IMMUNISATION

Aim

National policies now exist in most countries to provide protection against a range of potentially serious infectious illnesses. Separate monographs are available in this manual for BCG vaccination (against TB), and for immunisation against: *Haemophilus influenzae*; hepatitis B; measles, mumps and rubella (MMR: see the rubella vaccine monograph); meningococcal infection; pneumococcal infection; polio; and diphtheria, tetanus and pertussis (DTP: see the whooping cough vaccine monograph). All the above products (other than the hepatitis B vaccine) are available free of charge in the UK and in many other countries.

Basic Schedule

UK schedules were simplified in 2004 with the introduction of a new five-in-one vaccine, and augmented in 2006 with the addition of the pneumococcal vaccine (a vaccine first introduced into America six years earlier). Immunisation should never be delayed because of prematurity or low body weight. Indeed, it should always be started before discharge in babies spending more than 7 weeks in hospital after birth.

Birth	Give selected babies BCG, and start 'at risk' babies on a course of hepatitis B vaccination (q.v.).
8 weeks	Give the combined diphtheria, tetanus, pertussis, haemophilus and polio (DTaP/IPV/Hib) vaccine *and* the pneumococcal vaccine.
12 weeks	Give the combined DTaP/IPV/Hib vaccine *and* the meningococcal (MenC) vaccine.
16 weeks	Give the combined DTaP/IPV/Hib, the MenC, *and* the pneumococcal vaccines (three injections).
12 months	Give the new combined haemophilus (Hib) and meningococcal (MenC) vaccine.
13 months	Give the combined measles, mumps and rubella (MMR), *and* the pneumococcal vaccines.
3½–5 years	Pre-school booster vaccination with the combined DTaP/IPV (or dTaP/IPV), *and* MMR vaccines.
13–18 years	Booster vaccination with a combined tetanus, low dose diphtheria and polio (Td/IPV) vaccine.

Foreign travel

Advice for families on immunisation prior to foreign travel is given in a UK Departments of Health leaflet obtainable from pharmacies, GP's surgeries, post offices and travel agents, or by telephoning 0800 555 777. See also the Department's web site: www.travax.nhs.uk/ and www.fitfortravel.scot.nhs.uk. More detailed advice on this, and on malaria prophylaxis, is also given in the British National Formulary for Children and in the book *Health information for overseas travel* (www.archive.official-documents.co.uk/document/doh/hinfo/) published in 2001. Professionals can also get advice from the HPA in the UK by ringing 020 8200 4400.

Reactions to immunisation

Most reactions to immunisation are not serious. Older children sometimes faint, and a few hyperventilate. Even quite young infants sometimes respond to pain or sudden surprise with a syncopal attack. Blue breath-holding attacks, in which a child cries and then stops breathing, turning limp and unconscious can occur, and can end with a seizure. Attacks of stiffness and pallor, with self-limiting bradycardia or asystole (reflex anoxic seizures), are less common but well documented. Infants prone to these may also have a seizure if they become feverish after immunisation. Sudden brief loss of consciousness and body tone a few hours after vaccination for pertussis is another well described, but poorly understood, clinical entity (the hypotonic-hyporeflexic episode [HHE] syndrome). Such events should *not* be interpreted as anaphylactic or encephalopathic. Loss of consciousness should only last 5–10 minutes, and recovery is complete without treatment. Such episodes should be managed as though they were a fainting attack.

