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Original Article

INTRADERMAL RABIES VACCINATION: IMPROVED ECONOMICAL REGIMEN

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ABSTRACT

Rabies is the communicable disease which is 100% fatal. However it is 100% preventable with timely and accurate post exposure prophylaxis. Ahmedabad Municipal Corporation is one of the selected cities in the pilot project on Prevention and Control of Human Rabies 2008–2010 that by National Center for Disease Control (NCDC), New Delhi. One of the objectives of this project is to give Anti-Rabies Vaccine (ARV) by Intra-dermal (ID) route. Present study has been carried out in ARV Clinic of V S General Hospital. Forty randomly selected animal bite cases have selected. Written consent was taken after explaining about the study and serum sample was collected on day 28 from each one of the 40 patients who have received all scheduled doses of Intra-dermal rabies vaccine. Serum samples were sent to NCDC, New Delhi for estimation of antibody titers. Adequate amount of antibodies (i.e.>0.5I.U./ml) were observed in 37(92.7%) samples.

Key words: Animal bite cases, Anti Rabies Vaccine, Intra Dermal Route

INTRODUCTION

Rabies continues to be a major public health problem killing an estimated 20,000 people in India annually.[1] This virtually cent percent fatal disease is nearly hundred percent preventable by timely and appropriate post-exposure prophylaxis (PEP). Based on vaccine utilization approximately 3 million people receive PEP in the country [2] (Table 1).

Table 1: Situation of Human Rabies and estimated vaccine requirement in INDIA[2]

Number of estimated/reported cases of Rabies	Rate (Human cases per 100 000)	Estimated number of persons seeking post-exposure prophylaxis	Requirement of Vaccine (Quantity)	
			IM (5 ml)	ID (1ml)+ Expected wastage(10%)
Approx. 20 000	3	30,00,000	1,50,00,000	33,00,000

Production and use of Nervous Tissue Vaccine has been stopped since December 2004. Modern anti-rabies Cell Culture Vaccines (CCVs) that are being used for PEP are safe and effective. High cost and limited availability are limiting factors for its wider use. To overcome these problems, WHO recommended the use of intra-dermal route of administration of CCVs which not only reduces the cost of post exposure prophylaxis but also allows wider coverage in available quantity of vaccines. Total dose of vaccine required for 5 doses of IM route is 2.5ml while for Intra Dermal route the dose required is only 1ml**.** Under 11th five year plan one pilot project

has been started for on Prevention and Control of Human Rabies 2008–2010 by National Center for Disease Control (NCDC), New Delhi. Ahmedabad Municipal Corporation is one of the selected cities in the pilot project. This project was implemented in the year 2010 in Ahmedabad city and ARV is now given by Intra Dermal route in all teaching hospitals and some other selected hospitals. One of the objectives of this project is to replace Intra Muscular route of Anti rabies vaccine (ARV) by Intra Dermal route. In the present study, antibody titers were estimated after administration of Intradermal anti rabies vaccine. Serum samples were collected on day 28.

METHODOLOGY

This study was carried out in Anti-Rabies Clinic of V S General Hospital, one of the teaching hospitals of Ahmedabad Municipal Corporation. Study was conducted in the ARV Clinic after Intra Dermal route implementation of ARV was started in July 2010. An intra-dermal dose of 0.1 ml of vaccine was given over deltoid region of both arms (0.1ml X 2 arms) on day 0, 3, 7 and 28 (2-2-2-0-2) to all animal bite cases. Prior permission from the ethical committee of our institute was obtained for conducting the study and for collecting the serum samples from the patients. The patients who received Intra Dermal Rabies Vaccine were explained about the disease, its prevention, about the vaccine and purpose of our study. Patients who were ready to give written consent were selected. Data regarding socio-demographic profile of the cases, biting animal, site and category of the bite were taken in a pre-tested and pre-designed proforma. Blood samples were collected on day 28 from 40 patients who had received Intra dermal ARV (0.1ml X 2 sites) on day 0, 3, 7 and 28 (2-2-2-0-2) as per the schedule. Blood samples were collected on day 28. After separating serum, samples were sent to NCDC, New Delhi in proper cold chain for antibody titer estimation. Details regarding number of animal bite cases and vaccine usage were obtained from the Medical record section and Medical store of the hospital.

RESULTS AND DISCUSSION

Number of animal bite cases attending the anti rabies clinic are increasing as shown in figure 1. Reason behind this may be increasing number of dog population and also raised awareness among people regarding rabies and its prevention. Intra-dermal route of vaccination was started from July 2010 in V S General Hospital. Figure 2 shows gradual replacement of Intra Muscular route by Intra-dermal route. Total 34268 vaccine vials were used when vaccine was given by IM route, while 12330 vials were used after the ID route was started. It was observed that cost of vaccines is also reduced as a result (Table 2).

