patients under his care, and to Miss D Brown and Staff Nurse R Gibson for technical help.

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Meningococcal infections during infancy: confidential inquiries into 10 deaths

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Summary and conclusions

The first 10 deaths from meningococcal infections in children aged under 2 years that were reported to a DHSS multicentre study were reviewed. Confidential inquiries were made of the parents, family doctors, health visitors, and hospital staff concerned with each case, and management was discussed with a paediatrician and pathologist. Diagnosis and treatment were often delayed because doctors did not realise the importance of the purpuric rash. One child died at home, and by the time they were admitted to hospital all the remaining nine were shocked and needed resuscitation. Prodromal symptoms, mainly changes in behaviour, preceded the rash in all cases.

These prodromal symptoms should arouse the suspicion of septicaemia and prompt a search for petechiae so that early effective treatment may be started.

Introduction

Meningococcal infections may kill within a few hours of the onset of symptoms, and the death rate is particularly high among children aged under 2 years.[1 2] The difficulties of diagnosis have recently been emphasised,[3] and a high degree of suspicion is necessary if the correct diagnosis is to be made in time for the illness to be treated successfully. We report here on confidential inquiries into the first 10 deaths from meningococcal infections reported to the DHSS multicentre study of postneonatal mortality.

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Patients and methods

The DHSS multicentre study of all deaths of children aged 1 week to 2 years began collecting data in April 1976. During the first two years of the study, when 623 deaths were reported from seven centres in England and Scotland, 10 children died from *Neisseria meningitidis* infection, confirmed either by isolation of the organism or by the characteristic haemorrhagic rash and necropsy findings. Nine deaths occurred in hospital and one at home.

A standardised interview was obtained with each of the parents soon after the funeral; it included detailed questions about the symptoms of the terminal illness and the sequence of events leading to death. This information was compared with and supplemented by information gathered from hospital records of the admission and interviews with the family doctor, health visitor, and hospital attendants. When the documentation was completed each case was discussed locally with the help of a paediatrician and a pathologist. All those concerned with the medical care of the child were invited to this discussion and generally most came.

Results

Prodromal symptoms of altered behaviour preceded the appearance of a haemorrhagic rash in all cases by an average of 13 hours. The common symptoms reported were: irritability (9 cases), fever (8), missed feeds (7), an altered cry (6), drowsiness (6), and pallor (3). A diffuse, pale pink, macular prodromal rash affecting the face and trunk, and similar to that described by Easton *et al*, was noted in two cases.[4]

The sequence of events is shown in the table. One child died at home and was only observed to have a rash when found dead in the

Progress of meningococcal illnesses in the 10 children

Case No	Age (weeks)	Intervals from onset of symptoms (h)			
		To appearance of purpuric rash	To first GP contact	To admission	To death
1	35	9	14	15	16
2	22	13	9	16	19
3	42	12	*	13	16
4	25	3	7	9	13
5	31	13	14	19	21
6	9	28	24	25	38
7	39	14	6	6	15
8	9	13	15	16	21
9	85	8	9	14	40
10	11	14	5	Home death	14

*No GP contact. Fortuitous arrival of health visitor on a routine visit led to admission.

early hours of the morning, five hours after taking part of a last feed. Nine children were seen by a doctor at home, two of them on two occasions and one three times but never by the same doctor. Nine of the 13 contacts were made at a time when the general practitioner was shown scattered petechiae or a more confluent haemorrhagic rash. At no consultation was the correct diagnosis made, and three of these contacts did not result in admission or the giving of antimicrobial treatment, as the child did not appear unduly ill. On two of these latter occasions, the family doctor specifically noted that there was no neck stiffness. At the case discussion doctors invariably stated that they had never seen a similar rash before and therefore did not realise its importance.

Seven of the nine children who died in hospital had a typical haemorrhagic rash by the time of admission, and, although all were shocked on arrival and needed urgent resuscitation, only three had been rushed to hospital by car. The others had an average delay of 65 minutes while an ambulance was called and reached hospital. In relation to the rapidity of development of the illness there was often a long interval between the onset of the rash and admission to hospital: in four cases the interval was six hours.

In two cases junior hospital doctors failed to diagnose meningococcal infection after admission to hospital because they had not seen such a rash before and therefore started inappropriate treatment. In one case the correct diagnosis was delayed for one hour and in the other for three hours.

Discussion

The haemorrhagic rash, a sign of intravascular coagulation, is the commonest single aid to diagnosing meningococcal infections,[4] although it is not pathognomonic of the organism. In this series the importance of the rash was not appreciated before admission or, on two occasions, after admission because the doctors had not seen a similar rash. Failure in recognition caused delay in the start of appropriate treatment; all the children were shocked by the time of admission.

The gravest prognostic sign is the onset of shock,[2] and antimicrobial therapy needs to be given before its onset to be effective. Death may occur within a few hours of the onset of symptoms, and a history of severe non-specific symptoms of changes of behaviour should raise the possibility of septicaemic illness and prompt a search for petechiae, even if the child does not seem particularly ill. Meningitis, despite the misleading name of the causative organism, is often absent in fatal cases of meningococcal infections, and an examination to elicit meningism, especially in young children, is likely to prove fruitless.

Once a rash has appeared, the child should be transferred to hospital immediately, and, if possible, parenteral benzylpenicillin should be given en route. This policy will rarely confuse the differential diagnosis and may avert a tragedy provided the policy is continued in hospital.

We thank the family doctors and health visitors who so readily took part in the discussions of these cases and provided valuable insights into the problems of dealing with meningococcal infections in the community. The members of the steering committee of the DHSS multicentre postneonatal study provided advice and criticism. The work was funded by a grant from the DHSS.

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Alcoholism in the general hospital

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Summary and conclusions

To assess the prevalence of alcoholism among people admitted to hospital 303 patients completed a drinking questionnaire. A total of 59 (19·5%) were found to have a drinking problem, which constituted a sixfold greater prevalence than recorded in a community survey using the same technique. The drinkers were mostly men and tended to be younger than the non-drinkers and to smoke more heavily, live in more crowded conditions, and be of lower social class. Significantly more of the drinkers had at least one parent who was an alcoholic.

The results confirm that hospital inpatients comprise a larger proportion of alcholics than found in the general population. Hence medical staff should be alert to such patients, so that treatment may be initiated at an early stage of social decompensation.

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Introduction

Patients diagnosed as alcoholic may be difficult to treat at an early stage of their illness because of their unwillingness to accept the diagnosis or recognise that they have a problem. Nevertheless, any method that will detect incipient alcoholism should be exploited. General practitioners may diagnose only about one in 10 of all alcoholics,[1] and surveys of hospital wards suggest that a similar proportion of inpatients with drinking problems go unrecognised. In other countries[2-10] hospital inpatients comprise far more alcoholics than found in the general population. If the same applies in the United Kingdom physicians and surgeons should be alerted to their role in detecting the incipient alcoholic. To test this possibility we have investigated three groups of hospital attenders—namely, general medical inpatients, orthopaedic inpatients, and casualty reattenders.

Methods and patients

Patients admitted to a general medical ward and an orthopaedic ward and attending the casualty department were interviewed using a semi-structured drinking questionnaire as described by Edwards *et al*,[11] but without flash cards, together with a short demographic questionnaire. The distribution of scores did not conform to a bimodal curve, and the results were therefore recorded using the five-point cut-off of Edwards *et al*[11] and an eight-point cut-off correspond-