SURVEY REPORT

Awareness about Rabies Post Exposure Prophylaxis in Pakistan Among Patients and Health Care Workers: Results from an Asian Rabies Expert Bureau Study

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ABSTRACT

Objective: To identify the gaps in information on rabies and post exposure prophylaxis (PEP) in relation to categorization of wound severity, wound washing and appropriate use of vaccine and rabies immunoglobulin after exposure, and define actions that should be taken at dog bite management centres for prevention of rabies occurring after animal bites.

Study Design: Cross-sectional survey.

Place and Duration of Study: A multicentre study across Pakistan conducted from 1st July 2007 to 31st January 2008.

Methodology: A pre-tested questionnaire was distributed to the respective medical officers in 6 dog bite management centres across Pakistan from 1st July 2007 to 31st January 2008. Information was obtained about demographics of dog bite victims, the timing and type of PEP administered and their responses to the injury.

Results: Out of 519 completed questionnaires the mean age of dog bite victims was 24 years. Over one-third were less than 18 years of age; male/female ratio was 4.9:1; 43% lived in rural Pakistan; 67.8% were classified as lower socioeconomic class; 98% animal bites were from dogs, of which 92.5% were first time bites. 45.5% wounds were classified as Category I (no risk), 42.7%, Category II (moderate risk) and 11.9% Category III (severe risk). Tissue culture vaccine (TCV) was used 54% by intramuscular route and 45% by intradermal route. Only 118 (22.9%) patients received rabies immunoglobulin (RIG). Critical analysis of the results reveals serious gaps in understanding of wound severity classification and correct application of PEP with vaccine and RIG.

Conclusion: There is a dire need for improved awareness and understanding of dog bite management among health care givers in order to prevent rabies deaths.

Key words: *Rabies. Post Rabies Exposure Prophylaxis. Rabies awareness.*

INTRODUCTION

Rabies is primarily a zoonotic infection transmitted to human or another animal by the bite of a rabid animal. Rabies mainly affects the poorer strata of society in the developing world and is prevalent in both urban and rural areas virtually all over Pakistan. India has the highest reported incidence of human rabies in the world - 20,000 (or 2 per 100,000 population) based on a community survey in 2003.[1]

It is a 100% fatal disease and, ironically, 100% preventable if properly managed according to World Health Organization (WHO) guidelines. There is no known treatment for rabies.

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Received January 26, 2010; accepted June 15, 2011.

Unfortunately, the awareness of rabies in most developing countries of the world and especially in Pakistan is inadequate.[2] Most victims do not wash the bite wound with soap and water, and most do not even report to a health centre. In health care centres, the wound severity is not assessed correctly, and hence correct decisions about the use of vaccines and rabies immune globulin are not made. Government-administered hospitals in Pakistan are provided locally produced nerve tissue vaccine,[3] whereas private centres opt for the more effective and internationally used cell culture vaccine. RIG (Rabies immunoglobulin), despite being a life saving biological agent, is not provided to any institution in Pakistan, and because of its large expense it is rarely used.[3] Consequently there is much mismanagement of animal bites both within the community as well as at professional level, resulting in deaths from rabies.

The Asian Rabies Expert Bureau (AREB) is an informal group of experts in rabies. Its members are from nine Asian countries including Pakistan, Bangladesh, China, Phillipines, Sri Lanka, India, Thailand, Vietnam and Indonesia. The objectives are to present and discuss the situation and specific problems of rabies in each country. The present study was a collaborative effort

among AREB partners to study the situation of rabies awareness and its prevention after animal bite. Each country has further presented its individual data that has been extrapolated from the collaborative study. Our compilation pertaining to Pakistan is part of the larger international study that was assisted by Sanofi Pasteur (France).

METHODOLOGY

This study was part of the multicentre multi-country study conducted in eight Asian countries of AREB of patients seeking rabies post - exposure prophylaxis in rabies prevention centres from 1st July 2007 to 31st January 2008. In Pakistan, data was collected from six rabies prevention centres in Karachi (3) and 1 each in Hyderabad, Mirpurkhas, and Peshawar. Patients of all ages and either gender were included. Ethical permission was obtained from Indus Hospital based Interactive Research and Development (IRD) IRB.

A questionnaire was developed for the purpose of the study after taking input from all partners, the aim being to obtain information about timing and type of post exposure prophylaxis (PEP) in communities and their responses to the injury. Consecutive patients coming to the rabies prevention centres were interviewed for rabies exposure, history was obtained from the patient directly or one of the parents or guardians in case of minors. The information was filled out by the medical officer who interviewed the patient.

