ORIGINAL RESEARCH ARTICLE

MANAGEMENT OF SEVERE ANIMAL BITE WOUND : FEW OBSERVATIONS

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Abstract

Background: Rabies is a 100% fatal but completely preventable, viral zoonotic disease of the CNS and also given low public health importance. India is an endemic country for rabies. Annually, nearly 12,700 Indians die of rabies while around 3 million people are rescued by post exposure treatment. Management of severe animal bite wound plays an important role in control of rabies.

Objective : The main objective of this study is to initiate special and adequate treatment in case of critical animal bite wound with adequate antibody response.

Methodology: This was a cross sectional study and was conducted from May, 2019 to December, 2019. The data from 45 participants of category III bites in a renowned anti rabies treatment centre in Kolkata was collected with the help of pre-tested structured interview schedule consisting all the possible interview questions.

Results: Majority of the patients belong to the age group of less than 20 years i.e. 44.44%, majority of the patients were male i.e. 66.66%. Residence of majority of the patients were urban, 71.11%. Majority of the critical bite was dog bite i.e. 71.11% followed by cat bite 22.22%. It was observed that RIG infiltration in the tissue followed by antibiotics helped to heal the wound rapidly.

Conclusion: On the basis of the findings of the study it is highly recommended that in case of critical wound bite to follow the double dose vaccination on day 0 followed by ESSEN schedule as it allows more better antibody response in managing the disease alongwith meticulous Rabies Immunoglobulin administration.

Key Words : Rabies, Severe Animal Bite, Wound Management

Introduction

Animal bites to humans is a public health problem; posing a potential threat of rabies to over 3.3 billion people worldwide.[1] These exposures occur mainly in the underserved populations, both in rural and urban areas and has been documented for more than 4000 years.[2] Most cases occur in Africa and Asia; where a close habitation of large human and dog population is seen.[3] World Health Organization's (WHO) South East Asia Region has more exposures, than in any other part of the world; nearly 1.4 billion people are at risk.[4] In India, an estimated 17.4 million animal bites occur annually, with an incidence of 1.7 %.[5] (WHO Technical Series).

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Any bite on the skin by teeth of the animal considered as an animal bite exposure. All bites, regardless of body site, represent a risk of rabies virus transmission, the risk varies with the type of biting animal, anatomic site of bite, and severity of wound. Bites by animals like bats, can inflict minor injury and are difficult to detect.

Bite may be due to provocation / un-provocation. Animal bites to the person who is feeding or handling any animal generally regarded as provoked bite. But f it was an unprovoked attack by the animal, its regarded as the animal should be rabid.

Apart from of the risk due to rabies, wounds may cause serious injury like nerve or tendon laceration and infection of the system. Treating doctor will decide the best way to care of wound, as well as process of wound treatment. Which helps in the entire process, reducing risks in developing rabies. Unfortunately most of the patients dos not follow this protocol.

All patients reports with severe bite wound mostly in face, neck, head, upper & lower extrimities or any other portion of the body. There are several locations with some times loss of tissues with multiple bites are noticed. Some of the dogs are rabid as per history. The subjects were treated with rabies immunoglobulin throughout the wound. If the volume is inadequate, then normal saline for infiltration are added (1/3rd NS). In these cases each wound must be thoroughly cleaned and washed with soap and water for at least 15 minutes frequently to remove the virus in near about 40% to 50% as possible. Coming to the next important step is double dose vaccination in both upper arm i.e. starting with Zagreb schedule followed by ESSEN In case IDRV (TRC-Schedule) the dose is repeated, with an additional dose of Day 3 / Day 4.

Rabies is a preventable disease and is most amenable to control, as the appropriate tools for prevention i.e., post exposure prophylaxis (PEP) are available.[6] In rabies endemic country like India, where every animal bite is potentially suspected as rabid exposure, the exposed individuals should seek early and proper health care; simultaneously, PEP should be started immediately at the health care facility.[7] Wound washing with soap/ detergent & water, followed by application of virucidal agents to reduce the viral inoculum at the wound site; complete course of post-exposure vaccination with RIG infiltration to induce antibodies which prevents the risk of virus entering peripheral nerves and wound infiltration in all points by rabies immunoglobulin (RIG)/ rabies monoclonal antibodies (RMAb) in all category III exposures with the objective to neutralize the virus at the wound site where the neutralization of virus at the site of entry is necessary. No patient was administered RIG intermasularly.[8]

Objectives

The main objective of this study is to initiate special and adequate treatment in case of critical animal bite wound with adequate antibody response. Other objectives are to identify the types and nature of wound due to animal bite, to suggest the preventive and control measure for rabies.

Methodology

This was a cross sectional prospective study. 45 patients of category III bites in a renowned anti rabies treatment centre in Kolkata was chosen. (Institute of Animal Bite management and H.P. Poddar memorial clinic and Nursing Home).

Inclusion criteria: All patients of category III presenting with dog, cat, mongoose, rabid cow, fox bites and consented for study.

Exclusion criteria: Immuno compromised individuals, rodent bites, patients with pre exposure schedule, superficial bleeding of in category – III bites and all those who did not give verbal or written consent for the study.