Anaphylaxis: True anaphylactic reactions after immunisation are *very* rare, and seldom severe. A single 10 microgram/kg dose of adrenaline (q.v.) given deep IM (not subcutaneously) serves to contain most reactions, and is all that can realistically be made available in most community settings where immunisation is carried out. Where urticaria or slowly progressive peripheral oedema is all that develops, it can help to give 200 micrograms/kg of the H_1 histamine antagonist chlorphenamine maleate (chlorpheniramine maleate [former BAN]) promptly IM (even though the manufacturers have not yet endorsed its use in children). If there is *serious* stridor or progressive angio-oedema some advocate giving 0·4 ml/kg of a 1 mg/ml (1:1000) solution of L-adrenaline by nebuliser after administering a first 10 microgram/kg dose IM. Then give 100 micrograms/kg of chlorphenamine IM or, preferably IV diluted in 5 ml of 0·9% sodium chloride. Give oxygen, and take whatever steps are necessary to ensure that the airway can be secured should this become necessary. The dose of nebulised adrenaline can be repeated after 30 minutes. Wheeze and bronchospasm (seen particularly in patients with a past history of asthma) respond best to nebulised salbutamol (q.v.); 4 mg/kg of IV hydrocortisone (q.v.) may also be of benefit. Volume expansion with gelatin, pentastarch, or plasma albumin (q.v.) may rarely be needed. Send for help, but never leave the patient unattended. While severe anaphylactic shock, with hypotension, tachycardia and rapid cardiovascular collapse, can cause death, there has not been a single death using any of these products in the UK since formal monitoring began 25 years ago (during which time 300 million doses have been issued). Notify all untoward events in the UK to the Committee on Safety of Medicines at the Medicines and Health Products Regulatory Agency.

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Problems in the preterm baby

Irrespective of weight or gestation at birth *every* baby should be started on a course of primary immunisation when eight weeks old. This may trigger an increased incidence of self-limiting apnoea for 2–3 days in babies of less than 40 weeks postmenstrual age, but this is not a reason for postponing protection. Very preterm babies mount a less vigorous antibody response, and those on dexamethasone for chronic lung disease mount a particularly limited response to the several vaccines, but immunisation should not be delayed, because such children are likely to become seriously ill if they encounter whooping cough infection in the first year life. The suggestion that the most vulnerable children should be given a fourth dose of the DTP vaccine at a year has now been discounted, except in countries where diphtheria still occurs with any frequency.

Measles

In communities where measles is still prevalent a case can be made for offering the most vulnerable babies 2 doses of the combined measles (MMR) vaccine 3 months apart once they are 6 months old. A dose of the measles (or the MMR) vaccine will usually prevent overt illness if given within 3 days of exposure, but 250 mg of normal human immunoglobulin (q.v.) is probably more protective in babies less than 9 months old

HIV infection

Babies with suspected or proven Human Immunodeficiency Virus (HIV) infection need protection from diphtheria, tetanus, and whooping cough, and from haemophilus, pneumococcal and meningococcal infection like any other child. They should be given the inactivated, rather than the live (oral), polio vaccine, and only given the MMR vaccine if the CD4 count is above 500 cells/µl. They also need co-trimoxazole prophylaxis (q.v.). Babies in the UK are not given BCG.

Patients with sickle cell disease or no spleen

Babies with *situs ambiguus* and certain cardiac syndromes are often born without a spleen, making them dangerously prone to infection. While haematological features (Howell-Jolly bodies etc) are suggestive, imaging is essential for diagnosis. Give amoxycillin (125 mg twice a day) until the baby is immunised against *Haemophilus influenzae,* and a similar dose of phenoxymethylpenicillin (penicillin V) once immunised. They should eventually receive both the available pneumococcal vaccines (q.v.), as well as all the other usual vaccines. Do the same for children with homozygous (SS or Sb0Thal) sickle cell disease.

Babies with chronic lung disease

Consider winter prophylaxis against respiratory syncytial virus (RSV) infection with palivizumab (q.v.). Influenza can also be devastating in babies with a serious pulmonary or cardiac problem. However, while two 0·25 ml IM doses of vaccine 4 weeks apart provide substantial protection in infancy, safety and efficacy are still uncertain in babies less than 6 months old. The influenza vaccine should, however, be offered to all close family contacts (unless there is known egg hypersensitivity).

Consent

Time must be taken to ensure that parents have had all their questions answered. A record of any issues raised, and of any verbal consent given, should then be placed in the case notes. Prior written consent implies general agreement to the child's inclusion in an immunisation programme, but does not address the issue of current fitness and is no substitute for the presence and involvement of a parent when any vaccine is actually administered, especially in a hospital setting.

Documentation

Inform the relevant community child health department in the UK each time any immunisation procedure is undertaken. A standard form exists that itemises the information required. Complete the relevant section of the child's own personal child health record (red book) at the same time.

References.

See also the full UK web site guidelines ⊗

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