

BRIEF COMMUNICATION

Absence of rotavirus in the neonatal special care nursery of a Malaysian maternity hospital

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Abstract

The pattern of rotavirus infection in babies of the neonatal special care nursery (SCN) of the Kuala Lumpur Maternity Hospital was studied. The presence of rotavirus in the neonates' stools was ascertained using the method of polyacrylamide gel electrophoresis and silver staining. No rotavirus was detected in the 511 stools and rectal swabs collected from the 164 neonates over a 8-week period. Thus the babies admitted to the SCN from the labour rooms and the postnatal wards of the hospital were unlikely to be carriers of rotavirus or infected by rotavirus during their stay. It was concluded that rotavirus was not endemic in the nursery or the postnatal wards of this maternity hospital.

Key words: rotavirus, neonatal special care nursery

In Malaysia, previous studies on human rotavirus were focused on postneonatal children¹⁻⁴ as rotavirus-associated diarrhoea is most prevalent in this age group.⁵ In view of the high incidence of neonatal rotavirus infections in the nurseries of maternity hospitals in other countries,⁶⁻¹⁴ the pattern of neonatal rotavirus infections in the neonatal special care nursery (SCN) of the Kuala Lumpur Maternity Hospital was investigated.

This study involved 164 babies from a total of 201 neonates admitted to the SCN from the postnatal wards and delivery rooms of the Kuala Lumpur Maternity Hospital for a variety of medical conditions during a 8-week period from 17 January to 18 March 1993. The period of their stay in the SCN ranged from 1 to 19 days [mean, 5.6 days]. None of the babies developed diarrhoea during this period. In the study design a stool sample or rectal swab was to be collected from each baby on admission and then daily for the duration of their stay in the nursery. However, this was not always achieved and most first samples were collected the next day after admission which corresponded to the second day after birth. The number of babies from whom stools or rectal swabs were collected at different periods of their stay in the neonatal special care ward is shown in Table 1. Complete daily sequential collection of specimens of 2 to 4 days duration was achieved for 46 babies. In another 28 babies, the sequential specimen collection of 2 to 7 days duration was incomplete by a day. A

total of 347 stools and 164 rectal swabs was tested for rotavirus by polyacrylamide gel electrophoresis (PAGE) as previously described. In the event that both stool and rectal swab were collected on a particular day from a child, only the stool specimen was tested.

No rotavirus was detected in all the 511 samples tested. In such a situation 3 probable causes have to be considered: rotavirus was present but not detected due to problems associated with the virus detection method used, rotavirus was present but not detected due to problems in sample collection and finally,

TABLE 1: Number of babies at different durations of stay in the special care nursery from whom single faecal sample or rectal swab was collected

Faecal sample/rectal swab collection from babies	
Duration of babies' stay in the nursery [day]	No. of babies involved
1	67 [13%]
2	137 [27%]
3	95 [18%]
4	52 [10%]
5	50 [10%]
6	44 [9%]
7	24 [5%]
>7 – 19	42 [8%]

rotavirus was truly absent in all samples.

The non-detection of rotavirus from the neonates in this study is unlikely to be due to problems in the detection method employed because each run of PAGE included a positive rotavirus control which was detected on every occasion and the reagents for rotaviral RNA extraction were determined to be working properly when tested on known rotavirus-positive stool samples. The lower limit of rotavirus detection using PAGE was unlikely to be a major contributing factor for the negative result as studies which used PAGE were able to detect high incidence of asymptomatic neonatal rotavirus infection.^{11,12}

The second hypothesis is that rotavirus infection did occur but was not detected due to problems in sample collection: the types of samples collected contained insufficient virus for detection, samples were not collected on days of virus excretion, samples with virus were inadvertently missed as infected babies were discharged before virus excretion commenced or virus shedding was extremely brief.

The type of samples collected is unlikely to be the cause of the negative results as the majority were stool specimens and not rectal swabs. Although the latter [about one third of the specimens collected] may have contained less virus, high detection rate of rotavirus [50%] from rectal swab taken from asymptomatic babies has been reported.¹²

The possibility that rotavirus infections were missed because all rotavirus-infected babies were discharged from the SCN before virus excretion commenced is unlikely as 60 percent of the samples tested were from babies who were hospitalized for 3 days or more. Virus excretion would have been detected from at least a proportion of these babies-if they were infected-because the virus has a short incubation period. Rotavirus was detected in 1 to 2 days old babies¹⁵ and results from previous studies showed that by day 3 of life as high as 50% to 70% of neonates were already infected.^{9,11,12}

While every attempt was made to collect daily faecal samples from all babies during their stay in this unit, it was not always successful. As a result, if virus excretion had occurred only on days faecal samples were not collected it would not have been detected. Furthermore, the duration of rotavirus excretion in neonates can be as brief as 1 day^{16,17} and if such a situation had occurred in this study virus excretion might have eluded detection if it commenced *after* sample collection and continued no further than the subsequent day

where no sample was collected. Although virus excreted under these 2 situations would not be detected, the scenario that rotavirus infections were missed because all virus excretions took place only on days samples were not collected is improbable.

