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Title Intradermal (ID) Injection For Rabies Vaccine: Post-Exposure (PEP) And Pre-Exposure (PrEP) Prophylaxis & Economic Evaluation

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http://www.moh.gov.my/index.php/database_stores/store_view_page/30/330

Aim

To assess and compare the safety, efficacy / effectiveness, cost-effectiveness and organizational issue of intradermal (ID) and intramuscular (IM) rabies vaccine for PEP and PrEP.

Conclusions and results

The included studies consisted of three SRs and meta-analysis, one SR and network meta-analysis, one SR, five pre- and post- intervention studies, one non-RCT and one cost analysis study.

Effectiveness

Pre-Exposure Prophylaxis (PrEP)

- Both routes (ID and IM of rabies vaccine) achieved above the desired level of seroconversion rate (SCR) and the Rabies Virus Neutralizing Antibodies Geometric Mean Concentrations (RVNA GMTs) including after booster dose. However, the RVNA GMTs in IM route was significantly higher than ID route
- At different schedule and regimes, more patients with 2ID regime achieved GMT level ≥ 0.5 IU/ml and ≥ 10 IU/ml after one- or three-years primary vaccination schedules compared to 3ID regimes. On the other hand, 4-site/1-week schedule and standard regimen of Thailand Red Cross (TRC) (2-site/TRC) schedule achieved the same adequate RVNA GMT level of ≥ 0.5 IU/ml. However, the immune response at day 365 was higher in 4-site/1-week regimen than 2-site/ Thai Red Cross (TRC) regimen

Post Exposure Prophylaxis (PEP) Rabies Vaccination

- After primary and booster vaccination of PEP, both routes either IM or ID achieved seroconversion rates and the RVNA GMT level of ≥0.5 IU/ml. Both levels were higher in IM route compared to ID route

Safety & Cost/Cost-Effectiveness Analysis

- Compared with IM route; erythema, induration and lymphadenopathy were reported more frequently in ID route. Among paediatrics patients, more local irritations were reported at ID injection sites such as local erythema, induration, pain and itching. Others AEs were myalgia and fevers
- No cost-effectiveness analysis retrieved

Organizational

Ministry of Health Malaysia has come out with Interim Guideline for Human Rabies Prevention and Control in Malaysia while Sarawak state had developed Sarawak Plan of Action for Rabies Elimination by 2020.

Part B (Cost Analysis)

Five scenarios were constructed: Scenario 1 was a base-case (data provided based on a current practiced) and Scenario 2 to Scenario 5 referred to several situations which probably might applied during practice. Those scenarios are; Scenario 2 (50% of vaccinated persons will receive IM and another 50% will receive ID route of rabies vaccine), Scenario 3 (all vaccinated persons receive ID route Rabies vaccine), Scenario 4 (all vaccinated persons receive IM route of rabies vaccine) and Scenario 5 (one vial of rabies vaccine was maximised for two persons). Listed below were the cost saving (percentage difference) among various scenarios compared.

i) *Scenario 1 versus Scenario 2*: Scenario 2 reduced 4.07% of total rabies vaccination cost per year
ii) *Scenario 1 versus Scenario 5*: Scenario 5 reduced 32.94% of total rabies vaccination cost per year
iii) *Scenario 2 versus Scenario 4*: Scenario 2 saved 14.29% than Scenario 4
iv) *Scenario 3 versus Scenario 4*: Total cost saving of rabies vaccination was more in Scenario 3 (25%)
v) *Scenario 4 versus Scenario 5*: Optimum used of rabies vaccine per vial with ID route saved about 38.83% compared to only IM route (Scenario 4)

CONCLUSION

Based on the CMA, ID route of rabies vaccine either for PEP or PrEP was cost-saving compared to IM route. The optimum used of ID routes of rabies vaccine (Scenario 5) will save more compared to the base case especially during outbreak with a cost saving of approximately 32.94%.

Recommendations

Based on the above review, rabies vaccine administration through intradermal route is recommended during outbreak and prophylaxis as it may reduce the cost approximately at 32.94%. However, the intradermal technique requires prior training.

Methods

Part A

Electronic databases were searched through Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1948 to present, EBM Reviews-Cochrane Database of Systematic review, EBM Reviews-Cochrane Methodology Register of Controlled Trials, EBM Reviews-

Health Technology Assessment, EBM Reviews-NHS Economic Evaluation Database, and Embase 1996 to 10 January 2019. Searches were also run in PubMed, FDA website and International Network of Agencies for HTA (INAHTA) for any published reports.

No limit in the study year. Google and Google Scholar were also used to search for additional web-based materials and information about the technology. Besides, additional articles were also search by reviewing the references of retrieval articles.

Part B

Cost-minimization analysis (CMA) was conducted from the healthcare system perspective. The CMA of comparing an intradermal route of rabies vaccine against intramuscular route was performed. The model was a direct calculation which was developed based on available local data and was created in a spreadsheet (Excel 2010, Microsoft Corporation). The model provides the Disease Control Division an opportunity to include their own direct costs and reimbursements amounts from any specific payer to arrive at real-time values.

Further research/reviews required

Further assessment on the safety and effectiveness as well as cost-effectiveness of intradermal rabies vaccine is still required.

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