Pattern of Dog Bite in an Institutional Hospital of Almora - The Hill Town of Kumaun

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ABSTRACT

BACKGROUND

Rabies is a viral disease producing an almost uniformly fatal encephalitis in humans and other mammals. There is no established treatment for rabies once symptoms have begun. Rabies vaccination for prevention and PET is essential in the management of the illness. The purpose of present study was to describe the clinical profile and management of dog bite patients presenting to the tertiary care hospital in the Kumaun region of Uttarakhand.

METHODS

Patients presenting to the outpatient and emergency department with the complaint of dog bite were enrolled in the study. All particulars of patients, history and examination findings were recorded in the clinical proforma after taking proper informed consent. Wounds were categorized based on WHO guide to postexposure prophylaxis. Local treatment consisted of two parts: first aid and wound management. ARV was administered in category II and III exposures in accordance to the intradermal schedule. Data was analysed for clinical information such as age, sex, socioeconomic status, dog type, site of bite, categories of contact and treatment given.

RESULTS

In our study of 73 patients, 36 (49.32%) were males and 37 (50.68%) were females. Majority of the patients belonged to the age group of 11-40 years in both male (n=29; 80.5%) and female (n=26; 70.3%) patients. Mean age group of patients in the study was 30.50 years. Based on modified Kuppuswamy scale, most patients belonged to the class III (n=42; 57.6%) followed by class IV (n=14; 19.2%). Dog bites from both strays and pets were almost equal. However, only 50% pet dogs were partially vaccinated and remainder were not vaccinated. Thus, mandating the use of ARV immunization. All the patients sustaining bites from street dogs were vaccinated. Majority of the bites involved the lower extremities (n=31; 42.5%) followed by upper extremities (n=26; 35.6%). Based on WHO guidelines for wound categories, most patients belonged to category II (n=36; 49.3%) followed by category III (n=31; 42.5%).

CONCLUSIONS

In our study, we found that majority of patients sustaining dog bites were young adults and belonged to lower middle & upper lower class. There was no difference with respect to gender and dog type. Most common sites of dog bite were upper & lower extremities and belonged to WHO category II. No cases of rabies were observed in our study.

KEY WORDS

Dog, Animal, Bite, Rabies, Immunization, Prophylaxis, Treatment

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BACKGROUND

The association of dogs with humans is as old as the mankind itself. This is the only canine closely adapted to the domestic life of man. Human-dog relationship is the friendliest association. Despite this lovely-affectionate relation, because of its basic wild instinct and behaviour, it has a tendency to attack humans. This leads to various health hazards besides the injury to the tissues from attacks a range of zoonotic disease are transmitted, rabies being the most fatal. Rabies is a viral disease leading to an almost uniformly fatal encephalitis in humans.[1]

It remains a significant viral cause of mortality in tropical countries.[2] It occurs throughout the world except in Antarctica and a few island nations.[3] In developing areas where canine rabies is common, most cases of human rabies result from dog bites. There is no established treatment for rabies once symptoms have begun. Rabies vaccination for prevention and PET was introduced in the nineteenth century, first by Galtier and later by Pasteur.[4] Control of animal rabies is central to the prevention of human disease. Thus, prophylaxis (for domestic animals and selected humans) and PET remain essential to the prevention of clinical rabies.

After exposure, rabies prevention begins with good wound care, which reduces the risk of rabies by up to 90%.[5] Wash the wound thoroughly with a 20% soap solution.[6] This should be followed by application of 70% ethanol or an iodine-containing solution. Wounds should not be sutured prior to a decision about PET; if a wound must be sutured, rabies immunoglobulin should be instilled into the wound and infiltrated around it. Following wound care, the clinician must decide whether to institute passive or active immunization.[7]

PET appears safe in pregnant women and should not be withheld for this reason.[8] Anti-rabies immunoglobulin is available in both human (HRIG) and equine forms (pooled anti-rabies serum, and purified anti-rabies serum of equine origin (equine rabies immunoglobulin, ERIG)). HRIG is given in a dose of 20 IU/kg, with half injected in the vicinity of the wound, and the remainder injected intramuscularly in the gluteal region.

Objectives

1. To describe the clinical profile and management of dog bite patients presenting to the tertiary care hospital in the Kumaun region of Uttarakhand.
2. To study and establish different age groups and gender of patients sustaining dog bites.
3. To study the various risk factors and presentations of dog bites.
4. To study the management of dog bites.

METHODS

This is an hospital based observational cross-sectional study**.** The data of 73 patients collected from January 2018 to December 2018 was analysed and studied. The sampling method used was convenient sampling. All patients presenting to the outpatient and emergency department with the complaint of dog bite were enrolled in the study.

