

Case Report

Management of Animal Bite: A Challenge to Health System – A Case Report

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A B S T R A C T

Background: Anti-rabies vaccine (ARV) and rabies immunoglobulin are given as post-exposure prophylaxis in animal bite cases to prevent the fatal disease of rabies. In most cases, especially category III bite cases, these need to be administered. Most post-exposure treatment failures are due to the unavailability of anti-rabies vaccine and rabies immunoglobulin at public health centers. Here we have reported a case of animal bite presented at a rural health center.

Case Description: A 33-year-old female visited a Center for Rural Health AIIMS (CRHA) on July 22, 2023, with a complaint of a dog bite on the right arm and right ring finger 1 day back. Though the patient had washed the site of the bite under running water, she gave a history of applying turmeric paste. There was pain and swelling at the bite site along with a history of bleeding from bite sites.

Management: Post-exposure prophylaxis following intramuscular Essen regimen was prescribed based on the category of bite (category III). Tetanus toxoid 0.5 ml IM was administered. Symptomatic treatment was given for pain and swelling. The patient was referred for human rabies immunoglobulin (HRIG) as it was not available at CRHA. The patient could receive the first 3 doses of ARV but due to limited availability, she was referred for further doses.

Conclusion: The case report highlights the need for the provision of ARV and HRIG at health centers since the out-of-pocket expenditure is high.

Keywords: Rabies, Anti-Rabies Vaccine, Human Rabies Immunoglobulin

Introduction

Rabies is a fatal zoonotic, neglected tropical viral disease which has tormented humans since antiquity, and is a serious public health problem in over 150 countries and territories. It is transmitted to other animals and humans through close contact with saliva from infected

animals.¹ In India, dogs are the predominant reservoir of rabies virus.² About 96% of the mortality due to rabies is associated with dog bites. Once the virus infects the central nervous system and symptoms develop, rabies is fatal, and it differs from many other infections in that the development of clinical disease can be prevented

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through timely immunization even after exposure to the infecting agent.³

According to the World Health Organization (WHO),

countries enzootic for rabies and exposure to suspected or confirmed animal bites are categorized³ as shown in Table 1.

Table 1. Animal Bite Classification³

Category of Exposure	Type of Exposure	Recommended Post-Exposure Prophylaxis (PEP)
I	<ul style="list-style-type: none"> Touching or feeding animals Licks on intact skin Contact of intact skin with secretions/ excretion of rabid animal/ human case 	<ul style="list-style-type: none"> None, if reliable case history is available Wash the exposed area with water and soap and apply an antiseptic
II	<ul style="list-style-type: none"> Nibbling of uncovered skin Minor scratches or abrasions without bleeding 	<ul style="list-style-type: none"> Wound management Anti-rabies vaccine
III	<ul style="list-style-type: none"> Single or multiple transversal bites or scratches Licks on broken skin Contamination of mucous membrane with saliva (i.e., licks) 	<ul style="list-style-type: none"> Wound management Rabies immunoglobulin Anti-rabies vaccine

There are different types of anti-rabies vaccine (ARV) available which are concentrated, purified cell culture and embryonated egg-based.⁴ These vaccines have proved to be safe and effective in preventing rabies. Post-exposure prophylaxis (PEP) is given which includes wound management and administration of rabies immunoglobulin and ARV, based on WHO recommendation. PEP of animal bite management includes the administration of wound care and immunization (active and passive) after a potential exposure to the rabies virus. It always includes thorough washing and flushing of wounds for approximately 10–15 minutes with soap and copious amounts of water. If available, an iodine-containing topical preparation is also applied over the wound. Passive immunization is done with the administration of rabies immunoglobulin (RIG) for every patient with category III animal bite while active immunization is done with the administration of ARV in patients with category II and III animal bite cases.

We are hereby reporting a case of an animal bite which presented at the Center for Rural Health AIIMS (CRHA) to explore opportunities and challenges associated with the management of animal bite cases at the level of primary healthcare.

Case Report

A 33-year-old female resident of an area in Uttarakhand state, presented in the Outpatient Department (OPD) of

a CRHA, providing primary healthcare services on July 22, 2023, with a complaint of a dog bite on the right arm and right ring finger 1 day back (Figure 1). The patient reported that she visited her neighbor's place 1 day back (July 21, 2023) who owned a pet dog. While she was sitting, the dog came to her and started licking her followed by biting her on the right arm and ring finger. The bite was unprovoked in nature and the wound at both sites started bleeding. Following the bite, the patient immediately washed the wound with soap under running water for a duration of 5 minutes. She applied turmeric paste over the wound site. She had mild swelling and pain at the sites of the bite and presented for treatment.



