



ROYAL CHILDREN'S HOSPITAL
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Community

P A E D I A T R I C S

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Haemophilus influenzae Type b (Hib)

◆ Epidemiology

Haemophilus influenzae type b (Hib) is the most common community acquired invasive bacterial infection of Australian children. Infection usually presents as meningitis or epiglottitis but other manifestations include pneumonia, septic arthritis/osteomyelitis, cellulitis or sepsis without an identifiable focus.

Hib are part of the normal nose and throat flora and spread is thought to occur via respiratory secretions. Hib can be found in up to 5% of normal pre-school children. The rates may be even higher in young contacts of clinical cases. These contacts also have a several hundred fold increased risk of contracting invasive disease themselves.

Babies are protected from infection during the first few months of life by maternally acquired antibodies. However, as these antibodies wane the risk of infection increases. The epidemiology of infection varies from place to place. For example, in Victoria at least 60 per 100,000 children up to 5 years of age are affected. Meningitis and epiglottitis each count for about 40% of cases with median ages of occurrence being 16 and 35 months respectively. Furthermore, in Victoria, the individual risk of a child being admitted to hospital at some time due to Haemophilus infection is 1 in 300. This reduces to 1 in 350 at 6 months, 1 in 500 at 18 months, 1 in 1000 at 36 months, and 1 in 5000 by 5 years of age. In contrast rates of up to 1000 per 100,000 children have been reported for subgroups of Central Australian Aborigines. In these children most infections are meningitic and they occur at a much younger age.

It has been estimated that if a 1 year cohort of Australian children were followed from birth to 5 years they will suffer over 3500 cases of Hib

disease with up to 100 deaths, 75 needing hearing aids, 75 with severe neurologic sequelae and many more with significant but lesser disabilities. The majority of these complications are due to meningitis in younger children.

Invasive Haemophilus influenzae disease is notifiable and accurate diagnosis and reporting of cases to health authorities is very important.

◆ Prevention

Rifampicin

Reduction of disease in young contacts is possible via rifampicin prophylaxis. However, as over 95% of cases have no history of contact with an affected

child this preventive measure has only a minor impact on the overall disease incidence.

Vaccine

Prevention is best achieved by immunization and this view has the support of all relevant august bodies in Australia. Hib vaccines consist of capsular polysaccharide (PRP) conjugated to a carrier protein. They induce protective anti-PRP antibodies and are known to be safe and effective. Australia currently has one licensed vaccine (ProHIBiT-Connaught), known as PRP-D, for use in children at 18 months of age. PRP-D vaccine utilizes small amounts of diphtheria toxoid as the carrier protein.

PRP-D Vaccine Efficacy

When utilized in 15-18 months old children an efficacy of up to 95% has been demonstrated. Subsequent post marketing studies have also demonstrated efficacies ranging from 75% to over 90%.

Efficacy in younger children following 3 immunizations by 6 months of age has varied from 90% in Finnish studies to 35% in Alaskan children. These unexplained variations in efficacy have led to the vaccine not being currently licensed for Australian infants.

Although the vaccine uses diphtheria toxoid as the carrier protein a full course of triple antigen immunization is still required to give adequate protection against diphtheria.

PRP-D Vaccine Safety

The vaccine is well tolerated. Local erythema and induration have been reported with a frequency of less than 5% and tenderness in up to 12% of cases. Transient fever (over 39°C) occurs in 2-5% of cases. Irritability, sleepiness or anorexia were reported in 16% of

cases. Contraindications, such as true allergy to a vaccine component such as diphtheria toxoid, are few.

The vaccine may be administered concurrently with triple antigen or other vaccines but at a different site using a different syringe.

PRP-D vaccine is currently available for administration by individual medical practitioners. As it is not available on the PBS some doctors have facilitated administration by having stocks available at near cost for administration to their patients. Also, some local councils have facilitated vaccine administration by making it available at cost, or even subsidised, through their existing childhood immunization campaigns.

