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MENINGITIS SURVEILLANCE 1991

Bacterial meningitis remains an important cause of morbidity and mortality in Australia, particularly in children[1-4]. In 1990 Levy et al[1] reviewed the incidence of bacterial meningitis in NSW and assessed the effectiveness of the notification system in ascertaining cases of meningitis.

We have reviewed meningitis again in NSW, between July 1, 1990 and June 30, 1991 to:

- monitor trends in the incidence of bacterial meningitis; and
- review the surveillance of meningitis by routine notification mechanisms (passive surveillance), active surveillance by Public Health Units (PHUs) and hospital separation data (Inpatient Statistics Collection).

The NSW Health Department Inpatient Statistics Collection (ISC) provides details of the diagnoses which account for a person's stay in hospital. The diagnoses are coded according to the International Classification of Diseases, 9th Revision — Clinical Modification (ICD9-CM). As all cases of bacterial meningitis should be admitted to hospital, the ISC provides a means of measuring the case ascertainment of the notification system.

At the time of this review, meningococcal meningitis was notifiable by medical practitioners in NSW. No other forms of meningitis were notifiable.

METHODS

Incidence rates are based on the NSW hospital ISC for the year July 1, 1990 to June 30, 1991[5] and 1991 Census data[6,7]. Records were extracted for all separations coded for meningococcal meningitis (ICD9-036.0), bacterial meningitis (ICD9-320) and meningitis, unspecified (ICD9-322.9). We excluded cases of neonatal meningitis. Cases that were transferred between hospitals were counted only once. The data were scrutinised individually to detect other duplications.

In August 1991 the NSW Infectious Diseases Data System was reviewed (passive surveillance) for all notified cases of meningococcal meningitis from January 1 to June 30, 1991. At the same time PHUs were requested to undertake active surveillance for the same period. We requested the number of admissions to all hospitals for meningococcal meningitis (ICD9-036.0) and bacterial meningitis (ICD9-320). The information requested for each case included age, sex, date of admission, date of discharge and organism. Cases ascertained by active surveillance were then compared to the ISC. For this part of the analysis transfers and readmissions were not excluded from the ISC as PHUs were asked to collect details on all cases regardless of separation mode. We attributed data from a hospital within any Area/Region to that Area Health Service or Region. No attempt was made to assess admission patterns across 'borders'.

Continued on page 98 ►

Contents

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Meningitis surveillance 1991

► *Continued from page 97*

RESULTS

Between July 1, 1990 and June 30, 1991 there were 321 hospital separations for bacterial meningitis, for a rate of 5.6/100,000 population. Of these, 78 were meningococcal meningitis at a rate of 1.36/100,000 population and 115 were *Haemophilus influenzae* type b (Hib) meningitis at a rate of 2.0/100,000 population (Table 1).

In children aged between four weeks and five years there were 192 hospital separations for bacterial meningitis for the same period, a rate of 46.8/100,000 children aged less than five years. Of these, 46 were meningococcal meningitis (rate 11.2/100,000 children aged less than five) and 108 were Hib meningitis (rate 26.3/100,000 children aged less than five) (Table 2). Thus 60 per cent of all cases of meningitis occurred in children aged less than five years and more than half of these were due to Hib.

A further 191 cases of unspecified meningitis (ICD9-322.9) were reported on the ISC.

By August 1991 only eight cases of meningococcal meningitis had been notified to the NSW Health Department for the period January 1 to June 30, 1991.

With the exception of the Hunter Area, all PHUs (93 per cent) participated in active surveillance. Active surveillance identified a total of 130 hospital separations for bacterial meningitis and 180 cases were extracted from the ISC for the same period, excluding the Hunter Area (Table 3). All notified cases were detected by active surveillance.

Nineteen per cent of the cases of meningococcal meningitis identified by the ISC were notified to PHUs.

DISCUSSION

The annual incidence of bacterial meningitis in NSW, based on the ISC for 1990-1991, was 5.6/100,000. This rate is slightly increased from the previous two years, which may be attributable to the apparent increased rate of Hib meningitis in children under five years of age, from 13.6[1] to 26.3 per 100,000. It is unclear why the rate of Hib meningitis was low in 1989-90, but the 1990-91 rate is consistent with the rates found in children under five in Western Australia (26.9/100,000)[2], Victoria (25.4/100,000)[8] and Auckland (27/100,000)[9]. The annual incidence of meningococcal meningitis remained stable in both children and the whole population.

Incidence rates based on the ISC need to be interpreted with caution, as they are likely to be under-estimates. True incidence rates require a full examination of individual hospital records, laboratory records and mortality data for deaths before admission. A study by Hanna[2] found that 60 per cent of children with a discharge diagnosis of ICD9-322.9 (meningitis, unspecified) did have bacterial meningitis (personal communication). We identified 191 cases with a discharge diagnosis of ICD9-322.9. The implication for NSW is that the true incidence of meningitis may be as high as 7.6/100,000 population. However, the strengths of the ISC for this type of review are that it is accessible, quick and inexpensive. Further, and most important, it provides valid results for monitoring trends.

