Pertussis immunisation of children with histories of neurological problems

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The reduction in the incidence of whooping cough in Britain since the 1970s is due largely to a more effective national immunisation programme. One factor leading to this improved uptake of vaccine has been the formulation of clearer guidelines for using vaccine.¹ Currently, there are three groups of children for whom pertussis immunisation might be deferred until further advice has been obtained: those whose parents or siblings have a history of idiopathic epilepsy; those with a personal history of convulsions; and those who suffered cerebral damage neonatally.

This paper reports on immunisation of children from the above groups, focusing on the occurrence of serious adverse reactions within 28 days of whole cell pertussis vaccine being given (either as single antigen or combined in adsorbed triple vaccine).

Subjects, methods, and results

The subjects were referred to a specialist clinic established in 1987, and the observations relate to the first 1500 children seen. Details of the clinic and of the vaccine protocols are available from the author. Most of the children were given paracetamol (on a dose-weight basis) at or just before immunisation and again at six hourly intervals for the next 24 hours.² Follow up immediately after immunisation was by direct observation (children could be admitted for 24 hours), telephone, or home visit. Longer term follow up was through the clinic. A serious adverse reaction was defined as a pronounced local response (such as circumferential swelling of limb, fever ($>39.5^{\circ}\text{C}$), a seizure, a hypotonic-hyporesponsive episode, persistent screaming for more than four hours, or an encephalopathic illness.

Altogether, 451 children had histories of neurological problems. On the basis of their clinical histories and antibody titres, 29 were judged immune and were not vaccinated. The parents of a further 90 children declined pertussis immunisation. The table shows the principal diagnosis and outcome for the remaining 332.

Two serious adverse reactions occurred. One was an extensive response at the site of immunisation after the second dose of diphtheria, tetanus, and pertussis vaccine in a 6 month old baby, one of whose parents had idiopathic epilepsy. Subsequently, high concentrations of antibodies to diphtheria, tetanus, and the three pertussis serotypes (1, 1.2, and 1.3) were found, and these were maintained 12 months later and regarded as protective. The second reaction was a generalised seizure starting 25 hours after the first dose of vaccine in an 8 month old child with multiple congenital abnormalities. On admission the child was feverish and found to have bacteriuria. Five further convulsions occurred over the next 28 days, but these stopped after a course of anticonvulsants. The child was given diphtheria and tetanus vaccine and oral poliovirus vaccine to complete primary immunisation.

Comment

For any child the probability of acquiring pertussis and the risks of the disease and its sequelae must be compared with the vaccine's protective efficacy and potential adverse reactions. For nearly all children the balance favours vaccination.³ For the children reported here the decision is complicated by the need to take account of the extent and natural course of the underlying or potential neurological disorder and parental attitude to it.⁴ Altogether, 243 children whose parents or siblings had a history of seizures were immunised with no adverse neurological reactions, although one child had an extensive local reaction. Forty eight children with a personal history of seizures

Principal reason for referral of children to immunisation clinic

	No of children	No of serious adverse reactions
First degree relative with history of seizures:		
Idiopathic epilepsy*	164	1
Febrile convulsions	61	0
Mixed	18	0
Child with history of seizures:		
Presumed febrile in origin†	41	0
Non-febrile origin	7	0
Neonatal problems:		
Documented cerebral damage	23	1
Other problems	18	0

*In five cases both parents had idiopathic epilepsy.

†This diagnosis required a history of inpatient care after a seizure where there was a confirmed fever on admission.

received pertussis vaccine without any serious adverse reactions. Of the 23 infants with cerebral damage, one had a seizure that was possibly related to vaccination.

Our results suggest that children with histories of neurological problems can be safely immunised against pertussis. Parents should be advised about possible reactions, and that prophylactic paracetamol helps to prevent fever.

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Correction

Influence of total cholesterol, high density lipoprotein cholesterol, and triglycerides on risk of cerebrovascular disease: the Copenhagen city heart study

Some authors' errors occurred in table I of this paper by Ewa Lindstrom *et al* (2 July, pp 11-5); the corrected version is shown below. These errors do not change the conclusions of the paper.

TABLE I—Relative risks of non-haemorrhagic events and corresponding proportions of study population and cerebrovascular cases with different ranges of plasma cholesterol values at first examination

Plasma cholesterol (mmol/l)	6 Year follow up			12 Year follow up	
	No (%) of study population	No (%) of cases	Relative risk (95% confidence interval)	No (%) of cases	Relative risk (95% confidence interval)
<5	2172 (17.2)	52 (16.2)	1.00	94 (14.7)	1.00
5-6	4042 (32.0)	93 (28.7)	0.84 (0.58 to 1.20)	183 (28.7)	0.86 (0.66 to 1.12)
6-7	3688 (29.2)	96 (29.6)	0.84 (0.59 to 1.21)	189 (29.6)	0.85 (0.66 to 1.11)
7-8	1857 (14.7)	50 (15.4)	0.82 (0.54 to 1.25)	105 (16.5)	0.88 (0.65 to 1.19)
8-9	631 (5.0)	17 (5.2)	0.75 (0.42 to 1.34)	44 (6.9)	0.99 (0.68 to 1.45)
>9	240 (1.9)	16 (4.9)	1.84 (1.01 to 3.35)	23 (3.6)	1.43 (0.89 to 2.32)

Relative to plasma cholesterol <5 mmol/l, based on 12 year follow up. Adjusted for age, sex, length of school education, combination of household income and marital status, cigarette smoking, consumption of >10 g alcohol/day, body mass index, systolic blood pressure, diabetes, and triglycerides.

1 Department of Health, Welsh Office, Scottish Home and Health Department. *Immunization against infectious disease*. London: HMSO, 1990.

2 American Academy of Pediatrics Committee on Infectious Diseases. Family history of convulsions in candidates for immunisation with pertussis containing vaccines (diphtheria, tetanus, pertussis). *Pediatrics* 1987;80:743-4.

3 Miller D, Wadsworth J, Ross E. Severe neurological illness. Further analysis of the British national childhood encephalopathy study. *Tokai J Exp Clin Med* 1988;13:145-55.

4 Baxter DN. Improving immunisation uptake in the United Kingdom. *Public Health* 1990;104:267-74.

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