

IMPACT OF MEASLES POST-EXPOSURE PROPHYLAXIS IN PREVENTING NOSOCOMIAL TRANSMISSION IN A PEDIATRIC HOSPITAL

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BACKGROUND

Measles is an acute and potentially severe infection especially in young infants. It is a highly contagious disease capable of transmission via aerosolization as well as direct contact with the nasal or throat secretions of an infected person [1].

Measles vaccination has been compulsory in Singapore since 1985 under the National Childhood Immunization Programme. Currently, the first dose is given at 12 months of age and the second dose at 15 to 18 months of age [2]. The national vaccination coverage for the MMR vaccine has been consistently around 95% for the first dose and 88% for the second [2].

Nosocomial outbreaks have been documented [3]. Pediatric hospitals are particularly at risk due to the high numbers of susceptible patients such as infants <12 months old or with immunocompromised status. Effective strategies to control nosocomial measles transmission will be critical for successful measles elimination [4,5].

KKH is the largest pediatric hospital in Singapore. Here, we review the impact of our hospital's approach for post-exposure prophylaxis (PEP) against measles.

METHODOLOGY

In May 2016, we implemented measles post-exposure prophylaxis (PEP) – i.e. measles, mumps, and rubella (MMR) vaccine or Human Normal Immunoglobulin (HNIG) for close contacts. Risk stratification was in accordance to their age, days post-exposure and immunity status (i.e. Measles immunoglobulin G (IgG) or MMR vaccination history).

MMR vaccination was recommended for susceptible infants \geq 6 months old and \leq 3 days post-exposure. If not eligible for MMR vaccination, susceptible patients would be given HNIG.

We extracted details of all measles intra-hospital exposure events in our pediatric hospital in April 2016 to December 2016. For this analysis, we only included close contacts who were defined as patients within the same cubicle as the measles index case for any duration prior to the index case isolation. All close contacts were followed up with a telephone call to check if they developed fever or rash after the incubation period. Details of events pre- versus post-PEP implementation were analysed.

RESULTS

Prior to PEP implementation, there were 2 exposure events resulting in 8 close contacts, of which 7 (87.5%) had no MMR vaccination and one had received a single dose. Measles IgG testing was not done in these patients. At follow-up, two (25%) developed confirmed measles approximately 2 weeks post-exposure. They were 14 and 19 months old with no history of MMR vaccination.

RESULTS

Post-PEP implementation, there were 4 exposure events resulting in 14 close contacts, of which all had no MMR vaccination. Of these 14 patients, only 12⁺ (85.7%) were tested for measles IgG status. Of these 12 patients, 5 (41.7%) were positive for measles serology. Measles PEP was given to 8 patients (57.1%), where 7 received HNIG and 1 had MMR vaccination.

At follow up, 2 of the 14 close contacts reported fever during the incubation period but none developed measles. One was already known to be measles serology positive and the second who was given HNIG PEP was diagnosed with unresolved Respiratory Syncytial Virus infection.

Details	Pre-PEP	Post-PEP
Exposure events	2	4
Exposed patients	8	14
Age in months*	23 (20 - 62)	6 (3 - 10)
Sex (male, %)	4 (50.0)	4 (28.6)
Duration of exposure (hours)*	23 (14 - 36)	27 (14 - 34)
Immunity Status [^]		
No MMR vaccination	7 (87.5)	14 (100.0)
MMR Vaccine: 1 dose	1 (12.5)	0 (0.0)
Immunity Status by Measles IgG [^]	NIL	12 ⁺ (85.7)
IgG Positive	-	5 (41.7)
IgG Negative	-	7 (58.3)
Post Exposure IVIG given within 5 days [^]	0 (0.0)	7 (50.0)
Post Exposure MMR vaccination [^]	0 (0.0)	1 (7.1)
Presented with measles within incubation period [^]	2 (25.0) [#]	0

*(median, IQR) [^] (n, %)

[#]2 cases without Measles IgG testing: (1) 3 year old child received MMR vaccination within incubation period. (2) 4 month old child who turned down testing. Both were asymptomatic at the end of the incubation period.

CONCLUSION

Our analysis found that providing PEP for susceptible contacts within the same cubicle of an index measles case was highly effective in a pediatric hospital. The findings support current recommendations for timely administration of PEP following exposure to measles as a control measure against nosocomial measles transmission.

REFERENCES

1. Manual for the surveillance of vaccine-preventable diseases (4th Edition, 2008). Atlanta, Centers for Disease Control and Prevention (CDC), 2008 (<https://www.cdc.gov/vaccines/pubs/surv-manual/chpt07-measles.html>, accessed 4 July 2018).
2. Childhood Immunization. Ministry of Health, Singapore, 2017. https://www.moh.gov.sg/content/dam/moh_web/Publications/Reports/2017/Childhood%20Immunisation.pdf, accessed 4 July 2018.
3. Botelho-Nevers E, Gautret P, Biellik R, Brouqui P. Nosocomial transmission of measles: an updated review. *Vaccine*. 2012 Jun 8;30(27):3996-4001
4. Gohil SK, Okubo S, Klish S, Dickey L, Huang SS, Zahn M. Healthcare Workers and Post-Elimination Era Measles: Lessons on Acquisition and Exposure Prevention. *Clin Infect Dis*. 2016 Jan 15;62(2):166-172
5. Bond K, Martin-Gall V, Franklin L, Sutton B. A risk stratification approach to assessing for true cases of measles in a highly vaccinated population. *Aust N Z J Public Health*. 2016 Aug;40(4):371-6