

Most human cases have been reported from North America, Scandinavia, Russia, Japan, and the continent of Europe. In Eastern France and Germany there is a zone where human infections have been recognised<sup>3</sup> but cases have not been reported before from the French Pyrenees, though infected rodents and hares have been found near Bordeaux.<sup>4</sup> Our patient's illness thus extends the known geographical distribution of tularaemia, and we report the case as an example of the importation of the disease to Britain.

<sup>1</sup> Ledingham, J C G, and Fraser, F R, *Quarterly Journal of Medicine*, 1923-4, 17, 365.

<sup>2</sup> Blomley, D J, and Pearson, A D, *British Medical Journal*, 1972, 4, 235.

<sup>3</sup> Juszat, H J, in *Welt-Seuchen Atlas Pt I*, ed E Roderwaldt, p 31. Hamburg, Falk-Verlag, 1952.

<sup>4</sup> Juszat, H J, in *Welt-Seuchen Atlas Pt II*, ed E Roderwaldt, p 37. Hamburg, Falk-Verlag, 1954.

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## Antibody response of infants in tropics to five doses of oral polio vaccine

Three doses of oral polio vaccine (OPV), as currently recommended, are not sufficient for effective immunisation of infants in tropical countries owing to poor seroconversion rates.<sup>1,2</sup> Consequently paralytic poliomyelitis does occur in vaccinated populations.<sup>3</sup> The seroconversion rates of infants to five doses of OPV are reported here.

### Subjects, methods, and results

All infants were aged between 6 and 51 weeks when the first dose of OPV was given, by methods described elsewhere.<sup>4</sup> During the course of investigations the titre of OPV was repeatedly checked and found unchanged from the recommended levels.<sup>4</sup> The interval between doses was four weeks except in a few children in whom it was five or six weeks. Blood was collected from vaccinees immediately before giving the first dose of OPV, and again four weeks after the third dose, when a fourth dose was given. A third sample of blood was collected four weeks after the fifth dose. All sera were tested for the presence and titre of neutralising antibodies at a starting dilution of 1/8, against 100-300 TCID<sub>50</sub> of poliovirus types 1, 2, and 3.<sup>4</sup>

A total of 78 infants were studied. Sera taken from 55 infants after the third dose of OPV were promptly tested along with their prevaccination sera. Thirty-three infants (60%) who had already seroconverted to the three types of poliovirus, and had received a fourth dose, were not given a fifth dose as no further seroconversions were to be gained in them. The remaining 45 infants were given a fifth dose, and four weeks later 21 were found to have seroconverted to all three types. Sixteen had seroconverted to two types only, and six to one type; two infants remained seronegative to three types.

Since the assessment of seroresponse to five doses of OPV would be biased if only the 45 infants were included and the 33 excluded from analysis, all infants are considered together. Among the total of 78 infants studied, 76 (97%) responded to one or more serotypes and 54 (69%) responded to all three serotypes. The type-specific seroconversion rates are shown in the table.

### Discussion

Seroresponses of infants and children to one and two doses of OPV, and of infants to three doses, have been described from this laboratory,<sup>2,4</sup> using similar methods (see table). Obviously there is progressive increase in the seroresponse of vaccinees after each additional dose of OPV after the first. Such a poor seroresponse in the population is due to resistance to vaccine virus "take."<sup>5</sup> These results indicate that this resistance is not absolute, but could be overcome, in the

### Seroresponses of infants and children to one, two, three, and five doses of trivalent OPV

No of doses of OPV	Seroconversion rate (%)			Reference No
	Type 1	Type 2	Type 3	
One	19	61	30	(2)
Two	35	78	48	(2)
Three	69	90	76	(4)
Five	83	96	82	

majority, by repeated doses. Thus five doses are proportionately better than three doses. Some infants remained seronegative to one or more serotypes of poliovirus in spite of receiving five doses of OPV, including two who remained seronegative to all three types of poliovirus. These two had no evidence of immunodeficiency and were clinically normal. They illustrate that the refractoriness to infection and seroresponse may at times be profound and persistent.

On the basis of these results we recommend that the primary course of immunisation for infants in developing countries, especially in the tropics, should consist of at least five doses of OPV given at intervals of four weeks or more.

This investigation was supported by the Indian Council of Medical Research. Help from Ms P Vijayarathnam, I Suresh, and R Elangoven; Dr M Jadhav, Dr L V Devarajan, and Dr L Luther (Vellore); and Dr C W Cockburn (WHO) and Dr John Beale (Wellcome Foundation) is gratefully acknowledged. This study was included in a doctoral thesis submitted to the University of Madras.

<sup>1</sup> Drozdov, S G, and Cockburn, W C, in *Proceedings of the First International Conference on Vaccines against Viral and Rickettsial Diseases of Man*, p 198. Washington, DC, Pan American Health Organisation, 1967.

<sup>2</sup> John, T J, and Jayabal, P, *American Journal of Epidemiology*, 1972, 96, 263.

<sup>3</sup> Ratnaswamy, L, et al, *Indian Pediatrics*, 1973, 10, 443.

<sup>4</sup> John, T J, et al, *Pediatrics*, 1976, 57, 47.

<sup>5</sup> John, T J, *American Journal of Epidemiology*, 1975, 102, 414.

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## Induction of labour with buccal prostaglandin E<sub>2</sub>

The intravenous and oral routes of prostaglandin administration for labour induction have side effects—notably vomiting, diarrhoea, and uterine hypertonus. In an attempt to obviate these we decided to induce labour by administering prostaglandin by the buccal route. This technique has not been previously reported.

### Patients, methods, and results

Labour was induced for obstetric reasons in 24 women at term. Immediately after low amniotomy prostaglandin E<sub>2</sub> tablets were placed in the buccal space between the cheek and the gum above the upper molars. The 0.5 mg tablets were administered according to two schemes. The first 12 subjects received a fixed dose of 0.5 mg every 30 minutes and the remaining 12 an incremental dose that was titrated according to the uterine response—that is, 0.5 mg, 0.5 mg, 1.00 mg, 1.00 mg, 2.00 mg, 2.00 mg every 30 minutes. A maximum dose of 2.00 mg (four tablets) half-hourly was given. Induction was considered successful if 5-cm dilatation of the cervix or delivery was achieved within 12 hours.

In the fixed-dose group 11 patients were successfully induced, as were 10 of the 12 on incremental doses. The table shows the various points chosen for comparing the progress of labour.<sup>1</sup> Shorter mean times occurred in the incremental group. The mean induction-to-delivery times according to parity and cervical state are less in the incremental group, being most defined in primiparous patients with unripe cervixes. Six patients vomited and in one treatment had to be temporarily interrupted. Two cases developed diarrhoea. All the infants were born in good biological condition. Two developed mild jaundice.