NEONATAL HEPATITIS B VACCINATION PROGRAM

Australia has a unique pattern of hepatitis B (HB) epidemiology in that the distribution of HB infection is not uniform. In general, Australia is considered to be a country of low HB virus prevalence, with a rate of infection of 5 per cent for the population at large[1]. However, there are certain subpopulations (e.g. some ethnic groups, Aborigines, intravenous drug users) with high carriage rates of HB in whom the risk of infection is somewhat greater. The carriage rate of HB virus in antenatal patients attending Sydney teaching hospitals was found to be 2-3 per cent[2].

The incidence of HB infection in Australia is rising[3]. This is largely due to changing immigration patterns, with increasing immigration of people from HB endemic areas. In 1986 almost half the immigrants to Australia came from Asia and Mediterranean countries[4].

Vertical or perinatal transmission is the spread of infection from mother to baby before, during or after birth. It is one of the most efficient methods of transmission of HB infection. If mothers are HBsAg positive, more than 40 per cent of their infants show evidence of infection during the first six months of life. Although occasionally the HB virus is transmitted through transplacental haemorrhage, 90-95 per cent of infants born to mothers who are carriers will be uninfected at birth[2]. If not immunised soon after birth, these infants have a very high chance of infection; up to 90 per cent if the mother has both HBsAg and "e" antigen[4]. More important, those who acquire the HB virus in the neonatal period are more likely to become chronic carriers and develop the chronic sequelae of HB infection; up to 90 per cent of those infected during the neonatal period become chronic HB virus carriers. In contrast, only 10 per cent of adults infected with the HB virus become chronic carriers[5].

Preventing perinatal transmission of HB infection is an important public health issue. Introduction of the Neonatal Hepatitis B Vaccination Program in 1987 by the Health Department was aimed at interrupting vertical transmission of the virus and thereby reducing the reservoir of HB infection in the community. At the time of conducting this evaluation the following Health Department policy was in place (Circular 89/163):

- all women should have antenatal screening for HBsAg;
- all neonates born to HBsAg positive mothers should receive Hepatitis B immunoglobulin in addition to a complete course of the HB vaccine;
- all neonates born into high-risk population groups should be offered the HB vaccine, even if the mother is HBsAg negative;
- hospitals should make arrangements or provide advice on the administration of the second and third doses; and
- community nurses or tuberculosis nurses should be responsible for the follow-up program.

This has since been updated (Circular 91/105) to include recommendations that:

- each hospital should designate one person as the hospital coordinator; and
- each Area/Region should designate one person as the Area/Regional coordinator.

During early 1991 the Northern Sydney Area (NSA) Public Health Unit examined the Neonatal Hepatitis B Vaccination Program (NHBVP) to assess the need for it in the Area and to ensure that high-risk neonates are being effectively vaccinated and that the program is meeting the guidelines set out in Circular 89/163.

METHOD

The review followed the principles of process evaluation; that is, determining the need for the program and whether it was reaching the target population. Initially an attempt was made to determine the proportion of neonates falling into the high-risk category requiring vaccination. There is no centralised recording of HB status, so information on the number of babies born to HBsAg positive mothers or born into households where there is a HBsAg carrier is not readily available. This meant that only an estimate of the "at risk" neonatal population, based on the number of infants born to mothers from high-risk ethnic population groups, was possible.

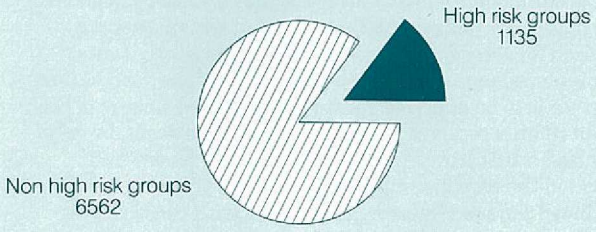
To review current practices, a questionnaire was distributed to each maternity unit in the Area and discussion with appropriate personnel was undertaken.

RESULTS

The "needs assessment" indicated that a significant proportion of the neonates born in the NSA are at high risk of acquiring HB infection by virtue of their ethnic background. There are an estimated 750,000 residents in the NSA. In 1988/89 there were 7696 deliveries for the Area; of these, 1135 (14.8 per cent) were from ethnic population groups with high HBsAg carrier rates, as illustrated in Figure 1. Taking into account that these figures probably underestimate the "at risk" neonatal population, at least 14.8 per cent of deliveries required HB vaccination.