Based on the exclusion of these reasons it was concluded that the most likely reason rotavirus was not detected in these babies is because it was absent or not endemic in this study area although it should be mentioned that any virus shedding that might have occurred on days samples were not collected would have been missed.

In contrast to numerous reports of asymptomatic rotavirus infections in maternity hospitals,⁶⁻¹⁵ there has been no report to the contrary. Perhaps negative results were not reported. The reason for the absence of rotavirus in the Kuala Lumpur Maternity Hospital is not known but cannot be attributed to seasonal variation as rotavirus has been detected throughout the year in this country.¹ A feature of this maternity hospital is the extremely short stay of both mothers and babies [without complication] in the postnatal wards of this hospital. Following births, mothers and babies are hospitalized for between 6 to 12 hours. It is not known whether these exceedingly brief sojourns is a factor in the absence of rotavirus from the postnatal wards or special care nursery of this hospital.

ACKNOWLEDGEMENTS

We thank the nursing staff, particularly Staff Nurse C.Y. Chor, for their help during this study. This project was funded by research grant BU6 from the Malaysian Government Ministry of Science, Technology and the Environment.

REFERENCES

1. Yap KL, Dahlan S, Paranjothy AM. Human rotavirus infection in Malaysia. I. A hospital-based study of rotavirus in children with acute gastroenteritis. *J Trop Paed* 1984; 30: 131-5.
2. Rasool N, Othman RY, Adenan MI, Hamzah M. Temporal variation of Malaysian rotavirus electropherotypes. *J Clin Microbiol* 1989; 27: 785-7.
3. Yap KL, Wong YH, Khor CM, Ooi YE. Rotavirus electropherotypes in Malaysian children. *Can J Microbiol* 1992; 38: 996-9.
4. Yap KL, Yasmin Malek, Wong YH *et al*. A one-year community-based study on the incidence of diarrhoea and rotavirus infection in urban and suburban Malaysian children. *Med J Malaysia* 1992; 47: 303-8.
5. Kapikian AZ, Chanock RM. Rotaviruses. In: Fields

- N, ed. Virology. New York: Raven Press, 1985: 863-906.
6. Rodriquez WJ, Kim HW, Brandt CD, Fletcher AB, Parrott RH. Rotavirus :A cause of nonsocomial infection in the nursery. *J Pediatr* 1982; 101: 274-7.
 7. Totterdell BM, Chrystie IL, Banatvala JE. Rotavirus infections in a maternity unit. *Arch Dis Child* 1976; 51: 924-8
 8. Valmari P, Pontynen S, Sunila R. Rotavirus infection in a neonatal unit. *Ann Clin Res* 1984; 16: 167-70.
 9. Grillner L, Broberger U, Chrystie I, Ransjo U. Rotavirus infections in newborns:an epidemiological and clinical study. *Scand J Infect Dis* 1985; 17: 349-55.
 10. Steele AD, Steinhardt LS, Alexander JJ. Viruses excreted in neonatal stools. *S Afr Med J* 1987; 72: 198-200.
 11. Jayashree S, Bhan MK, Raj P *et al* Neonatal rotavirus infection and its relation to cord blood antibodies. *Scand J Infect Dis* 1988; 20: 249-53.
 12. Huq MI, Al-Ghamdi MA, Sibaii MSE, Al-Harfi R. Incidence of asymptomatic rotavirus infection in neonates in nursery of a children hospital in Damman, Saudi Arabia. *E Afr Med J* 1988; 65: 478-82.
 13. Zbinden R, Kunz J, Schaad UB, Scilt U, Slongo R. Incidence and diagnosis of rotavirus infection in neonates: results of two studies. *J Perint Med* 1990; 18: 363-8.
 14. Tietzova J, Sefcovicova L, Barova M. 1990. Occurrence of rotavirus RNA electropherotypes in the pediatric population in Slovakia. *Cesk Epidemiol Mikrobiol Imunol* 1990; 39(5): 280-7.
 15. Murphy AM, Albrey MB, Crewe EG. Rotavirus infections of neonates. *Lancet* 1977; 2: 1149-50.
 16. Cameron DJS, Bishop RF, Davidson, GP, Townley, RRW, Holmes IH, Ruck BJ. New virus associated with diarrhoea in neonates. *Med J Aust* 1976; 1: 85-6.
 17. Cameron DJS, Bishop RF, Veenstra AA, Bames GL, Holmes IH, Ruck BJ. Pattern of shedding of 2 non-cultivable viruses in stools of newborn babies. *Lancet* 1978; 2: 7-13.