Future Vaccines

Additional conjugate vaccines are in use overseas and are expected to be soon available within Australia. These vaccines are also reported to be safe and immunogenic in babies less than 6 months of age. Protein carriers for these vaccines are tetanus toxoid (PRP-T), Outer membrane protein of *Neisseria meningitidis* (PRP-OMP) and a mutant diphtheria toxin protein (Hb-OC). Due to the differences in contents of these vaccines antibody profiles and dynamics vary, making different protocols for administration necessary. Interchangeability of vaccines during a course of administration within an individual has not yet been established.

Combination vaccines of Hib and triple antigen are also on the horizon.

Hib infections are common, serious and preventable. Children remain at risk of invasive Haemophilus disease during their first 5 years of life.

PRP-D vaccine to prevent Hib is safe, effective and available.

Vaccination is recommended for all children at 18 months of age.

Catch up immunization should be considered for all 2, 3, & 4 year old children.

PRP-D can be administered at the same time as other vaccines.

THE NURSE'S ROLE IN REDUCING CHILD INJURY: AN ACTION PLAN

Nurses are uniquely placed to provide guidance to parents of young children at that critical time when new parents haven't yet developed unsafe habits.

The protection of children against the risk of accidental injury is a community responsibility to the extent that children are unable to protect themselves. Some community members, especially maternal and child health nurses, have a greater opportunity to influence the safety of our children than most.

The greatest health risk to all children aged between one and fourteen years is accidental injury. It accounts for half of all the deaths of Australian children in that age range, currently about 500 each year.

What can nurses do to prevent accidental injury to children?

PASSENGER SAFETY

Children are at risk as passengers in motor vehicles, especially if they are unrestrained. Restraints need to be appropriate

for the size and weight of the child, they should be correctly installed and adjusted. There are four stages of restraints: birth to six months (3 to 9 kg), six months to four years (toddler seats for 8 to 18 kg), four years onwards (booster seat with an H-harness for 14 to 21 kg) and for older children (booster seat with adult lap-sash belt for 14 to 32 kg). Children over 32 kg can use an adult seat belt alone.

ACTION:

- * Advise parents in the correct use of car restraints.
- * Refer to restraint fitting stations for correct fitting and adjustment.
- * Support restraint loan schemes.
- * Invite a speaker from the state traffic authority.

PEDESTRIAN SAFETY

Children under 10 years of age have difficulty negotiating traffic safely, anticipating danger, and judging the speed a car is travelling at or the distance a car is away from them. Parents frequently overestimate their children's abilities as pedestrians. Streets can be redesigned to make them safer, speed can be reduced by the provision of speed humps, safe crossings can be installed.

ACTION:

- * Encourage parents of children under 10 to take them to and from school.
- * Advise parents to hold children's hands when near traffic.
- * Recommend that parents talk about and demonstrate the safe way to cross roads and safe places to cross.
- * Lobby councils to develop community play areas, fenced off from traffic.

- * Advocate the elimination of unsafe road situations.

BICYCLE SAFETY

Children aged between 10 and 14 are especially at risk as cyclists because they are riding in traffic. Children under 10 should not ride in traffic unaccompanied by an adult. Bicycle helmets dramatically reduce the risk of head injury. Bicycle education programs are advised for primary school aged children. Most children are injured as cyclists falling off their bicycles. More severe injuries are usually sustained when colliding with motor vehicles.

ACTION:

- * Support helmet wearing, even on tricycles.
- * Recommend school bicycle education programs.
- * Encourage parents to ride with their children.

WATER SAFETY

Drowning is the greatest risk to pre-school children and accounts for almost 40% of deaths in the 1 to 5 age group. Children can drown in just a few centimetres of water, partly because they are top heavy, have poorly developed coordination skills, and do not fear water. Children slip into water quietly - they do not panic or call out and they do not hold their breath so water can fill their lungs quickly. Children drown in swimming pools, spas, baths, buckets, irrigation channels, lakes and dams, but most commonly in the pool in their own backyard.

ACTION:

- * Advise parents to buy nappy buckets with firmly fitting lids and to keep them in the laundry tub rather than on the floor.
- * Warn parents with swimming pools and spas to enclose

them with Australian Standards-approved fences fitted with self-closing latches and with no direct access from the house.