FIGURE 1

DELIVERIES FOR NORTHERN SYDNEY RESIDENTS 1988/1989
Total = 7696



Population groups in which 2% or more individuals are HBsAg carriers

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FIGURE 2

DELIVERIES FOR NORTHERN SYDNEY RESIDENTS 1988/1989
High risk groups. Total = 1135

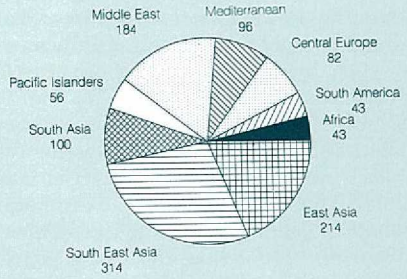

Figure 2 is a breakdown of deliveries from ethnic population groups with high HBsAg carrier rates. This figure does not include Australian Aborigines and New Zealand Maoris, for whom numbers were very small.

Discussion

As a result of the review, several problems with the program were identified. First, there were problems with identifying high-risk neonates in the non-hospital clinic attendants, most of whom were privately insured patients. Although all women should be screened for HBsAg in the antenatal period, it was difficult to verify this, particularly in the case of private patients.

Second, it became evident that insufficient records are being kept. Except for the maternity unit at Hornsby and Ku-ring-gai District Hospital, where an HB vaccination register was introduced recently, most units were unable to provide data on the number of neonates receiving the HB immunoglobulin and/or vaccine in 1990.

The third major problem which stemmed from this was the lack of sufficient follow-up after the infant received the first dose of the HB vaccine. As three doses of the vaccine are required for seroconversion or protection in 95 per cent of recipients, adequate follow-up is essential if the vaccination program is to be effective. Most hospitals were unsure of the rate of infants receiving the second and third doses, largely because all maternity units involved in the survey had allocated the responsibility of follow-up to the early childhood nurses. However, discussions with these nurses indicated that they did not know of this responsibility or did not have the resources to follow up all infants after their first immunisation, except at Hornsby and Ku-ring-gai District Hospital. Arrangements for follow-up were also inadequate for those neonates who are born in the NSA but live outside the Area. In most of these cases no arrangements had been made by the maternity units and the responsibility of follow-up was again designated to the early childhood nurses.

There are several problems confined to the private hospitals in the Area. In the private hospitals only those neonates born to HBsAg positive mothers received the HB immunoglobulin and vaccine. Neonates of mothers from high-risk population groups were not being routinely vaccinated, and no facilities were provided for the administration of the second and third doses of the vaccine as this was considered to be the realm of the paediatricians. Also, because staff members did not know the vaccine was provided free of charge for the NHBVP, the parents were paying for it.

Conclusions and Recommendations

In addition to identifying key deficiencies in the delivery of the NHBVP in the NSA and enabling valuable recommendations to be made, the study highlights the importance of undertaking process evaluation before the examination of impact or outcome of any program.

The following recommendations were made and are currently being implemented for a revised NHBVP for hospitals, both public and private, within the Northern Sydney Area:

- each hospital with a maternity unit designate one person to coordinate the program and ensure it is being run effectively in that hospital;
- written information stressing the importance of antenatal hepatitis B screening be given to all pregnant women at the time of booking into the maternity unit. The information should be available in different languages for the benefit of non-English speaking groups, to increase public awareness and ensure that all antenatal patients are being routinely screened;
- all maternity units maintain a record of each vaccination to enable adequate follow-up;
- each hospital develop a mechanism for adequate follow-up to ensure all three doses of the vaccine are given. This may require the involvement of the early childhood nurses;
- health care workers should determine if either the mother OR father comes from a high-risk population group; and
- high-risk groups should include not just people from certain ethnic population groups but also those at greater risk of acquiring hepatitis B because of their lifestyle (for example, health care workers and intravenous drug users). This is not the current practice, nor is it specified in Circular 89/163.

A revised NHBVP should be evaluated constantly to ensure it is meeting its objectives.

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1. Carey MG. Hepatitis B Position Paper. NSW Health Department Epidemiology and Health Services Evaluation Branch, 1990.
2. Farrell GC. Towards the eradication of Hepatitis B in Australia. *Aust NZ J Med* 1987; 17:645-6.
3. Williams SJ, Craig PI, Liddle C, Batey RG, Farrell GC. Hepatitis B in Australia: Determinants of intrafamily spread. *Aust NZ J Med* 1987; 17:220-227.
4. Pesce AF, Crewe EB, Cunningham AL. Should all pregnant women be screened for Hepatitis B surface antigen? *Med J Aust* 1989; 150:19-21.
5. Pastorek JG. Hepatitis B. *Obstetrics and Gynaecology Clinics of North America* 1989; 16,3:645-657.