

Original Research Article

Economical way to decrease financial burden: anti rabies vaccines by intra dermal administration in developing countries

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ABSTRACT

Background: To prevent deaths due to rabies only remedy available is post exposure prophylaxis. The major constraint is affordability to anti-rabies vaccine for intramuscular administration or intra dermal administration as PEP. So, intra dermal anti rabies vaccination (IDRV) as recommended by WHO in developing countries like India, reduces the quantity and cost of vaccination, although in most of the health facilities still intra muscular anti rabies vaccination is preferred. Objective of our study is to assess the cost benefit of intra dermal anti rabies vaccination and to find out the demographic profile of patients attending ARV clinic.

Methods: It is a hospital record-based study done after ethical committee approval, carried out in a tertiary health care facility, Hamidia hospital, Bhopal (M.P.), India.

Results: Our study includes 4818 entries of dog bite cases in whom vaccination cost is found to be approximately Rs. 3,90,420 with Intra dermal administration and it reduces vaccine cost by 60-70% compared with mostly preferred intramuscular vaccination. Among them 31.47% were below 14 years of age and majority 75% were male. Category III bite cases are most common 83.6% and commonest site of dog bite was over the lower limb 68.73%.

Conclusions: Intra dermal regimen is more cost beneficial compared to intra muscular regimen, which is thus more helpful to reduce financial burden in developing countries like India.

Keywords: Rabies, Anti-rabies vaccination, Intra dermal administration

INTRODUCTION

Rabies is acute, viral disease of CNS. In India, it is still an important problem affecting public health, though it is not a disease of high priority.¹ It is 100% fatal at the same time 100% preventable if managed appropriately and timely.¹ Primarily a zoonotic disease of warm-blooded animals particularly carnivores (dogs, wild cats, jackal, wolves etc.).² It is transmitted to humans by the bite, lick or scratch of an infected animal.² Here to prevent deaths due to rabies only remedy available is post exposure prophylaxis.³ In India every year approximately 17 million animal bite cases occur and 20,000 human deaths occur due to rabies. Based on vaccine utilization,

approximately 3 million people receive post-exposure treatment in our country.⁴

As higher cost of i/m administration of CCV is a limiting factor for its wider use. So, in February 2006, as per WHO recommendations drug controller general of India (DCGI) approved the use of safe, efficacious and economical intra-dermal (ID) route of inoculation of CCVs.⁵ India needs a cost-effective and sustainable programme for furnishing post exposure prophylaxis. Aim of the study is to assess the cost benefit of intra dermal anti rabies vaccination and to find out the demographic profile of patients attending ARV clinic.

METHODS

It is a hospital record-based study. At first, we took approval from ethics committee. Study participants were dog bite cases who attended anti rabies clinic (ARV) in Hamidia hospital, Bhopal (M.P.), India from July to December 2017. We took all entries of dog bite cases from ARV clinic register from July to December 2017. We entered those entries in MS excel which includes age, sex, category of bite, site of bite, doses of intra dermal anti rabies vaccination. We found the price of vaccines from drug store of Hamidia hospital. It took approximately 3 months (September to November 2018) to collect whole data, which is then entered in MS excel is analysed by Epi-Info7 and results were obtained.

RESULTS

4818 entries of dog bite cases who were given Inj. PVCCRV (purified vero cell culture rabies vaccine Abhayrab) by intradermal route are noted and analysed.

Table 1, shows that for One dose of intra dermal administration of injection Abhayrab consists of 0.2 ml and for Intra muscular administration it is 0.5 ml. 2892 vials were used for intra dermal vaccination in 4818 cases. If same number of cases were given intra muscular vaccination, 5782 vaccine vials would be used, and this

only accounts for 4 doses of intra muscular vaccination (however, 5 doses of intramuscular vaccination are recommended which will obviously increase the vials consumption). Cost of vaccination is found to be approximately Rs. 3,90,420 with intra dermal administration (which will be approximately Rs 7,80,570 with intra muscular administration) in study subjects. (Table 1).

Out of all subjects majority of them were below 14 years of age 31.47% (1516 cases) followed by 15 to 29 years include 30.18% (1454 cases), then 18.24% (569 cases) of 30-44 years age group, then 11.81% (569 cases) of 45-60 years, least 8.3% (400 cases) were of more than 60 years. (Figure 1).

Out of all 4818 victims, 3576 victims (74.22%) were male and rest 1242 (25.77%) were female (Figure 2).

Out of all cases category III bite cases are maximum 83.6% (4028), followed by category III bite 9.92% (478) and lastly were category I bite 6.48% (312).

Among all victims most common site of dog bite was over the lower limb i.e., in 68.73% victims (3305), followed by bite over upper limb 25.10% (1207), then on trunk and abdomen 3.18% (153) and least was on head and neck 2.99% (144).

Table 1: Cost of post exposure prophylaxis in study cases.

