

Original Research Article

Intradermal antirabies vaccination: a cost-effective method

Kiran R. Rohi*

Department of Community Medicine, R.G.M.C. Kalwa, Thane, Maharashtra, India

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***Correspondence:**

Dr. Kiran R. Rohi,

E-mail: kiran.rohi@gmail.com

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ABSTRACT

Background: Compliance to post-exposure vaccination is crucial to achieve optimum level of antibody titers. The present study was planned to assess the cost effectiveness of 4 dose intradermal regimen over 5 dose intramuscular regimen. The objective of present study is to reveal cost effectiveness of intradermal regimen over intramuscular PEP regimen

Methods: Hospital record based study. Patients who attended antirabies clinic from Jan 2010 to Dec 2010 were studied. 2051 patients who were given Inj. PCECV by intradermal route formed the study group. Pearson's Chi square test was used as a test of significance.

Results: 2051 patients were studied. 1741 (84.9%) patients were male. 1907 (92.9%) were dog bites. 1277 (62.3%) were stray dog bites. 1516 (58.0%) were class III dog bites. 1313 (68.2%) were non-observable dog bites. 1711 (88.7%) were provoked dog bites. Most common site of dog bite was over the lower limb i.e. 1350 (70.2%). 1255 (65.3%) patients completed the 4 dose regimen. This is in stark contrast to previous evidence from our centre in which a compliance of 40.2% to the intramuscular regimen was evident. (Pearson $X^2 = 180.94$, $df = 1$, $p < 0.0001$). Cost effectiveness favored intradermal regimen over intramuscular regimen.

Conclusions: It was observed intradermal regimen had more cost effectiveness compared to intramuscular regimen.

Keywords: Antirabies vaccination, Cost effective, Intradermal, Intramuscular

INTRODUCTION

Rabies is a deadly viral infection that is mainly spread by infected animals. Even in the 21st century, rabies remains incurable. Legislation and implementation regarding dog population control through sterilization are not practiced adequately. In this situation, human pre-exposure and post-exposure prophylaxis together with vaccination of domestic animals and wildlife animals are currently the most efficient interventions.¹ Rabies continues to be a major public health problem in our country. Although the actual number is not known, it is estimated that 17 million animal bite cases occur and 20,000 human deaths occur due to rabies each year in India. Based on vaccine utilization, approximately 3 million people receive post-exposure treatment in our country.² Rabies is 100% fatal at the same time 100% preventable if managed

appropriately and timely. Deaths due to rabies can be prevented by appropriate post exposure prophylaxis (PEP) consisting of wound care, administration of immunoglobulin and administration of the complete schedule of rabies vaccine.³

Previously in India, nervous tissue vaccines (NTV) were used mostly. But this was replaced by modern, safe and effective cell culture vaccines (CCVs), as NTV's were causing inherent neuroparalytic side effects. But the high cost of cell culture vaccines administered intramuscularly was the major limiting factor in the fight against the disease.² However, in India, as Semple (sheep brain) vaccine was widely used in Government hospitals till 2004 (till mid 2005 precisely) the shortage of rabies vaccine was not felt. But, now with the stoppage of Semple vaccine and the shortage of modern vaccines (due

to budgeting constraints) is being increasingly felt.¹ To overcome these problems, WHO recommended the use of Intradermal (ID) route of administration of CCVs, which not only reduces the cost of PEP, but also allow wide coverage in available quantity of vaccines.

After considering the recommendations of experts, results of clinical trials and international experience, Drug Controller General of India (DCGI) approved the use of safe, efficacious and feasible ID route of administration of CCVs from February 2006.² In this regimen, only 4 visits are needed to complete vaccination. Day 14 is skipped here as compared to IM regimen. So by this, we are able to reduce the indirect cost involved in terms of man hour cost, travel time and expenses for that visit.⁴ The objective of present study is to investigate cost effectiveness of intradermal regimen over intramuscular regimen of antirabies vaccination.

METHODS

This was a hospital record based cross-sectional study. Patients who attended Anti rabies clinic from January to December 2010 were studied. 2051 patients who were given Anti Rabies Vaccination by intra dermal route formed the study group. For the purpose of comparison, 2007 data of the IM route has been used (n=1075). Statistical analysis is done by Pearson's Chi Square test.

RESULTS

2051 patients were studied. 1741 (84.8%) patients were male and 310 (15.1%) patients were female. 1339 (65.3%) patients completed the 4 dose regimen and 712 (34.7%) patients not completed the 4 dose regimen. This in stark contrast to previous evidence from our centre in which a compliance of 40.2% to the intramuscular regimen was evident.

Compliance was seen more in female patients (68.7%) as compared to male patients (64.7%), but the difference was not statistically significant (p=0.17).

Table 1: Distribution of completion of ID vaccination schedule.

Registered patients	Completed	Not completed
2051	1339(65.3%)	712(34.7%)

Compliance to ID vaccination was observed more in above 80 years age group (71.4%) followed by 41-60 years age group (69%) and 0-20 years age group (64.6%), though the difference was not statistically significant (p=0.41).

It was observed that compliance was observed more in intradermal (65.3%) vaccination schedule as compared to intramuscular (40.2%) vaccination schedule with very highly significant statistical difference.

Table 2: Comparison of compliance ID Vs IM vaccination schedule.

Schedule	Completed	Not completed
ID	1339(65.3%)	712(34.7%)
IM	432(40.2%)	643(59.8%)

$\chi^2 = 180.94$, $df = 1$, $p = <0.0001$ (VHS), OR (95% CI) = 2.80 (2.40-3.27).

Table 3: Number of vaccine vials used and its cost for IDRV.

	Vials	Cost (Rs.)
ID	1756	3,85,301.52/-
IM	8365*	18,35,448.3/-
Difference in cost		14,50,146.78/-

*Estimated number of vials

It was observed that, intra dermal regimen accounted for a saving of approximately Rs.14,50,146.78/- for the Hospital authorities in the year 2010.

DISCUSSION

Compliance to post-exposure vaccination is crucial to achieve optimum level of antibody titers. Present study was planned to assess the compliance and cost effectiveness of 4 dose intradermal regimen over 5 dose intramuscular regimen.

The compliance to the ID regimen was found to be 65.3%, this is in stark contrast to previous evidence from our centre in which a compliance of 40.2% to the intramuscular regimen was evident (p<0.0001). Increased compliance to post-exposure vaccination may be due to the fewer number of visits to Anti-Rabies Clinic in case of ID regimen as compared to IM regimen. Intra dermal regimen accounted for a saving of Rs.14,50,146.78/- for the Hospital authorities in the year 2010. Enhanced compliance to the ID regimen is also evident.

Asma Rahim et al highlighted that, the economic advantages of using ID regimen. In case of PVRV, they could be saved, about Rs 10 lakhs for 2006, 2007 and Rs. 20 lakhs for 2008 per year if ID route of administration had been followed.⁴

CONCLUSION

Increased compliance to post-exposure vaccination in case of ID regimen as compared to IM regimen. Intradermal regimen also reduces the number of vaccine vials used. Hence intradermal regimen is more cost beneficial than intramuscular (Essen) regimen.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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