Figure 1. Bite Sites at Right Ring Finger and Right Arm

There was no past history of exposure to any animal or animal bite in the past three months. She also had no history of diabetes mellitus, hypertension or any immunosuppressive condition. She had no documented past history of receiving tetanus toxoid in the last three years.

Physical examination revealed that she was alert, conscious and well-oriented to time, place and person, afebrile to touch with a pulse rate of 76/min, blood pressure of 110/70 mmHg and 52 kg weight. On examination of bite sites, multiple bite marks of size varying from 0.2 X 0.2 cm to 0.5 X 0.5 cm were present over the right forearm with local rise of temperature and tenderness present. No visible active bleeding was present. On the right ring finger, a single bite mark of size 0.1 X 0.1 cm was seen with no visible active bleeding.

Following examination, the dog bite was classified as a category III animal bite since there were multiple bite marks along with licks on broken skin and contamination of the mucous membrane with saliva.

Case Management

Appropriate wound management was done which included washing of bite sites with soap and water for a duration of 10–15 minutes followed by the application of povidone iodine over the sites. She was advised to take ARV according to the Essen regimen (intramuscular) on days 0, 3, 7, 14, and 28.

She was also advised to take human rabies immunoglobulin (HRIG) whose dose was calculated based on the body weight of the patient (20 IU/kg). The maximum dose came out to be 1040 IU which was advised to be infiltrated at the wound sites as much as possible and the rest could be given intramuscularly.

She was administered with an injection of tetanus toxoid (0.5 mL) intramuscularly on the left upper arm. Tablet diclofenac (50 mg 1 tab per oral) was advised to be taken as required for relief from pain.

Since there was no availability of ARV and HRIG at the health facility, she was referred to a higher center for the same.

Discussion

According to WHO, India is endemic for rabies and accounts for 36% of the world's rabies deaths.⁵ As there is low awareness about rabies and pre/ post prophylaxis regarding animal bites, many animal bite cases go unreported or are reported too late due to unawareness which might affect the efficacy of PEP. As per available information from WHO, 18,000–20,000 deaths are reported every year in India due to rabies.⁶

Death due to rabies among humans is 100% preventable before the appearance of clinical signs.⁷ In our country, there is a lack of knowledge about rabies which results in delayed presentation of animal bite cases. Apart from this, there are various misconceptions regarding wound management such as the application of red chilli powder/ oil/ turmeric paste etc. and hence patients present with unhygienic and sometimes contaminated wounds, which lead to more risk of rabies.

Other challenges which hamper the management of animal bite cases at primary health facilities include a shortage of ARV and RIG which results in patients being referred to higher centers which might lead to higher costs of treatment from patients' perspective. In a study by Sujitha et al., they found that the cost of post-exposure vaccination as per Essen regimen was approximately Rs. 2000, which on including immunoglobulin for category 3, added up to Rs. 22,894 for a 60 kg person. This was compared with the cost of pre-exposure prophylaxis (PrEP) which was found to be Rs. 1050–1200. It was found that PrEP was 20 times less than the cost of PEP.⁸

Another challenge for the management of severe cases of animal bites includes skilled administration of RIG whether HRIG or ERIG (Equine Rabies Immunoglobulin) along with the availability of anaphylaxis management at health facilities, which is sometimes not available at most of the primary health facilities.

Available preparations of HRIG or ERIG in the private sector are costly owing to the higher cost of manufacturing them, which makes them quite unaffordable for many patients who belong to lower- or middle-income strata of the community resulting in incomplete PEP.

Newer Initiatives

On September 28, 2023, India launched a new National Action Plan for dog-mediated Rabies Elimination (NAPRE) by 2030. It provides a broad framework for combating dog-mediated rabies. It will help stakeholders to develop their own action plan in order to minimize rabies risk through sustained mass dog vaccinations, pre- and post-exposure prophylaxis and public education until the country has eradicated dog-mediated rabies. It also envisages the strengthening of public health services and constant support for activities which would help in eliminating dog-mediated rabies from the country.⁹

Recommendations

1. Adequate availability of ARV with proper inventory management should be done to ensure fewer stock-outs at health centers.
2. Anti-rabies immunoglobulin with supportive facilities for anaphylaxis management should be available at all centers providing anti-rabies immunoglobulins.

Conclusion

Even though the country is aiming to eliminate dog-mediated rabies by 2030, there is a need to ensure adequate availability of ARV and anti-rabies immunoglobulin at primary healthcare facilities which act as the first point of contact for the general public and health practitioners.

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