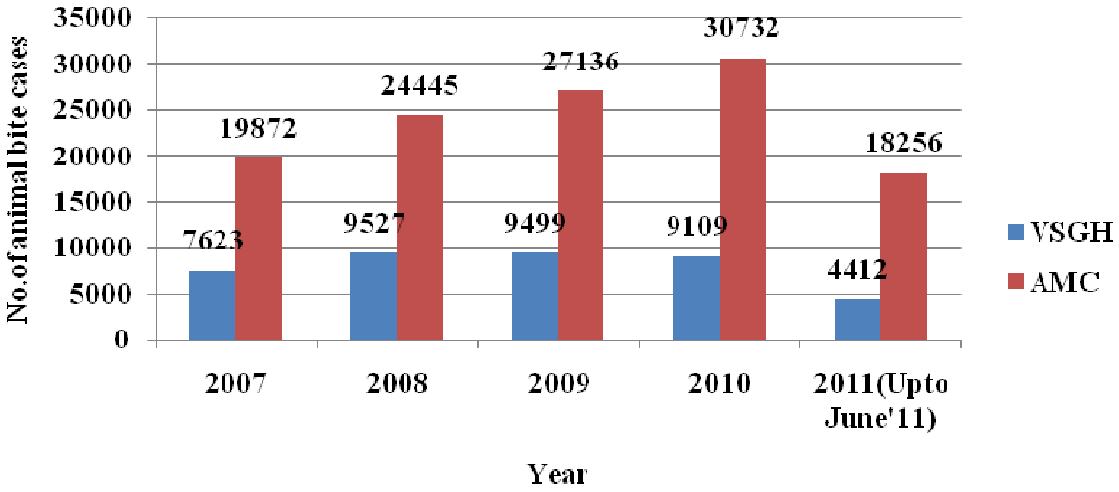

Figure 1: Number of animal bite cases registered in last five years

Table 2: Animal bite cases and vaccine usage before and after starting intra dermal route in VSGH*

	July2009-June2010 (Only IM route)	July2010-June2011 (Mostly ID route)*
Animal bite cases	9543	9029
Vaccine Vial used	34268	12330
Cost of vaccine (Rs.)	1,02,11,864	36,74,340

* Intra dermal route started form July 2010

Table 3 shows profile of animal bite cases. Out of 40 patients, 27(67.5 %) were from 15-49 years of age. Males were involved more as compared to females it could be because of their outdoor activities. 29(75%) patients were having bite of category III while 11(25%) had category II bite. Lower limb was involved in 35(87.5%) patients followed by upper limb in 4(10%) patients.

One patient was having a bite on face. Multiple wounds were found in 12(32.5%) cases. Antibody titers on day 28 showed adequate amount of antibodies in the serum samples of 37(92.7%) vaccinees (Table 4).

No adverse reactions were found in any of these 40 patients. Similar study carried out by Chhabra et al showed that antibody titers were adequately formed in all the serum samples collected after giving Intra-dermal vaccine.[2]

Table 3: Profile of animal bite cases (n=40)

Characteristics	Number	Percentage
Age Group		
<15	9	22.5
15-49	27	67.5
>50	4	10
Sex		
Male	30	75
Female	10	25
Category of bite		
Class II	11	27.5
Class III	29	72.5
Site of bite		
Lower Limb	35	87.5
Upper Limb	4	10
face	1	2.5
Number of wounds		
Single	27	67.5
Multiple	12	32.5

Table 4: Results of Antibody Titre on day 28 of ID route of ARV

Antibody Titre	Number (%)
≥0.5I.U/ml(Adequate)	37(92.7)
<0.5 I.U/ml(Inadequate)	3(7.3)
Total	40(100)

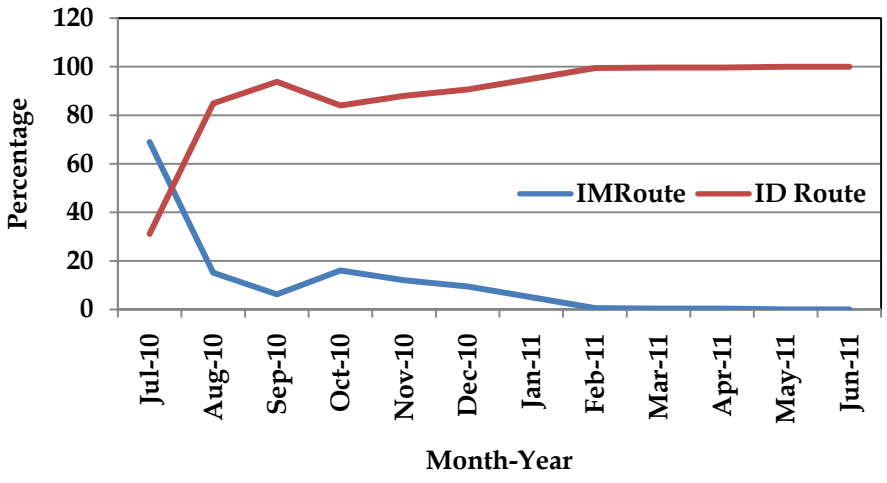

Figure 2: Proportion of Intra Muscular and Intra Dermal route

Results of study carried out by Beran et al indicated that with each 0.1 ml intra dermal dose of PCECV contained antigen corresponding to 0.32 IU per intramuscular dose, every subject had titers above 0.5 IU/mL by day 14.[4] Study carried out by Charanasri et al, in which the antibody responses of 65 volunteers receiving an I.D regimen (0.1 ml given at two different sites on days 0, 3, 7 and 0.1 ml given at one site on days 30 and 90) were compared with a control group of 35 volunteers receiving the standard I.M. regimen. They noted

that by day 14, seroconversion was observed in all vaccinees in both groups.[5] Chutivongse et al carried out a prospective study of 202 pregnant Thai women who received post-exposure treatment for rabies with a tissue culture-derived rabies vaccine and human or equine rabies immune globulin revealed an adverse reaction rate similar to that seen among non pregnant.[6]

CONCLUSION

It is concluded that post-exposure rabies vaccination when administered intra-dermal in 0.1-ml doses using the two-site method ("2,2,2,0,2") is safe and highly immunogenic.

RECOMMENDATION

To start Intra-dermal administration of ARV, adequately trained staff to give ID inoculation of anti-rabies vaccine and maintenance of cold chain for vaccine storage are required.

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