The case report form (CRF) was developed by members of the AREB. Information regarding demographics was collected by emergency room medical officers. The socioeconomic status was evaluated as low, medium or high, according to the patient's own evaluation and confirmed according to the following criteria: level of education (none, primary school, secondary school, or higher), habitation (owner or non-owner and the housing category); and the patient's belongings (vehicle, television, telephone, etc.) The socioeconomic status of minors was determined to be the same as their parents'.

The location of the patient's residence was noted (rural or urban) and its distance from the rabies prevention centre (evaluated in time), and history of previous rabies exposures and PEP was obtained. Further, information was taken regarding the biting animal, category of exposure, wound location and number of wounds; immediate wound care prior to transportation to the rabies prevention clinic, time elapsed between rabies exposure and consultation at the rabies prevention centre and post exposure prophylaxis. The patients were assessed about their awareness of rabies and their sources of information; and who referred them to the rabies prevention centre.

Descriptive statistical analysis was carried out under the responsibility of the biostatistics platform of Sanofi Pasteur (France) with the SAS software version 8.2 (SAS Institute, Cary, NC, USA). Descriptive statistics were given as number and percentage for categorical data and mean, minimum, maximum, and median for continuous data.

RESULTS

Of 650 questionnaires on hard copy, 519 were returned completed. The male/female ratio of victims was 4.9:1. The mean age for participants was 24 $\pm$ 17.2 years. Majority i.e. 66.3% were less than 18 years of age and only 2.3% were over 60 years of age. Two hundred and nine lived in rural Pakistan and 278 (57.1%) lived in urban or periurban areas of large cities. Regarding socioeconomic status, 67.8% were classified as lower socioeconomic class, and 31.6% to middle class. Majority (98%) lived within a distance coverable in 5 hours of the rabies centre, but only 27.8% actually reached within 5 hours of the bite (Table I).

Table I: Patient location and time taken to reach centre.

	N	Percentage
N included	519	
Living place	487	100%
Rural	209	42.9%
Urban	278	57.1%
How long does it take to go from your home to the rabies centre?	498	100%
0 - 1h	229	46%
1h - 5h	261	52.4%
5h - 12h	5	1%
1 day	2	0.4%
> = 2 days	1	0.2%
Lapse of time between rabies exposure and visit to the centre	471	100%
0 - 6h	131	27.8%
6h - 24h	57	12.1%
1 day	135	28.7%
2 days	60	12.7%
3 days	36	7.6%
4 days	14	3%
5 days	13	2.8%
6 days	5	1.1%
7 days	3	0.6%
> = 8 days	17	3.6%

Majority (92.5%) had never experienced a dog bite previously, while 7.5% (n=39) had a dog bite up to 20 years back, of whom 23 received PEP and 61.3% completed PEP. For the present exposure 98% were bitten by dogs and only a few were bitten by a cat or monkey. Two hundred and twenty nine (45.5%) bites were placed in category I, 42.7% (n=215), in category II, and 11.9% (n=60), in category III (Tables II and III). One hundred and sixty five (32.5%) respondents had been bitten by a dog that had bitten other persons as well. One hundred and thirty six (26.7%) consulted a traditional healer after the bite; 105 (26.6%) washed the wound with soap and water and 359 (69.4%) consulted a doctor (Table II).

Table II: Wound characteristics.

	N	Percentage
N included	519	
Total number of wounds	409	100%
01	141	34.5%
02	144	35.2%
03	65	15.9%
04	32	7.8%
05	14	3.4%
06	8	2%
07	2	0.5%
08	2	0.5%
12	1	0.2%
WHO category of exposure	504	100%
Category I	229	45.4%
Category II	215	42.7%
Category III	60	11.9%
Wound location	511	100%
Head/neck	28	5.5%
Hands/fingers	130	25.4%
Other	370	72.4%

Table III: Rabies exposure (present bite).

	N	Percentage
N included	519	
Biting animal	518	100%
Dog	507	97.9%
Cat	6	1.2%
Monkey	1	0.2%
Other	4	0.8%
Did the animal bite other people?	507	100%
No	180	35.5%
Unknown	162	32%
Yes	165	32.5%

Table IV: Rabies post exposure prophylaxis (at the rabies centre).

	N	Percentage
N included	519	
Is the patient pre-immunized?	515	100
No	366	71.1
Yes	149	28.9
If Yes, route and dose	116	100
ID 2 doses	13	11.2
IM 2 doses	103	88.8
If No, vaccination schedule prescribed	314	100
ID TRC	144	45.9
IM Essen	158	50.3
IM Zagreb	12	3.8
Does the subject receive RIG?	516	100
No	398	77.1
Yes	118	22.9
Does the subject need a suture?	516	100
No	464	89.9
Yes	52	10.1
If Yes, specify	20	100
Immediately after rabies treatment	13	65
Not immediately after rabies treatment	7	35

ID = Intradermal; IM = Intramuscular.

