

Assessment of initiation of post-exposure prophylaxis with anti-rabies vaccine in cases of dog bites: an observational study

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ABSTRACT

Background: The management of rabies is challenging because of the long incubation period, lack of specificity of early prodromal symptoms and 100% fatality rate. Post-exposure prophylaxis (PEP) with anti-rabies vaccine (ARV) at the earliest has proven life-saving. Studies conducted in many parts of the country have shown that the time interval between exposure and initiation of PEP is wide. The objective was to study the profile of dog bites cases and assess initiation of PEP with ARV.

Methods: Prospective observational study where prescription sheets of all new cases of dog bite injury were evaluated for a period of 3-month.

Results: The victims of dog bite were predominantly males (72.41% males vs. 27.59% females, n=551). 45% cases belonged to the age group of 15-44 years. The majority of the cases (88.03%) were of wound Category II. The most common site of a dog bite was lower limb (80.94%). The percentage of cases who had received ARV within 24 hrs was 41.92, between 1 and 3 days was 31.03, between 4 and 10 days was 21.60, whereas 5.45% cases received vaccine after 10 days of exposure.

Conclusion: Substantial proportion of victims of dog bite did not report and receive PEP within 24 hrs of exposure.

Keywords: Anti-rabies vaccine, Critical time interval, Dog bite, Post-exposure prophylaxis

INTRODUCTION

Rabies is the oldest viral infectious disease, known to the mankind since 3000 years. This fatal disease is associated with animal bites and affects humans and other mammals.¹ Dogs have long been recognized as the main transmitters of the disease to humans.² Rabies virus is a member of the genus *Lyssavirus* in the family *Rhabdoviridae*. Rhabdos, meaning "rod-like," refers to the distinctive elongated shape of these viruses. Their enveloped virions contain a single-strand, non-segmented, negative-sense RNA.³

The diagnosis of rabies is challenging because of the long incubation period (20-60 days on average, with rare reports of 5-6 days and up to 7 years) and lack of specificity of early prodromal and neurologic symptoms. The infection eventually evolves into a viral encephalitis (furious rabies), with classic symptoms of hydrophobia, aerophobia, hyperexcitability and autonomic dysfunction. Most patients with these symptoms die within few days. So far there is no effective treatment for an established disease hence post-exposure prophylaxis (PEP) remains the most crucial intervention.

In India, annually about 15 million people are bitten by animals, mostly by dogs and require PEP. The annual number of person days lost because of animal bites is 380 lakhs, and the cost of post-bite treatment is about INR 140 crores in India.⁴ Various studies conducted across the country have shown that the critical time interval between exposure (i.e., dog bite) and initiation of treatment is wide.^{5,6} According to the national guidelines on rabies prophylaxis, PEP should be started as early as possible after exposure.⁷ In view of this the present study was planned with the objectives to evaluate the clinical profile of dog bite cases and to assess initiation of PEP with anti-rabies vaccine (ARV) in patients attending tertiary care center.

METHODS

The present study was conducted at ARV out-patients department (ARV OPD) of the tertiary care hospital in Western Maharashtra, India. The study was approved by the Institutional Ethics Committee. It was a prospective observational study where new cases of dog bite were evaluated for a period of 3-month.

- Study population: all cases of dog bite attending ARV OPD of tertiary care center in Western Maharashtra, India
- Inclusion criteria: all new cases of a dog bite of either sex and of any age group
- Exclusion criteria: patients not willing to participate in the study.

Information was gathered from patients’ case papers and wound assessment after obtaining informed consent from them. The collected data included, personal information, site of bite, category of the wound (Wound Category as per National Guidelines)⁷ and the time interval between dog bite and initiation of PEP with ARV. The data was analyzed using descriptive statistics.

RESULTS

As shown in Table 1, age and gender wise distribution of dog bite cases clearly indicates that there is a higher occurrence of dog bite in males compared to females in almost all the age groups. When the occurrence of dog bite was considered in different age groups irrespective of their gender as shown in Figure 1, we observed that it is fairly high (45.01%) in the age group of 14-44 years.

When wound assessment for patients of dog bite were performed according to the category of wound as shown in Table 2, the majority of cases (88.03%) belonged to Category II.

As shown in Table 3, lower limbs were the most common bite sites in the majority of cases (80.94%). Whereas, upper limbs are next common bite site as 52 (9.44%) cases had bites

Table 1: Age and gender wise distribution of dog bite cases.

Age group in years	Number of cases		Total (%) n=551
	Male	Female	
0+	1	1	2 (0.36)
1+	28	14	42 (7.62)
5+	70	30	100 (18.15)
14+	192	56	248 (45.01)
44+	66	36	102 (18.51)
60+	42	15	57 (10.35)
Total (%)	399 (72.41)	152 (27.59)	551

Table 2: Category wise distribution of dog bite case.

