear maul injuries	Average no. per patient in leopard injuries
Plastic surgery	4.5	2.5
Orthopaedic surgery	3.6	1.2
Ophthalmology surgery	1.7	0.7
Cvts surgery	1.6	1.4
Neurosurgery	0.9	1.7
Ent surgery	2.3	1.8

A number of patients developed post-operative complications compared to injuries due to other species (Table 5). About 75% of these patients were left with permanent scar on face or scalp (Table 6). 47 people had permanent eye damage for which enucleation was done (Figure 1).



Figure 1: Forearm fracture in bear maul patient.

556 patients had facial bone fractures. 33 had intracranial bleed. 2nd most common injuries noted were musculoskeletal injuries (Figure 2). 474 people had some form of musculoskeletal injuries. 87% had upper limb injuries. 13% had lower limb fracture. Spine fractures were seen in less than 1% (4 patients). Abdominal visceral injuries were seen in less than 10% of cases. Long term follow-up of the patients showed about 32% ended up with psychiatric illness, mostly depression and

PTSD. 42% patients were left with permanent scar on face and scalp. 12% patients were left with permanent disfigurement of face. 16% patients were left with some degree of disability. 9% patients with partial or complete blindness. The average number of days spent in the hospital by the patients was 18.5.



Figure 2: Facial injuries in bear maul patient.

Leopard injuries

67 leopard injuries reported to our hospital during this period out of which 49 patients died. Most of the injuries were around neck with trauma to structures like blood vessel, esophagus, pharynx and cervical spine (Table 3) (Figure 3). 49 out of 67 patients died (Table 2). Most of the patients had complex multiple injuries (Table 3) and needed multistage procedures (Table 5).



Figure 3: Leopard attack victim.

Table 5: Immediate post-surgical complications.

Complications	Bear maul injuries	Leopard injuries	Monkey injuries	Red fox injuries
Surgical site infection	1	13	3	4
Graft failure	9	2	0	0
osteomyelitis	7	1	0	0
Gangrene	6	1	0	0
Permanent eye damage	27	6	0	0

Injuries due to red fox and monkey attacks

Injuries due to red fox and monkeys were less severe because the animals are less dangerous and smaller in size mostly involving back and lower limbs and no patient died (Table 2 and 3) (Figure 4). None of the patient needed more than 1 surgery nor was anyone left with any deformity or disability.



Figure 4: Victim of red fox attack.

DISCUSSION

Human wildlife conflict is increasing at an alarming rate in Kashmir valley, India.¹ Though few studies are reported in the literature about wild and domestic animal

injuries, extensive study of the literature could not help us to find the exact incidence and pattern of wild life injuries and management guidelines, thus making it a neglected trauma.² To our knowledge this series is one of the first and largest on human wild life conflict. 76% of injuries in our study were due to bear maul injuries. 6% were due to leopard attacks 2% injuries were due to red fox and 1% attacks are due to monkeys. In 14% cases nature of animal could not be found. Most of the patients in present study were young men with average age of 39 years. Nabi et al in their study also found bear maul attacks as the most common wild animal attacks on men. Other animals in the study were tiger and wolf.^{3,4}

In bear maul injury group most of the victims were young men (73%) working in their paddy fields or apple orchids. High no of male victims may be attributed to the fact of increased outdoor activities by men. Most of the attacks in our study were reported in harvesting season (July to September), near foot hills. Most of the attacks happened during day time, mostly evening morning period. Similar pattern has been reported in other studies.^{3,4,9,12,13} However a significant number of attacks reported in the last few years happened in residential areas where a bear entered in the residential area and attacked people. This can be attributed to the fact due to population explosion people have started making their homes closer to forest areas and converting more and more paddy fields into apple orchids.

Table 6: Final outcome.

Final outcome	Bear maul victims	Leopard attack victims	Red fox attack victims	Monkey attack victims
Patients with no significant residual deformity	12%	11%	0	0
Patients with fascial disfigurement	11%	7%	0	0
Patients with limb disability	9%	3%	0	0
Patients with ocular problems	14%	2%	0	0
Patients with vision loss	9%	3%	0	0
Amputation	1.7%	1%	0	0
With residual paralysis	0.8%	3%	0	0

Bear being a tall animal uses paws and claws for attack and usually attacks upper part of body, mostly head and neck. 100% patients reported in present study had some degree of injury involving head and neck region which included fascial/scalp lacerations, facial and skull bone fractures, intracranial bleeding, eye and ear injuries. In bear maul victims most of the attacks were because of sudden encounters between man and bear. No defence was in most of the encounters. Less than 1% bear maul attacks were offensive, which were more serious. Most of the leopard attacks were offensive. Many studies have shown Attacks due to grizzly bear and polar bear are more fatal.^{5,6,8,10} A significant portion of victims of leopard attacks were the women who had gone to forest

to collect firewood. Almost all the patients had injuries around neck injuries structures like a major blood vessel, cervical spine fractures, esophagus or pharynx. Most of the attacks were offensive. 73% patient died due to leopard attacks. Nabi et al in their study on leopard injuries showed similar observation.^{3,4} Leopard attacks were more lethal with mortality 50%. Compared to bear maul attacks a significant number of attacks due to leopard happened either close to residential areas or in the residential areas. The recent most leopard attack reported has been in the building just outside our hospital gait. The reason may be due to extensive deforestation and less availability of staple food for tigers leading their migration to urban residential areas.

CONCLUSION

Injuries due to red fox and monkey attacks are less common with lesser mortality and morbidity. This may be due to smaller size and lesser aggressiveness of these animals compared to bear and tiger.

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