

Brief article

"Evaluating the reduction in direct costs incurred with intradermal administration of cell culture rabies vaccine in comparison to intramuscular schedule in a tertiary hospital of north Kerala".

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Abstract:

Objectives: 1) To assess the utilization of antirabies vaccine (ARV) for a period of 3 years in the preventive clinic 2) To find out the total cost of ARV used in this period 3) To compare the cost of intramuscular (IM) regimen with intradermal (ID) regimen in terms of cost benefits.

Design: Retrospective study by analysis of Case Records.

Setting: Preventive Clinic of Calicut Medical College. (Tertiary care teaching hospital)

Participants: All cases that have undergone treatment with ARV irrespective of category of bite.

Main outcome measure: To Calculate the cost benefits of ID regimen, if it had been implemented in this tertiary hospital for the past 3 years.

Results: Only 0.8ml of vaccine is needed for each patient resulting in use

of less than 1vial/patient in ID regimen as opposed to 5 vials/patient in IM regime and only 4 visits are needed to complete the vaccination in ID regimen compared to the IM regimen as the visit on Day 14 is skipped. By ID method, we are able to reduce the indirect cost involved in terms of cost of human hours lost, travel time and expenses for hospital visits.

Conclusion: ID route of antirabies vaccine administration may be accepted for its cost effectiveness and cost benefits and this is a good option for our set up, as it significantly reduces the cost of vaccination and also more patients will be able to get modern cell culture vaccines, provided proper training is given to the paramedical staff.

key words: anti-rabies vaccination, intra-dermal route, cell culture vaccine.

Introduction:

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(1).

Rabies is 100% fatal at the same time 100% preventable if managed appropriately and timely. Anti-Rabies treatment is based on local wound care and administration of appropriate Rabies biologicals as Rabies Immunoglobulin and Vaccines.

Indian Scenario:

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 high cost and limited availability are the limiting factors for the wider use of CCVs (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 (1).

Scenario In Kerala:

Intradermal regime has been recently introduced in Kerala and efforts are taken to introduce this technique in a phased manner in anti-rabies Clinics across the State. Calicut Medical College caters to the population of entire North Kerala. The vaccine stocks in Taluk Hospitals, Primary Health Centres and Community Health Centres (CHCs) are not regularly replenished and are inadequate. Patients utilize

the vaccines in our Preventive Clinic as noticed by the high rates of outpatient attendance. Huge expenditure is incurred by the State Government in terms of ARV.

In Kerala, efforts for control of stray animals and licensing of pets are poor. More number of exposures and resultant treatment is the outcome of this situation. There is an urgent need to reduce the expenditure for vaccines by accepting and introducing ID regimen, thereby reducing the expenditure. We undertook a retrospective analysis of case records to calculate the cost benefits of ID regimen, if it had been implemented in this tertiary hospital set up for the past 3 Years.

Objectives

1. To assess the utilization of antirabies vaccine for a period of 3 years in the preventive clinic.
2. To find out the total cost of ARV used in this period.
3. To compare the cost of I.M.regimen with I.D. regimen in terms of cost benefits

Materials and Methods:

Type of study

Retrospective study by analysis of Case Records

Time frame: 3 years (2006 – 2008)

Sample: All cases that have undergone treatment with ARV irrespective of category of bite. In many cases, full treatment may not have been taken from here as this is a referral hospital. After the initial doses, rest of the schedule may be continued from local hospitals.

Methodology

All cases treated with Intramuscular ARV (both partial and complete) for a period of 3 years (2006 – 2008) in the Preventive Clinic of Calicut Medical College were included in the study. Purified vero cell vaccine (PVCV) supplied by the hospital was used which cost about Rs.280/vial in the market. The cost of ARV for 3 years was calculated and compared with Intradermal regimen (**modified thai schedule**) if administered. The benefit in terms of expenditure to the Government was calculated if ID regimen had been used in all these cases.

Results

Table – 1: Utilization and cost incurred for the ARV while using IM regimen

S.No.	Year	ARV used	Cost incurred
1	2006	5566 vials	Rs.15,58,480/-
2	2007	5717 vials	Rs.16,00,760/-
3	2008	10451 vials	Rs.29,26,280/-
	Total	21734 vials	Rs.60,85,520/-

Table – 2: Cost incurred for the ARV if ID regimen had been practiced in the same situation

S.No.	Year	ARV needed for ID (approx)	Cost incurred
1	2006	1785 vials	Rs.4,99,800/-
2	2007	1830 vials	Rs.5,12,400/-
3	2008	3345 vials	Rs.9,36,600/-
	Total	6960 vials	Rs.19,48,800/-

Table - 3 : Comparison between I.M. & ID regimen in terms of cost incurred with Abhayarab (PVRV)