Category of wound	Number of cases (%) n=551
Category I	10 (1.81)
Category II	485 (88.03)
Category III	56 (10.16)
Total	551

Table 3: Profile of wound according to the site of bite.

Site of bite	Number of cases (%) n=551
Upper limb	52 (9.44)
Trunk	38 (6.90)
Head and neck	15 (2.72)
Lower limb	446 (80.94)
Total	551

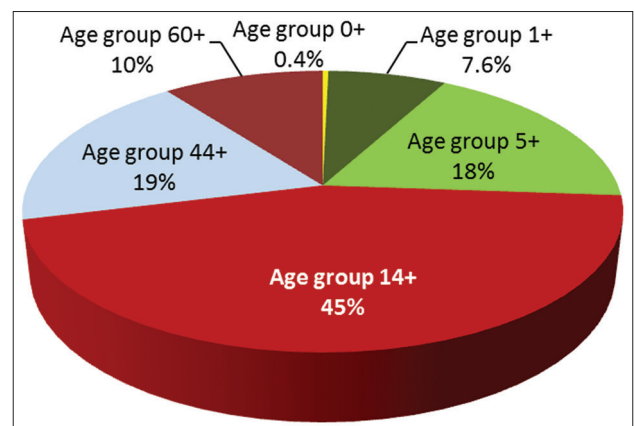


Figure 1: Occurrence of dog bite according to age group.

of upper limbs. In few cases, there were bites of both upper and lower limbs. Other bite sites were trunk and head/neck.

In the present study, we observed that after exposure majority of cases (58.08%) did not receive ARV within 24 hrs. While few cases (31.03%) received vaccine within 1-3 days.

Very few cases (5.45%) received vaccine after 10 days of exposure.

DISCUSSION

The present study shows a higher occurrence of dog bite in males as compared to females in all age groups (Table 1). This observation is consistent with the previous studies conducted in other regions of India by Vyas et al.,⁵ and Rasanian et al.⁸ This finding could be attributed to the out-dwelling work nature of males and or relatively fearless attitude of males as compared to females. Behera et al.,⁹ in study conducted in the southern region of India, have reported the majority of cases were from the age group of 15-44 years. As far as age group is concerned the findings of our study are consistent with Behera et al.,⁹ (Table 1 and Figure 1). Higher incidence of dog bite in the age group of 14-44 may be attributed to the out dwelling work requirement of the said age group.

Evaluation of category of bite in the present study revealed that majority of the cases belonged to Category II of bite wound (Table 2). This finding is consistent with that reported by Rasanian et al.⁸ In contrast to this Vyas et al.,⁵ and Behera et al.,⁹ reported that Category III wound animal bite cases accounted for the majority of cases. Lower limbs irrespective of the side were the most common biting site reported in the present study as it is the most easily approachable part of body for an animal especially running dog, followed by the upper limbs, trunk and head/neck region (Table 3). This is similar to the findings reported by Shetty et al.,¹⁰ and Vyas et al.⁵

As per the national guidelines, it is re-emphasized that PEP should be started as early as possible after exposure. However, PEP should not be denied to person reporting late for treatment as explained previously.⁷ Table 4 shows that in the present study post-exposure reporting time to health care facilities and hence the initiation of PEP varied from “within 24 hrs” to “more than 10 days.” Majority of cases did not report immediately to the health care facilities within 24 hrs of dog bite. Vyas et al.,⁵ and Sharma et al.,⁶ have reported that majority of cases of dog bite did not report immediately to health care facilities for treatment. In contrast, Shetty et al.,¹⁰ have stated that majority of

cases (63.2%) reported within 24 hrs of the bite. The underreporting within 24 hrs of bite leading to the delay in the initiation of PEP in the present study could be due to lack of knowledge and awareness regarding dog bite and post-exposure management of the same. At the same time, the possibility of lack of transportation facilities, unavailability of health care centers in close vicinity and casual attitude of victim toward dog bite injury should be considered. The present study surmises the need to educate the community regarding animal bite especially dog bite management and care.

CONCLUSION

A substantial proportion of victims of dog bite did not report and hence receive PEP within 24 hrs of exposure.

Recommendations

The present study substantiates the need of awareness in the community regarding the early reporting and initiation of PEP of ARV which will minimize critical time interval between the exposure and treatment and eventually fatality.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Institutional ethics committee

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Table 4: Distribution of patients as per time interval between dog bite and PEP initiation.

Time interval between dog bite and PEP initiation	Number of cases (%) n=551
Within 24 hrs	231 (41.92)
1-3 days	178 (31.03)
4-10 days	119 (21.60)
More than 10 days	23 (5.45)
Total	551

PEP: Post-exposure prophylaxis

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