ABC of 1 to 7

H B VALMAN

WHOOPIING COUGH

The present epidemic of whooping cough warrants a reappraisal of prevention and management. Young infants receive no protective immunity from their mothers and have the highest incidence of complications. Immunisation is directed at increasing herd immunity and reducing exposure of infants to the disease in older children. Persistent neurological abnormalities associated with immunisation occur, particularly when the known contraindications are ignored or not elicited.

Risks

Risk of dying from: *

Smoking (10 cigarettes / day)	1/400
All accidents	1/2000
Traffic accidents	1/8000
Leukaemia from natural causes	1/20 000
Work in industry	1/30 000
Drowning	1/30 000
Poisoning	1/100 000
Natural disasters	1/500 000
Rock climbing for 90 seconds	1/1 000 000
Driving 50 miles	1/1 000 000
Being struck by lightning	1/2 000 000

Risk of persistent neurological damage from full course of pertussis vaccination 1/100 000

* From the Royal Commission on environmental pollution. Sixth report.

The recent National Childhood Encephalopathy Study showed that the incidence of serious neurological illnesses in immunised children was slightly but significantly higher than that in unimmunised children of the same age seven days after immunisation, particularly in the first 72 hours. No such excess occurred after diphtheria and tetanus immunisation without pertussis. Normal children undergoing a full course of triple vaccination have a risk of about 1 in 100 000 of suffering persistent neurological damage. The Meade Panel, which studied the same problem for 1970-4 retrospectively and without control data, suggested that the incidence of persistent brain damage in normal children was about 1 in 155 000 injections or about 1 in 53 000 children; 49% of children with neurological problems after triple vaccine had at least one contraindication to immunisation.

The acceptance rates for pertussis immunisation in England and Wales fell from 79% in 1973 to 31% in 1978. From 1977 to 1979 notifications of pertussis were higher than the rate in any epidemic in the previous 20 years. The attack rate was especially high where immunisation rates were lowest. The vaccine modified infectivity within a family so that 2 out of 10 vaccinated siblings compared with 7 out of 10 unvaccinated siblings contracted the disease. Immunised children also seemed to have a milder illness. In 1977-80 there were 28 deaths from whooping cough in England and Wales compared with two deaths in children who developed a neurological illness within 7 days of immunisation in the three years of the National Encephalopathy Study. During the 1977-9 epidemic there were about 5000 admissions to hospital, 200 cases of pneumonia, and 83 cases of convulsions related to whooping cough. The long-term effects are unknown.

Contraindications to immunisation

Is the baby unwell in any way ?	YES/NO
Has the baby had any side effects from previous immunisations ?	YES/NO
Did the baby behave normally during the first week of life ?	YES/NO
Has the baby, or anyone in the immediate family, ever had fits or convulsions ?	YES/NO
Is the baby developing normally ?	YES/NO

Mothers can fill out a card in the waiting room at each visit for immunisation.

According to the latest advice from the Joint Committee on Vaccination and Immunisation, the contraindications to whooping cough immunisation are: a reaction to a preceding dose, cerebral irritation in the neonatal period, and fits. Immunisation is not absolutely contraindicated in children whose parents or siblings have a history of idiopathic epilepsy, those with developmental delay due to a neurological defect, or those with neurological disease, but individual cases need careful assessment. The risk of damage from immunisation is higher than normal in these children, but so is the risk of severe effects of whooping cough. A personal or family history of allergy is no longer thought to be a contraindication, but doctors should use their discretion in each case. If an infant has an acute febrile illness, immunisation is best postponed, but minor infections without fever or systemic upset are not contraindications.

Diagnosis

Management

Whooping cough is difficult to diagnose during the first 7 to 14 days of the illness (catarrhal phase), when there is a short dry, nocturnal cough. Later, bouts of 10-20 short dry coughs occur day and night; each is on the same high note or rises in pitch. A long attack of coughing is followed by a sharp indrawing of breath, which may produce the crowing sound, or whoop. Some children, especially babies, with *Bordetella pertussis* infection never develop the whoop. Feeding with crumbly food often provokes a coughing spasm, which may culminate in vomiting. Afterwards there is a short period when the infant can be fed again without provoking coughing. In uncomplicated cases there are no abnormal respiratory signs.

The most important differential diagnosis in infants is bronchiolitis; this is usually due to the respiratory syncytial virus, which produces epidemics of winter cough in infants under 1 year. For the first few days there may be only bouts of vibratory rasping cough which never produces a whoop. Later rhonchi or crepitations are heard in the chest and the infant either deteriorates or improves rapidly within a few days. Older siblings infected with the virus may have a milder illness. Other viruses may cause acute bronchitis with coughing but there are seldom more than two coughs at a time.

A properly taken pernasal swab plated promptly on a specific medium should reveal *Bordetella pertussis* in most patients during the first few weeks of the illness. A blood lymphocyte count of $10 \times 10^9/l$ or more with a normal erythrocyte sedimentation rate suggests whooping cough.

If the diagnosis is suspected in the catarrhal phase (usually because a sibling has had recognisable whooping cough) a 10-day course of erythromycin may be given to the child and to other children in the home. Parents must be warned that an antibiotic may shorten the course of the disease only in the early stages and is unlikely to affect established illness. Vomiting can be treated by giving soft, not crumbly, food or small amounts of fluid hourly.

No medicine reliably improves the cough. Salbutamol has been used in a dosage of 0.3 mg/kg/24 hours divided into three doses. When sleep is disturbed some authorities recommend that the child should be given a bedtime dose of 3-5 mg/kg of phenobarbitone or a large dose of promethazine hydrochloride starting with 1 mg/kg. In severe cases mothers can be taught to give physiotherapy, which may help to clear secretions, especially before the infant goes to sleep. An attack may be stopped by a gentle slap on the back.

The threshold for admission should be lower for children aged under 6 months. Convulsions and cyanosis during coughing attacks are absolute indications for admission to an isolation cubicle. Parents often become exhausted by sleep loss, and arranging for different members of the family to sleep with the child will give the mother a respite. The cough usually lasts for 8 to 12 weeks and may recur when the child has any new viral respiratory infection during the subsequent year. If the child is generally ill or the cough has not improved after six weeks a chest radiograph should be performed to exclude bronchopneumonia or lobar collapse, which need treatment with physiotherapy and antibiotics. Long-term effects on the lung, such as bronchiectasis, are rare in developed countries.

The infant will not be infective for other children after about four weeks from the beginning of the illness or about two days after erythromycin is started. The incubation period is about seven days and contacts who have no symptoms two weeks after exposure have usually escaped infection.

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