Rabies vaccine used	Amount required (ml) per dose	Cost per vial (in Rs.) (govt. purchased)	No. of vials used for 4818 cases (including 10%vvf)	Total cost (in Rs.)
Intra-dermal rabies vaccine	0.2	135	2892	3,90,420
Intra muscular rabies vaccine	0.5	135	5782 (for 4 doses only)	7,80,570

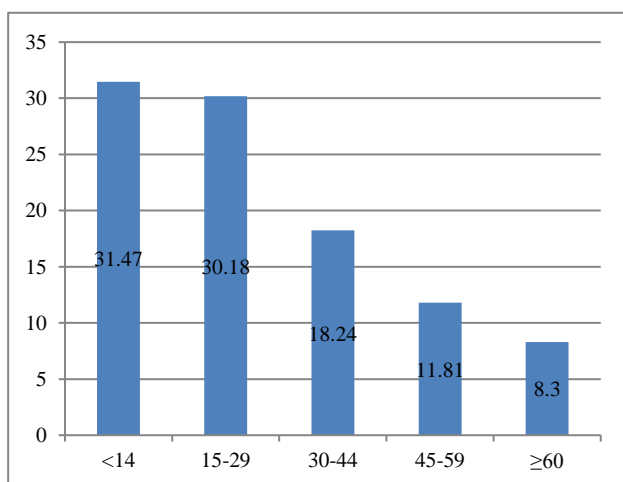


Figure 1: Age group (in years) distribution of dog bite cases (in %) (n=4818).

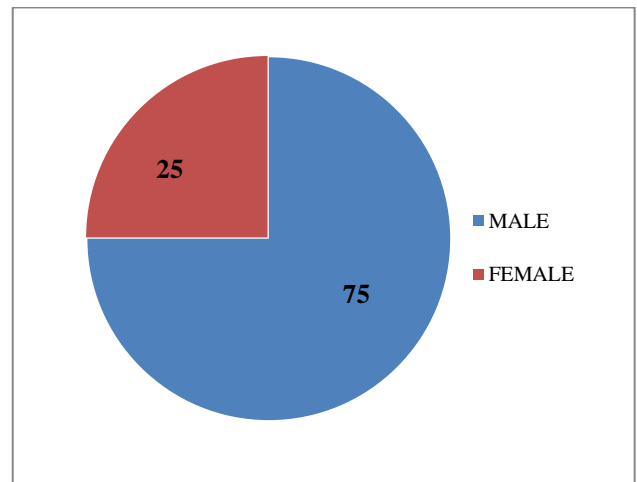


Figure 2: Gender wise distribution of dog bite cases (in %) (n=4818).

DISCUSSION

In our study for 4818 dog bite cases vaccination cost is found to be approximately Rs. 3,90,420 with intra dermal administration which came to be approximately Rs 7,80,570 with intramuscular vaccination and so it reduces vaccine cost by 60-70%. 31.47% cases were below 14 years of age and 83.6% cases were Category III bite and in 68.73% cases bite was over the lower limb. Among victims' males predominate (75%) as they have more exposure risk and higher health seeking behaviour. Intra dermal regimen accounted for a saving of Rs. 3,90,150/- for the hospital authorities in the year 2017 (which is saving of half year only for 4 doses of i/m).

Rahim et al found about 10 lakhs of rupees for 2006, 2007 and 20 lakhs for 2008 could be saved per year if ID route of administration had been followed in their clinic which is similar findings as us regarding cost saving if ID route of administration had been followed.⁶ Dr. Kiran R. Rohi also concluded that Intra dermal regimen accounted for a saving of Rs.14,50,146.78/- for the hospital authorities in the year 2010 if ID route of administration had been followed. 84.8% patients were male and 15.1% patients were female. Findings are similar as us regarding cost saving if ID route of administration had been followed and 75% were males.¹ Harshal et al study demonstrated that the majority (70.4%) were males, similar to ours where 75% were males.³ Mangeshkar et al noticed that the vaccine cost for ID was Rs. 2,80,600. For the intramuscular (IM) assuming 84% compliance vaccine cost was estimated as Rs. 15,64,000. The cost was estimated assuming 40% compliance was Rs. 7,82,230. Thus, a saving of Rs. 5,01,630 to Rs. 12,83,400 was affected which is similar to findings of our study regarding cost saving if ID route of administration had been followed.⁷

Our study clearly demarcates the saving by intra dermal administration vs intra muscular anti rabies vaccination in terms of cost of vaccine vial. Government should try to implement this regimen in all health facilities to cut short the expenditure of vaccination. Major limitation of our study is we had not included the cost of logistic but it will not make much difference as many other studies had shown that including logistic cost also intra dermal administration is far cheaper than intra muscular administration.

CONCLUSION

We can conclude that intra dermal regimen reduces the number of vaccine vials used. Intra dermal regimen are more cost beneficial as compared to intramuscular regimen, which is thus more helpful to reduce financial burden in developing countries like India. India needs a cost-beneficial and sustainable programme for furnishing post exposure prophylaxis.

Recommendations

Intra dermal administration of rabies is no doubt consumes a smaller number of vials therefore accounts for low cost. Besides this it causes less travelling expenditure on behalf of patient and loss of daily wages as they have to visit hospital less often. So, to decrease economical burden, government should implement intra dermal anti rabies vaccination in all possible health facilities and in fact private practitioner should also practice this to maintain homogeneity and universality of vaccination.

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