The consent of the 45 patients was taken for participation in the study. This cross sectional study conducted between the period of May, 2019 to December, 2019 with the help of pre-tested structured interview schedule consisting all the possible interview questions and also to provide a method of treatment of rabies immunoglobin administration as an anti rabies therapy to take care of conditions of localized wounds comprising the step of administering the rabies immunoglobin administration.

Necessary statistical methods were applied using SPSS version 20.0 in consultation with statistician for analysis of the compiled data collected through interviews.

Result

Out 45 category III animal bite victims majority belong to the age group of less than 20 years i.e. 44.44% followed by 33.33 >20 – 40 years of age and 22.22 were above 40 years. 66.66% were male and 33.33% were female. Majority of the patients belong to APL were 66.66% and BPL were 33.33%. Hindu were 66.66% followed by 26.66 were Muslim and 06.66% were Christian. 93.33% of the patients were literate and 06.665 were illiterate. Residence of 71.11% patients was urban and 28.88% were rural. (Table-1)

Majority of the patients come with dog bite (71.11%) followed by cat (22.22%), fox (04.44%) and Mongoose (02.22%). (Table-2)

Site of the animal bite of the patients was leg (53.33%) followed by fore arm (26.66%), neck (04.44%), face (11.11%) and anterior abdominal wall (04.44%). (Table-3)

Maximum measurement of wound was > 5-10 cm (40%) followed by < 5 cm (31.1%) and > 10 cm and above (28.88%). There were multiple wound found in the patients. (Table-4)

Majority of the patients reported within 48 hours after animal bite (80%) followed by after 48 hours (20%). (Table-5)

Out of 45 critical animal bite patients 91.11% toilet their wound inadequately and only 08.88% washed their wound adequately. (Table-6)

Maximum biting animals were untraced (35.55%) followed by dead (31.11%) and living (33.33%). (Table-7)

Antibody was adequate on day 28 then reduces from day 42 after administration of Zagreb to ESSEN Schedule vaccination, IDRV Schedule and ESSEN Schedule. It was then maintains a steady and protect6ed level upto 1st three month, then gradually declines. After the booster dose in required has given which boosted up the antibody level. (Table-8, table-9, Table-10)

Table – 1 : Socio demographic profile of the participants. (n=45)

Socio demographic profile	Number	Percentage (%)
Age		
< 20 years	20	44.44
>20 – 40 years	15	33.33
>40 years	10	22.22
Gender		
Male	30	66.66
Female	15	33.33
Socio economic status		
BPL	15	33.33
APL	30	66.66

Socio demographic profile	Number	Percentage (%)
Religion		
Hindu	30	66.66
Muslim	12	26.66
Christian	03	06.66
Educational status		
Literate	42	93.33
Illiterate	03	06.66
Residence		
Rural	13	28.88
Urban	32	71.11

Table – 2 : Distribution of patients according to type of biting animal. (n=45)

Type of biting animal	Number	Percentage (%)
Dog	32	71.11
Cat	10	22.22
Fox	02	04.44
Mongoose	01	02.22
Total	**45**	**100**

Table – 3 : Distribution of patients according to site of animal bite. (n=45)

Site of animal bite	Number	Percentage (%)
Leg	24	53.33
Fore arm	12	26.66
Neck	02	04.44
Face	05	11.11
Anterior abdominal wall	02	04.44
Total	**45**	**100**

Table – 4 : Distribution of patients according to measurement of wound. (n=45)

Measurement of wound	Number	Percentage (%)
< 5 cm	14	31.11
> 5 – 10 cm	18	40.00
> 10 cm and above	13	28.88
Total	**45**	**100**

Table – 5 : Distribution of patients according to reporting of animal bite cases in the centre. (n=45)

Reporting of animal bite cases	Number	Percentage (%)
Early Reporting (within 48 hrs)	36	80.00
Late reporting (after 48 hours)	09	20.00
Total	**45**	**100**

Table – 6 : Distribution of patients according to primary wound toilet. (n=45)

Primary wound toilet	Number	Percentage (%)
Adequate	04	08.88
Inadequate	41	91.11
Total	**45**	**100**

Table 7 : Distribution of condition of biting animals. (n=45).

Condition of biting animals	Number	Percentage (%)
Living	15	33.33
Dead	14	31.11
Untraced	16	35.55
Total	**45**	**100**

Table – 8 : Distribution of patients according to administration of Zagreb to ESSEN Schedule. (n=15).

No. of patients	Schedule	Average antibody
15	Day 12 – 14	0.7
15	Day 28	3.4
15	Day 42	3.2

Table – 9: Distribution of patients according to administration IDRV Schedule. (n=15).

No. of patients	Schedule	Average antibody
15	Day 12 – 14	0.6
15	Day 28	2.2
15	Day 42	2.0

Table – 10 : Distribution of patients according to administration ESSEN Schedule. (n=15).