All particulars of patients, relevant clinical history and examination findings were recorded in the clinical proforma after taking proper informed consent.

Category	Categories of Contact with Suspected Rabid Animal	Post-exposure Prophylaxis Measures
I	Touching or feeding of animals Licks on intact skin	None
II	Nibbling of uncovered skin Minor scratches or abrasions without bleeding Licks on broken skin	Immediate vaccination and local treatment of the wound
II	Single or multiple transdermal bites or scratches Contamination of mucous membrane with saliva (i.e., licks) Exposure to bats, whatever the nature of contact	Immediate vaccination and administration of rabies immunoglobulin Local treatment of the wound
Wounds Were Categorized Based on WHO Guide to Postexposure Prophylaxis		

Local Treatment Consisted of Two Parts

First Aid

This included washing and flushing the wound well with soap solution, detergent solution or water alone and applying povidone iodine after washing the wound.

Wound Management

Suturing was postponed when suturing was necessary, it was done after applying immunoglobulin locally.

HRIG (dose=20 IU/kg) was instilled half in the depth of the wound and remaining half infiltrated around the wound.

Anti-tetanus treatment and antibiotics were started to control wound infections.

ARV was administered in category II and III exposures in accordance to the intradermal schedule. 0.1 ml each (total 0.2 ml in two sites) tissue culture ARV was administered on both deltoid areas ID route involving two different lymphatic area drainage sites.[9] 1 ml insulin syringe with 28 G fixed needle was used and 70% ethanol or isopropyl alcohol was used as skin disinfectant.

Data was analysed for clinical information such as age, sex, socioeconomic status, dog type, site of bite, categories of contact and treatment given.

Statistical Analysis

Statistical testing was conducted with the statistical package for the social science system version SPSS 17.0. Continuous variables are presented as mean ± SD, and categorical variables were presented as absolute numbers and percentage. Tables were created using MS Excel 2021.

Figure 1. Child with Facial Dog Bite

RESULTS

Age Group (in years)	Number of Patients	Percentage
0-10	3	4.1
11-20	18	24.6
21-30	16	21.9
31-40	21	33.3
41-50	6	8.2
51-60	5	6.8
61-70	3	4.1
>70	1	1.3
Mean age	30.50 years	
Standard deviation	15.29	
N=73		

Table 1. Age Distribution of the Patients

Majority belonged to the age group of 11-40 years in both male (n=29; 80.5%) and female (n=26; 70.3%) patients. Mean age group of patients in the study was 30.50 years with standard deviation of 15.29. This could represent the increased risk of exposure of children and young adults to the dogs including both pet and street dogs.

Sex	Number of Patients	Percentage
Male	36	49.32
Female	37	50.68
N=73		

Table 2. Sex Distribution

In our study of 73 patients, 36 (49.32%) were males and 37 (50.68%) were females. There was no statistically significant difference between the pattern of dog bites and sex distribution. Both the groups had similar age-sex distribution.

Socioeconomic Status (Modified Kuppuswamy Scale)	Number of Patients	Percentage
I	2	2.7
II	8	10.9
III	42	57.6
IV	14	19.2
V	7	9.6
N=73		

Table 3. Socioeconomic Status Distribution

Based on modified Kuppuswamy scale, most patients belonged to the class III (n=42; 57.6%) followed by class IV (n=14; 19.2%). Thus, majority of the dog bites were sustained by individuals belonging to lower middle and upper lower class as these individuals were involved in agriculture and other occupations necessitating outdoors exposure.

Dog Type	Number of Patients	Percentage
Street dogs	37	50.68
Pet dogs	36	49.32
N=73		

Table 4. Types of Dogs

Dog bites from both strays and pets were almost equal. However, only 50% pet dogs were partially vaccinated and remainder were not vaccinated. Thus, mandating the use of ARV immunization. All the patients sustaining bites from street dogs were vaccinated.

Site of Dog Bite	Number of Patients	Percentage
Head	3	4.1
Trunk	5	6.8
Upper Extremity	26	35.6
Lower Extremity	31	42.5
Multiple Sites	8	11.0
N=73		

Table 5. Site of Dog Bite

Majority of the bites involved the lower extremities (n=31; 42.5%) followed by upper extremities (n=26; 35.6%). Bites are more common in lower extremity whether the dog was pet or stray, in the person running away from the dog out of fear or running & playing with the dog. Tendency of licking the face, head and upper extremity while playing with familiar dog can result in facial and upper extremity bites in children.