The subsequent management was reported to be 100% with cell culture vaccine- 54% intramuscular route and 45% by intradermal route. One hundred and eighteen victims (29.9%) were reported to have received rabies immune globulin (RIG, Table III).

DISCUSSION

Rabies virus may be present in the saliva of mammals. Thus the bite of a rabid biting mammal is capable of causing rabies in the animal or human victim. There have been reported instances of rabies from the bites of rabid cattle or domestic animals especially cats. However, in most studies from Asia, dog was the most common biting animal.[4] The overall male/ female ratio of animal bite victims among Asian countries was 1.6:1.[1,2] The high ratio of 4.9:1 is probably because Pakistani females are domestically inclined and travel outside their homes less often as compared to men. Children and young adults were bitten more often as they frequently attack or provoke dogs playfully, and are less likely to defend themselves from an attacking animal. Most victims came from rural areas and had to travel distances to gain access to medical care in cities. The study obviously does not include persons who did not seek care. It also implies that rabies prevention centres must be within easy access to bite victims. A rabid animal usually bites more than one person. Nearly a third of the victims interviewed were bitten by a "probably rabid" animal. Many victims apply home remedies such as red chillies, spices, oil and other chemicals, in the belief that these will kill the virus.[1] WHO emphasizes immediate and thorough wound wash with soap and water and application of disinfectants as this removes animal saliva and reduces viral load.[5] Most patients in this study did not perform this simple yet essential step.

Standard WHO practice recommends wound categorization according to severity of bite which determines further management.[6] Category I is a non-bite and needs no PEP. Category II implies breach of skin and is considered "moderate risk". This requires wound cleansing, plus use of vaccine. Category III describes single or multiple deep wound or wounds and is considered "high risk". This requires infiltration of the wound with RIG, plus injection of vaccine. The questionnaire showed that in large number of cases wound severity was incorrectly categorized, whereas only 60 bite wounds were classified as "category III", 158 were described as being located on head/neck and hand/fingers. Majority had multiple bites, which by definition qualifies for category III, indicating that the medical officer's classification of wound categories was poorly understood and reported incorrectly. Wrong classification would obviously lead to incorrect management.

The investigators reported using cell culture vaccine in 100% cases, 54% intramuscular route and 45% by intradermal route. The authors are aware that training had not been imparted to medical officers in all, but two centres in use of modified Thai Red Cross (TRC) intradermal regimen with cell culture vaccine; hence, one can safely assume that the medical officer reporting intradermal regimen meant nerve tissue vaccine into the anterior abdominal wall which is still used extensively in Pakistani cities other than in Karachi. The modified TRC regimen is used in most developing countries and has shown to be highly economical, requiring 1-2 vials over 4 visits, while the intramuscular Essen regimen requires 5 vials over 5 visits.[7]

The use of RIG in this study is again erroneously reported, while 60 patients are classified in category 3, 118 were reported as having received RIG. These numbers do not balance out, implying either lack of understanding of wound classification or incorrect reporting. Infiltration of RIG into category 3 bite is essential since the passive antibodies neutralize the virus at site and protect for the initial 14 days after a bite.[8] Again, it is unfortunate that this life saving biological agent is not provided free to public sector hospitals (Table IV).

Only 6 centres were included in the study. The practice may vary in other towns and cities. This study was carried out in 8 other countries, none of which use nervous tissue vaccine. Hence the questionnaire was faulty as it made no mention of its application even though this product continues to be used in public hospitals in Pakistan and Bangladesh.

This study exposes an abysmally low level of knowledge and practices of post exposure prophylaxis of animal bites among those surveyed. Accumulated reports of failure to prevent rabies deaths blame inadequate or improper postexposure prophylaxis where immuno-biologicals (i.e. RIG and vaccine) were used incorrectly or not at all in category 3 bite wounds.[8-10]

There is tremendous need to educate dog bite victims and make them aware about proper wound toilet and reporting to a rabies prevention centre. The medical profession must be better informed about the application of approved PEP after correct wound category assessment.[6,11] It should advocate for free supply of cell culture vaccine and RIG; teaching of correct wound severity classification and the application of the correct method of PEP.

CONCLUSION

This study revealed severe shortcomings in knowledge, application and practices of management of dog bites among physicians interviewed. Serious efforts should be made to raise awareness.

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