No. of patients	Schedule	Average antibody
15	Day 12 – 14	0.4
15	Day 28	1.4
15	Day 42	1.3

Category III Exposure (Severe Animal Bite Wound)

RIG Administration

Discussion

Rabies remain an incurable disease and chronic disease symptoms and signs develop death ensues within one week in case of furious rabies and three week in paralytic rabies without intensive care support. There is one records in thin regard, regarding survival of one case of rabies patients after following Milwankiprotocol and 14 patients due to or extensive intensive care support with application of antiviral drugs even may play a role. In this disease, the main objective is prevention is better than cure. Simultaneously there are instances of treatment of failures particularly after application of inadequate dose of vaccination. The clinical manifestations are very variable particularly in paralytic Rabies and it is depending on nature of variants rapidity of immune system, a T Cell acclimation Large number of virus inoculum, exposure close to CNS non infiltration of RIG in all wounds with faulty technique of vaccination, without taking additional care in severe bites, inadequate wound toilet etc. Hence some cases of treatment failure are also on record. In case of severe bite there is high chance of developing rabies is a fact because non infiltration of RIG in all sites. In addition it is practically unknown that which patient is immuno compromised or not. In case of Bat differs dog variant in term of its ability to include host immune response.[9]

The animal bite wounds are classified into three categories and the treatment protocol is different in each category. In this category III severe bites is chosen after adequate taking safety in relation of treatment.

In this series of studies, stress has given to manage the severely animal bite wounds due to Rabid dog bite mostly and also dog bites. The diagnostic approach for detection of viral antigen of dog not possible to the author. Hence stress has given to manage and treat severely bite would and it shown or evident that starting double dose vaccination as in Zagreb followed by ESSEN schedule of Day 0 has given higher antibody response on Day 12-14 in 0.9 – 1.4 IU/ML of blood (RFFIT) in average the study was conducted on 15 nos of patients. Day 28 tire is higher ie 3.4 and day 42 is 3.2 IU/ML of blood (Elisa). The minimum protective value which is required for 100% sero protection is 0.5 IU/ML of blood (RFFIT) which is achieved. In the long run the value usually comes down for which particularly the persons who are handling animals, veterinarians, peoples working in rabies laboratories needs booster dose and all the subjects in general for re-exposure needs Day-0/Day-3 I/M dose or 4 site IDRV on day 0, with the objective of boosting memory cells which shows very high antibody response >10 IV IU/ML of blood (RFFIT) .

The incubation period in rabies is very variable from even 6 Days to many years and early development of rabies may be observed assuming high inoculum of virus, starting with no treatment or treatment stated not following WHO or NCDS standard guidelines. The cause for long incubation period may be virus in dormant stage for many days and years although the average incubation period in three weeks to three months. During my long practicing period, I have records of two patients whose incubation period for 4 days and are upto 20 years. Thereafter two studies with IDRV (double dose 4 site or day 0 followed by TRC schedule) and single dose I/M ESEN schedule are also discussed and shown in different tables as shown in studies. TRC studies are also safe as well as immunogenic. In Zagreb followed by ESSEN schedule, the day 14 dose is not skipped. Which possibly worked as repeated boosters in IDRV and ZAGREB converted to ESSEN has given a better antibody protection when double dose on day 0 has played an important role. In IDRV day 14 dose has not given as a rule, may be a cause for a slightly less antibody tire on day 28 than double dose Zagreb followed by ESSEN. IDRV cannot be administered in immune compromised patients. It should be kept in mind that day 14 and day 28 doses almost act as booster dose. That is boosting up the memory cells, hence elevating the antibody response.

In case of ESSEN schedule the cases treated and followed strictly as per WHO guidelines where 100% sero protection achieved after two weeks of time. Stress to be given on wound toilet, proper RIG administration and proper vaccination over the deltoid or antero lateral aspect of thigh or may be followed IDRV regimen keeping day 14 for another dose. The results are clearly shown in the table 8.

In humans distribution of antigen affords higher antigenic load. In case of chronic kidney disease awaiting for renal renal transplant in some cases the standard recommendation is double dose vaccination with hepatitis B vaccine used for prophylaxis (double dose).

Conclusion and Recommendation

Rabies is a vaccine preventable disease caused by bites, scratches and licks of warm blooded animal which can transmit the disease. The treatment aims followed wound toilet to reduce peripheral viral load, prompt infiltration of rabies immunoglobulin followed by full course of vaccination is the standard procedures.

This conducted study shows the initial double dose vaccination has played an important role to keep higher antibody response. Time is the most precious gift of god. Time to be spent to address the preventive aspect which is the vital most part of the disease management. No time delay or be wasted in the post exposure management of the disease. The treatment protocol is to be very methodical. The ultimate target is to save the life as well as aim for rabies prevention in India are needed to make India Rabies free by 2030. To fulfil it more research work should be carried out which can minimize the death rate, offer wide range of protection and make the earth healthier and better place to live.

On the basis of the findings of the study it is highly recommended that in case of severe wound bite cases the double dose vaccination on day 0 followed by ESSEN schedule as it shows better antibody response in managing the disease alongwith meticulous Rabies Immunoglobulin administration following classical wound toilet.

As dog bites are most common in India, regular dog bites surveillance is necessary to control the risk factors associated with it. To achieve this national dog bite reporting and database system must be maintained at every appropriate centre for assessing the impact.

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