- * Organise short courses in CPR for parents.
- * If there is a dam on a farm, advise parents to enclose a play yard close to the house with a swimming pool fence.
- * Children must always be supervised around water, even in the bath.
- * Advise emptying paddling pools every time they are used.
- * Children should wear correctly fitted personal flotation devices (PFDs) in boats.

CHOKING AND SUFFOCATION

A toddler's airway at its narrowest point is about 6 mm. Any object which could cause a total airway blockage is hazardous for children under 3. A cylinder to test the size of objects which may cause choking is available and should be on hand for demonstration.

ACTION

- * Remind parents that children should sit quietly while eating and drinking.
- * Educate parents to avoid hazardous foods such as nuts, especially peanuts, hard sweets, popcorn, raw carrot and apple, lumps of meat and bones with small pieces of cartilage attached to them.
- * Recommend parents to choose toys carefully - if the label states that the toy is unsuitable for children under three, this is because it probably contains small parts which could choke a child.
- * Advise parents to choose cots which meet the Australian Standard to avoid entrapment hazards and to place cots away from blind or curtain cords.

- * Inform parents of the dangers of plastic bags.
- * Teach parents the correct first aid for choking.

BURNS AND SCALDS

Flame-resistant nightwear and better design of heating have reduced the incidence of children being burned. House fires are still a problem and most are lit by children. Smoke detectors can give early warning of a fire. Guards are needed on all heaters. Two-thirds of burns are hot liquid burns, i.e. scalds, mostly caused by cups of tea and coffee. Hot water at 55°C takes about 30 seconds to produce a full thickness burn; at 70°C it takes only 1 second. Most hot water services can be turned down to 55°C to reduce scalding.

ACTION:

- * Advocate the use of smoke detectors and heater guards.
- * Alert parents to the labelling on children's nightwear.

- * Advise parents to use coiled kettle cords, stoveguards, fire smothering cloths and other safety products in the kitchen.

- * Counsel parents that door barriers can be used to keep children out of the kitchen while cooking.

- * Warn parents to check the temperature of the bath before putting a child into the water.

- * Advise that hot water systems can be turned down to 55°C.

- * Warn about the dangers of hot drinks; ask parents not to drink tea or coffee while holding their babies.

- * Teach parents to put only cold water on burns.

POISONING PREVENTION

Medications and household chemicals are the most likely sources of poisoning for young children. All household chemicals and medications should be stored in cupboards with child-

resistant locks. Children gain access to medications from bedside tables and from visitors' handbags.

ACTION:

- * Advise parents that medications should be dispensed in child-resistant containers.

- * Encourage parents to install at least two child-resistant catches in the home, one for medications and one for chemicals and cleaners.

- * Advise parents to have a designated safe place for all visitors' handbags.

- * Warn parents of the dangers of some common products such as iron tablets and paracetamol which may not have appropriate warning labels.

- * Remind parents not to refer to medications as sweets or lollies.

- * Ensure that parents understand the role of the Poisons Information Centre and have the number by the phone.

Jan Shield

● To be continued in next issue

◆ From the Literature ◆

Alcohol burns in the neonatal

A.M.C. Watkins & E.J. Keogh. *Journal of Paediatrics and Child Health* 28 (4) Aug 1992 pp 306-308.

Two cases of very premature infants who sustained chemical burns from alcohol-based skin preparations are presented by these Melbourne authors.

The first baby had a major life-threatening burn on her back and buttocks after lying for about 30 minutes on a plastic-backed sheet which later investigation revealed had been impregnated with chlorhexidine solution during cardiac catheterisation. She has been left with extensive scarring and was referred to a plastic surgeon for management at 13 months of age.

The second baby suffered full thickness skin loss after only three brief contacts with 70% isopropyl alcohol required to disinfect the skin prior to blood sampling.

Because of their skin permeability, care needs to be exercised when using alcohol preparations on extremely low birthweight infants. The authors believe that such preparations should be used only when no satisfactory alternative is available. These preparations may well become more popular, however, because of the concern about the effects of iodine absorption after using iodophor preparations. They recommend using iodophor or aqueous chlorhexidine; if an alcoholic solution is unavoidable, then the sheet under the baby should be changed once the skin has been prepared.

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