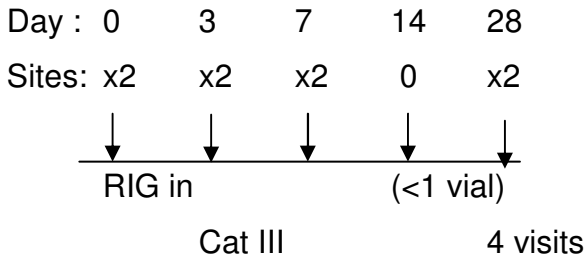
Vaccines	Route	2006	2007	2008	Full course of vaccination ^{n*}
Abhayarab Rs.280/vial	I.M.	Rs.15,58,480/-	Rs.16,00,760/-	Rs.29,26,280/-	Rs.1,400/-
	I.D.	Rs.4,99,800/-	Rs.5,12,400/-	Rs.9,36,600/-	Rs.450/-
Percentage(%) reduction in cost with ID regimen		67.98%	67.99%	67.98%	67.86%

*Full course of vaccination : IM regimen – 5 visits, 5 vials

: ID regimen – 0.2ml x 4 visits (0.8ml) (<1ml)

Intradermal Regimen:

Updated Thai Red Cross Schedule⁽¹⁾ [2-2-2-0-2]



DISCUSSION

Dose: 0.1ml at each site (0.5ml vial)

Site : Deltoid (An inch above the insertion of Deltoid)

This regimen involves injection of 0.1ml of reconstituted vaccine per ID site and on two such ID sites per visit on days 0,3,7 and 28. Day 0 is the day of first dose administration of ID RV and may not be the day of animal bite.

Safety and Efficacy:

The low incidence of side effects and high safety and efficacy of the ID route have been demonstrated. While the antibody titre may be somewhat lower than the IM regimen for longer duration, but it is adequate in terms of protection (the antibody titre is more than the protective value of 0.5 IU/L, recommended by WHO for protection)

Economic – Advantages of ID route:

The economic advantages of using ID regimen is obvious, as theoretically only 0.8ml of vaccine is needed for each patient resulting in use of less than 1vial/patient as opposed to 5 vials/patient that receive PEP using IM route.²

In our Preventive Clinic about rupees **ten lakhs** could have been saved for the years 2006 and 2007 each and rupees **20 lakhs** for the year 2008 if ID route of administration had been used. In this regimen, and only 4 visits are needed to complete vaccination. Day 14 is skipped here as compared to

IM regimen. So by this, we would have been able to reduce the indirect cost involved in terms of human hours, travel time and expenses for that visit. Vaccine shortage is a problem in our clinic and also in most Government hospitals and most of those who turn up for treatment cannot afford to buy the complete schedule of vaccines each dose ranging from Rs.280 to Rs.300. Data from Preventive Clinic shows that patients attending the Clinic and ARV used are increasing year by year adding financial burden for the purchase of ARVs.

To address the issues, where vaccine and money are in short supply, ID route is ideal in terms of economic benefits, safety and efficacy. This reduces the cost of vaccination by about 70-80% and this clearly makes an attractive option for resource-starved countries like ours.⁽²⁾

Issues Involved:

In 1992 itself, WHO had recommended the 2-site ID method for PEP (3). But only in 2006, DCGI approved the use of ID route in India

- Operational problems with intradermal route of administration had to be worked out.
- High amount of technical skill is required for ID administration
- Training for correct technique of vaccine administration is to be highlighted and imparted in this regard.
- In tertiary and peripheral health care systems, trained workers like Health Inspectors, staff nurses may be entrusted with vaccine administration.
- Non-availability of 0.1ml ampoule/vial for ID administration is a cause of concern.
- Good cold chain maintenance should be followed in the clinics.
- Supply of suitable syringes and needles for ID administration had to be taken up.

With commitment and effort, these issues can be worked out thereby setting up an ideal vaccine clinic.

Thailand, Sri Lanka and Philippines had implemented the ID route with success for a long time (1). Now in India, states like Andhra Pradesh, Orissa, Himachal Pradesh, Karnataka, Uttar Pradesh, Tamil Nadu and Uttaranchal and Kerala have implemented this cost-effective ID route of administration.

Conclusion:

To conclude, the ID route of administration may be accepted for its cost effectiveness and cost benefits and this no doubt is a good option for our set up, since it significantly reduces the cost of vaccination and also more patients will be able to get modern cell culture

vaccines, provided proper training is given to the staffs concerned. Recognizing the importance of the ID regime, Kerala Government has introduced IDRv in all the Government Medical colleges and selected government institutions.

References:

1. National Guidelines for Rabies Prophylaxis and Intradermal Administration of Cell Culture Rabies Vaccines, NICD, 2007.
2. Chhabra M, Ichhpunjamin RC, Bhardwaj M, Tiwari KN, Panda RC, Lal S. Safety & immunogenicity of the intradermal Thai red cross (2-2-2-0-1-1) post exposure vaccination regimen in Indian population using purified Chick embryo cell Rabies vaccine. Indian J Med Microbiology 2005; 23: 24-8.
3. 8th Report of WHO-Expert committee on Rabies, Geneva, WHO, 1992; 24-25 (WHO TRS, No.824).

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