TABLE 1

INCIDENCE OF MENINGITIS PER 100,000 NSW POPULATION

Type of meningitis	1988-89[1]	1989-90[1]	1990-91
All bacterial	5.4	5.1	5.6
Meningococcal	1.2	1.4	1.4

TABLE 2

INCIDENCE OF MENINGITIS PER 100,000 CHILDREN <5 YEARS

Type of meningitis	1989-90[1]	1990-91
Meningococcal	10.5	11.2
Hib	13.6	26.3

TABLE 3

COMPARISON OF MENINGITIS CASE ASCERTAINMENT BY ACTIVE SURVEILLANCE (AS) AND HOSPITAL SEPARATIONS (ISC), BY PUBLIC HEALTH UNIT FOR JANUARY 1, 1991-JUNE 30,1991

Public Health Unit	Type of Meningitis					
	Meningococcal (ICD9-036.0)		Hib (ICD9-320.0)		Other bacteria (ICD9-320.1-9)	
	AS	ICS	AS	ISC	AS	ISC
Central and Southern Sydney	6	5	12	8	17	14
Western Sector	3	6	13	15	10	11
Northern Sydney	1	3	0	6	0	9
Eastern Sydney	7	4	0	5	0	13
South Western Sydney	4	2	2	6	2	1
Central Coast	3	3	4	4	6	6
Illawarra	3	3	2	2	8	9
North Coast	3	4	3	4	4	5
New England	2	2	0	2	0	4
Orana and Far West	0	2	3	5	1	2
Central West Region	1	0	1	1	2	2
South Eastern Region	1	0	1	0	0	1
South West Region	0	4	4	6	0	2
Total	34	38*	45	64*	51	78*

*excluding the Hunter area.

The detection of meningococcal meningitis by passive surveillance was disappointingly low, with only 19 per cent of cases detected compared to 54 per cent for the same period in 1990[1].

However, the first six months of 1991 coincided with the introduction of computer databases to PHUs and the low detection rate may reflect teething problems. Active surveillance fared better, detecting 89 per cent (34/38) of meningococcal meningitis and 72 per cent (130/180) of all bacterial meningitis identified by the ISC. The overall rate

Continued on page 101 ►

Maternal screening for Down's syndrome

► Continued from page 100

amniocenteses. However, even if all women who screen positive accept amniocentesis, only 61 per cent of Down's syndrome pregnancies will be detected. Triple test screening will also result in large numbers of false positive test results and some false negative results. Each mother screened will need to be carefully advised on the meaning of the test result, be it positive or negative. The result of an amniocentesis is known after about three weeks, and should be available by the 20th week of pregnancy so the family may decide whether to proceed with the pregnancy. Counselling services will need to be available almost immediately the test results are available, so a decision about amniocentesis can be reached and acted on promptly. For families living in rural regions, an amniocentesis will entail travel to a major centre at short notice.

The rate of some other chromosomal defects increases with increasing maternal age. These include trisomy 18, trisomy 13 and XXY abnormalities. Some trisomy 18 pregnancies have been detected after screening with the triple test, but the reliability of the test in regard to trisomy 18 is not known. If amniocentesis is offered only to women whose risk is high according to the triple test, regardless of maternal age, some affected pregnancies which would have been detected under screening based on maternal age will be missed.

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Meningitis surveillance 1991

► Continued from page 98

of detection was lowered in part by some PHUs actively seeking only cases of meningococcal meningitis.

Table 3 shows that while most PHUs did not identify as many cases from their Area/Region as the ISC, two PHUs identified more. There are several explanations for the discrepancies. Active surveillance, in some instances, was based on hospital admissions while the ISC reports separations so patients may have been admitted in the surveillance period but discharged after June 30, 1991 when the ISC closed. Also, patients may cross borders. In some cases more detail was provided on active surveillance. For example, a case identified to South Western Sydney PHU as meningococcal meningitis, on clinical grounds, was discharged as 'meningitis due to unspecified bacterium (ICD9-320.9)' because no organism was isolated. Finally, the ISC was not a full enumeration of all hospital separations for the study period. Full enumeration of all public hospital separations began on July 1, 1991 and will begin for all private hospital separations on July 1, 1993, which will alleviate this problem in the future.

Innovative changes to public health in NSW should assist passive surveillance of meningitis. The Public Health Act 1991 has made Hib meningitis a notifiable condition. It is to be notified by both hospitals and laboratories, which should not only increase detection rates but allow swift public health action to prevent secondary cases. This is also the case for meningococcal meningitis.

Another positive public health development has been the licensing of a first vaccine against Hib infections. Although immunisation for Hib infections will not be added to the childhood immunisation schedule until a vaccine that is suitable for children less than six months of age becomes available[10], a PRP-D vaccine is available on a retail basis for children aged 18 months.

RECOMMENDATION

That the NSW Health Department Inpatient Statistics Collection provides the most cost-effective method for annually reviewing trends in bacterial meningitis in NSW.

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