The management of contacts following a case of nosocomial meningococcaemia MCNin a children's ward

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Abstract

This report describes the response to a very rare instance of meningococcal disease in a child hospitalised for an unrelated condition. The circumstances of the case meant that there were large numbers of staff, patients, family members and visitors who were possible contacts. Staff from two public health units in the vicinity of the hospital were called in to assist in the coordination of the assessment of the exposure status of contacts, the provision of chemoprophylaxis and counselling of contacts. The response team was compelled to make a broad interpretation of the guidelines for prophylaxis of contacts because of the uncertainty about when the case may have acquired the infection and the many opportunities for possible transfer of the infecting organism to contacts. A total of 107 people were assessed, with 68 receiving some form of prophylaxis. A number of interesting problems arose during the conduct of the response. There were no more cases of meningococcal disease amongst identified contacts or their contacts.

Introduction

It is known that secondary cases of invasive meningococcal disease may occur amongst close contacts of persons with the disease. In order to reduce the risk to contacts, it is now standard practice to administer prophylactic antibiotics to persons identified as being at risk.

The National Health and Medical Research Council (NH&MRC) has issued guidelines for management of contacts⁻¹. It is recommended that chemoprophylaxis should be offered only to close contacts, including household members, dormitory contacts, staff and children in childcare facilities and those directly exposed to the patient's oral secretions. Only health care workers who perform mouth-to-mouth resuscitation or intubation, or who are in prolonged contact with the patient are considered to be at increased risk.

As nearly all cases of meningococcal disease arise in the community, contacts are usually confined to household and community contacts and to health care workers involved in management of the patient. Such cases are ill when admitted to hospital and are usually isolated in hospital. They therefore pose little or no risk to other patients, to visitors or to staff not directly caring for the patient.

In general, the task of identifying community contacts in need of prophylaxis and coordinating their counselling and management is carried out by public health services staff attached to the state or territory health department; family and hospital contacts are usually dealt with by the infection control unit at the hospital.

Cases of nosocomial meningococcal disease are rarely reported. Usually they occur in hospital staff^{2,3}, patients^{3,5} or carers ⁶ exposed to nasopharyngeal secretions from hospitalised cases or in very close contact with such cases. There has been one report located of a patient, hospitalised for another condition, subsequently developing meningococcal pneumonia from an unknown source while in hospital⁷.

This report deals with a case of a child who, during prolonged hospitalisation in shared ward accommodation for traumatic injury, developed meningococcaemia and died. The unusual circumstances meant that there were a large number of potential contacts all arising within the hospital. Public health services staff were therefore approached by the hospital to coordinate the response. The circumstances of the case and the features of the response are described.

Clinical case

The case was a 22 month old child of Aboriginal descent admitted to a four bed room in a children's ward for a fractured right femur. The child's leg was placed in traction pending application of a hip spica cast. On the 12th day after admission, the patient became irritable and feverish. Blood cultures were ordered. The child's condition deteriorated rapidly and the patient died early the next morning. *Neisseria meningitidis* was isolated from the blood cultures and was subsequently typed as serogroup B. Post mortem examination confirmed the cause of death as fulminant meningococcaemia.

The coordinated response

The Public Health Unit at West Moreton was notified immediately of the death and the laboratory results. Subsequently, the unit was asked to help coordinate the chemoprophylaxis of contacts because of the large numbers involved. On the same day, prophylaxis was initiated at the hospital for health staff attending the patient that morning and for immediate members of the family.

The following morning, a team of two medical officers, a public health nurse and two public health officers assembled from the West Moreton and Brisbane South Public Health Units presented at the children's ward. After discussion with the ward staff and the infectious diseases specialist, and on viewing the four bed room where the child had been located, a working definition for significant contact based on the NH&MRC guidelines was established as any one of the following:

- Mouth-to-mouth resuscitation performed on the affected child.
- Four hours' continuous exposure of a close nature in the preceding 10 days.
- Eight hours' accumulated exposure of a close nature in the preceding 10 days.
- Overnight stay in the room.