WHO Category of Contact	Number of Patients	Percentage
I	6	8.2
II	36	49.3
III	31	42.5
N=73		

Table 6. Distribution of Wound Category

Based on WHO guidelines for wound categories, most patients belonged to category II (n=36; 49.3%) followed by category III (n=31; 42.5%). Category I contacts require no vaccination. Category II and III contacts require vaccination and local treatment of wound. Category III contacts require, in addition, administration of rabies immunoglobulin.

DISCUSSION

Rabies, a disease of antiquity continues to be a major public health problem in India. Multiple factors contribute to high mortality and morbidity due to animal bites.[10] The annual estimated number of dog bites in India is 17.4 million, leading to estimated 18,000-20,000 cases of human rabies per year. [11,12,13]

Almora is a town with urban, semiurban and partly rural environment. Urban area is densely populated with crowded spaces with narrow roads & streets. A lot of eateries, restaurants, hotels and food points, no proper system of garbage disposal makes the town a perfect home for street dogs. Besides this every household has pets of various breeds of small, big and fancy dogs for different purposes. Semiurban and rural households prefer pets to protect their agricultural produce, fruits and grains. There is no perfect documentary evidence but it is a crude observation of the authors that there are around 1000 street dogs in the main hill of the Almora town itself and 500-600 pet dogs.

In our study of 73 patients, 36 (49.32%) were males and 37 (50.68%) were females. Majority of the patients belonged to the age group of 11-40 years in both male (n=29; 80.5%) and female (n=26; 70.3%) patients. Mean age group of patients in the study was 30.50 years. This generally reflects the greater exposure of young adults to the dogs. Also of significant importance is the involvement of children younger than 18 years age (n=20; 27.4%) who are at a greater risk due to shorter incubation period for rabies. Based on modified Kuppuswamy scale, most patients belonged to the class III (n=42; 57.6%) followed by class IV (n=14; 19.2%). Dog bites from both strays and pets were almost equal. However, only 50% pet dogs were partially vaccinated and remainder were not vaccinated. Thus, mandating the use of ARV immunization. All the patients sustaining bites from street dogs were vaccinated.

Majority of the bites involved the lower extremities (n=31; 42.5%) followed by upper extremities (n=26; 35.6%). Its clinical significance lies in the fact that the incubation

period is usually short in persons bitten on the face or head, and long in those bitten on the legs. This may be related to the distance the virus has to travel to reach the brain. Bites are more common in lower extremity whether the dog was pet or stray, in the person running away from the dog out of fear or running & playing with the dog. Tendency of licking the face, head and upper extremity while playing with familiar dog can result in facial and upper extremity bites in children. (Figure 1)

People in Almora are dog friendly and live in harmony with dogs in the street and home. Unprovoked dog bites are rare, most of the time dogs bite when they feel threatened, are sick or startled.

Based on WHO guidelines for wound categories, most patients belonged to category II (n=36; 49.3%) followed by category III (n=31; 42.5%). Animal bites deposit the virus in the wound. Therefore, the wound should be scrubbed well immediately with soap and water. [14,15] This is a very important step in the prevention of rabies as soap destroys the virus effectively.[5,6] After washing the soap away completely, the wound was treated with povidone iodine. In category III wounds, HRIG was applied topically and infiltrated around the wound. Suturing was postponed in most wounds. [7,16] Anti-tetanus measures and antibiotics to prevent sepsis were utilized as necessary.[9]

CONCLUSIONS

In our study, we found that majority of patients sustaining dog bites were young adults and belonged to lower middle & upper lower class. There was no difference with respect to gender and dog type. Most common sites of dog bite were upper & lower extremities and belonged to WHO category II. No cases of rabies were observed in our study.

Recommendations

Dog bite is an important health problem throughout the world. In Uttarakhand, it is mostly unreported or under-reported. The index study presents the report of surgical clinics in a tertiary care hospital. The actual prevalence may be higher as the small town of Almora has other hospitals and clinics which manage the animal bites. Dog bite is commonly encountered in the clinical practice at almost all levels of health care. Majority of patients encountered in the tertiary care centre was managed on outpatient basis. However, patients sustaining severe injuries will require hospitalization and planned management based on WHO guidelines. A larger multicentre study is necessary to determine the actual situation so that specific measures can be planned to reduce the risk of dog bite and curb the canine menace.

Limitations

The index study is limited by the observations of a single centre of the town where there are two tertiary level hospitals along with many private centres for the treatment of injuries including animal bites. The fact that there is no dedicated centre for the treatment of rabies or animal bites is also one important factor in missing many cases of animal bites in the record, the exact figures can be gathered by doing a multicentre study. Authors agree to the need of such a study so that preventive strategies at various levels can be planned to curb the growing canine menace in the society.

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