The ward staff supplied lists of staff who had cared for the case, patients who had shared the room overnight with the case, volunteer visitors who had ministered to the case and family members who had visited. As many as possible were contacted that day and assessed against the definition for contact. If they met the definition, they were counselled and advised to present at the children's ward as soon as convenient to receive prophylaxis. It was ascertained that a number of parents of patients had stayed overnight in the room and, as they satisfied the definition of significant contact, they were also offered prophylaxis.

As people arrived at the ward they were counselled and provided with written information as required. Children were weighed to determine the correct dosage of rifampicin, and people with contraindications for rifampicin were offered intramuscular ceftriaxone. Consent was obtained before proceeding with the provision of prophylaxis.

Those people who were not contactable on the day were left messages to contact the hospital for advice on how to proceed. Hospital personnel were requested to follow up remaining staff. Arrangements were made for the accident and emergency department at the hospital to process people who presented in the following days. The final tally of possible contacts and their outcomes is shown in Table 1.

A variety of problems had to be dealt with during the course of the response:

- High turnover of patients in the shared room in the nominated time period.
- The number of parents who stayed overnight with their children in hospital.
- The number of other people (Red Cross workers and visitors) involved in the care of the case.
- The high number of pregnant parents and staff who required IM ceftriaxone.
- A number of unusual medical conditions in contacts necessitated further advice about the use of either rifampicin or ceftriaxone.
- Because of the large numbers of contacts to be processed, there was uncertainty whether the hospital pharmacy would be able to obtain sufficient doses of rifampicin.
- No database was available to access information about staff numbers, so all contacts had to be traced manually through staff rosters.

Category	No. assessed	Treated	Rifampicin	Ceftriaxone
Family member	11	11	. 9	2
Medical staff	6	6		6
Nursing staff	53	21	13	8
Inpatient	20	20	20	n malue teached this
Inpatient's relative	8	8	4	4
Red Cross worker	9	2	2	n'i susido entra baller
TOTAL	107	68	48	20

Table 1. Category, numbers and treatment outcome for contacts of case.

A statement was prepared for a media release and the health minister was briefed. Two weeks later, a debriefing meeting was held with representatives from the health district, the hospital and the public health units to discuss the operation and make recommendations. While it was considered that the important issues were addressed in a timely fashion, it was believed that the response could have been more efficiently coordinated. To that end, *Management of important notifiable infectious diseases* procedures have been developed within the district.

Discussion

It should be pointed out that the meningococcaemia which developed in the child was a presumed case of nosocomial infection. There were no other cases of meningococcal disease in the hospital at the time so the source of the infection remains unknown. The length of hospitalisation prior to development of disease symptoms makes it unlikely that infection was acquired before admission.

The NH&MRC guidelines ¹ define contacts as persons in (close) contact with the patient during the 10 days preceding onset of disease. As the case had been hospitalised for longer than 10 days, the response team was obliged to choose the full 10 day period in compiling the contact list. The combination of this factor and the more intensive nature of the nursing care required by the case meant that there were a large number of people to be considered.

In choosing who should be offered prophylaxis, the response team followed the NH&MRC recommendations in relation to the family contacts and the patients and relatives who shared overnight dormitory accommodation with the case. However, when it came to consideration of health care workers and others who had cared for the patient, the response team needed to make a broad interpretation of the guidelines because of the unusual circumstances of this case. The very close and prolonged nursing care required and the fact that the patient's condition was not suspected meant that there were many opportunities for possible transfer of infection to carers. Consequently, many more medical and nursing staff (27 in total) were prophylaxed than would usually occur. It was also considered important to try to eliminate the chance of carriage of a pathogenic strain of meningococcus by staff in a children's ward.

While it remains unproven that the intervention was an essential factor in preventing further infections, there were no secondary cases linked to this case of meningococcal disease. The collaboration between the public health and hospital services was seen as a useful learning experience and could be used as a blueprint for handling any future events of this nature.

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