A primary care perspective of meningococcal disease
Annette L. Wood and Sarah J. O’Brien

Abstract
Background It is generally agreed that pre-admission benzyl penicillin improves the outcome in infection by Neisseria meningitidis. Even so, only a minority of cases in Birmingham received such treatment. The aim of this study was, therefore, to determine the views of general practitioners (GPs) in Birmingham on the early management of meningococcal disease, including the use of parenteral antibiotics.

Methods A standard semi-structured confidential questionnaire was posted to GPs on the list of Birmingham Family Health Services Authority. The questions covered the GPs’ clinical experience of meningococcal infection and their views on the pre-hospital management of suspected cases of Neisseria meningitidis.

Results Completed questionnaires were received from 372 GPs, a response rate of 70 per cent. Nearly all GPs said they carried benzyl penicillin in their on-call bag (353; 95 per cent) and would give it to a patient they suspected had meningococcal disease (361; 97 per cent). A total of 208 GPs (56 per cent) would not give parenteral chloramphenicol to a patient they suspected had meningococcal disease and a penicillin allergy, and only 25 (7 per cent) carried it as an alternative antibiotic. The most common reason for not giving chloramphenicol was unfamiliarity with dosages (132; 63.5 per cent).

Conclusions The vast majority of GPs in Birmingham would apparently give benzyl penicillin to a patient they suspected had meningococcal infection. No single issue emerged to explain why pre-admission administration of benzyl penicillin was so low. Further work is being carried out locally to help translate positive attitudes into a change in behaviour.

Keywords: meningococcal infection, benzyl penicillin, general practitioner

Introduction
It is generally agreed that infection with Neisseria meningitidis should be treated with parenteral antibiotics as soon as is feasible. In previous studies, the percentage of cases with meningococcal disease receiving pre-admission benzyl penicillin ranged from 9 per cent to 59 per cent. A number of reasons have been postulated for the variation in observed practice, including difficulties in obtaining the antibiotic. Therefore in 1993, Birmingham Family Health Services Authority (FHSA) distributed vials of benzyl penicillin to all general practitioners (GPs), together with a laminated card detailing the presentation of meningococcal infection and a dosage schedule for benzyl penicillin. Despite this, a review of the cases of meningitis or meningococcal disease known to the Consultants in Communicable Disease Control (CSCDC) found that only a minority of cases (15 per cent) received such treatment. Similarly poor levels of pre-admission benzyl penicillin have also been described recently on Merseyside. This study was therefore carried out during 1995 to determine possible reasons for the perceived reluctance of GPs in Birmingham to use benzyl penicillin.

Methods
A standard semi-structured confidential questionnaire was posted to all GPs registered with Birmingham FHSA in 1995. A reminder sent to GPs allowed them to specifically state if they did not want to take part in the study. The questionnaire sought information from GPs about their clinical experience of meningococcal disease and their views on aspects of its early management. A question was included on useful sources of information on the topic, to inform any future initiatives about meningococcal infection for local GPs.

The data were entered onto an EPIINFO database and analysed by means of Students t-test. An analysis of the responders and non-responders was made on a number of parameters. These were: (1) the GP being in a single-handed practice or one where general practice registrars or trainees were based; (2) the socio-economic status of the population served by the GP; (3) the cumulative incidence of meningococcal disease in the locality where the GP was based. These parameters were used to assess the impact of peer pressure or teaching commitments on maintaining clinical knowledge, the potential workload of the GP and the interest of the GP in the disease as a result of clinical experience.

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Results

Of the 548 GPs listed with Birmingham FHSA, 16 did not want to take part in the study, leaving a sample size of 532. Completed questionnaires were received from 372 GPs, a response rate of 70 per cent. There was no statistical difference between the responders and non-responders with respect to being based in either a single handed practice (60/372 compared with 110/532, \( p > 0.05 \)) or a training practice (112/372 compared with 159/532, \( p > 0.05 \)). There was, however, a statistically significant difference in the response rates from those GPs practising in the most deprived areas compared with those in the most affluent parts of Birmingham (143/272 compared with 229/260, \( p < 0.001 \)). No relationship was found between the local cumulative incidence of meningococcal disease over the past seven years and the response rate.

Two hundred and thirteen GPs (57 per cent) had seen a case of meningococcal disease as a hospital doctor, 160 (43 per cent) as a GP. Ten GPs had seen a case as both a hospital doctor and a GP. Nine GPs had never seen a case of meningococcal disease.

The preferred method of admission for a suspected case of meningococcal infection varied. The majority of GPs (342; 91 per cent) would contact the admitting doctor and arrange transport to hospital for a suspected case. Nearly one-third of GPs (113; 30 per cent) would use Accident and Emergency (A&E) services directly, either by arranging admission of the patient to the A&E department (89; 24 per cent) or by telling the patient to go straight to the A&E department (24; 7 per cent). Some GPs stated that the method of admission depended on circumstances and gave more than one answer.

Benzy1 penicillin was carried in the on-call bag of 353 GPs (95 per cent). The antibiotic was also kept in the practice refrigerator (171; 46 per cent), elsewhere in the practice (116; 31 per cent) or at home (70; 19 per cent). Three hundred and sixty-one GPs (98 per cent) said they would give benzyl penicillin to a patient they suspected had meningococcal disease. Of the 11 who would not, the most commonly stated reason was uncertainty about clinical presentation (five GPs). Only one of the nine GPs who had never seen a case of meningococcal infection gave this as a reason for withholding treatment.

A minority of GPs (25; 7 per cent) carried parenteral chloramphenicol in their on-call bags as an alternative to penicillin. Reasons for not carrying it varied (Table 1). The majority of GPs (208; 56 per cent) stated they would not give parenteral chloramphenicol to a suspected case of meningococcal disease with a penicillin allergy. The most common reasons stated were unfamiliarity with dosages (132; 64 per cent), uncertainty about clinical presentation (83; 40 per cent) and not wanting to give an intravenous injection to a child (25; 12 per cent). Regular updates on meningococcal infection were considered the most useful source of information (300; 81 per cent), followed by clinical management cards (255; 69 per cent) (Table 2).

Discussion

This study was undertook to try and determine why the distribution of benzyl penicillin to all GPs in Birmingham had not been reflected in an increased number of patients with suspected meningococcal disease receiving the antibiotic before hospital admission. The response to the survey was good although GPs from the more affluent areas of Birmingham were more likely to have responded. Nevertheless, the findings provided useful information for the Department of Public Health.

A number of reasons are persistently advanced to explain the generally small proportion of cases receiving benzyl penicillin. These include administration of the drug delaying hospital admission, the belief that the patient will be treated quickly once in hospital, diagnostic dilemmas, the fear of causing anaphylaxis and interference with hospital tests.

No single issue emerged to explain why GPs did not appear to follow national recommendations for the early treatment of meningococcal infection. It is unlikely that not having rapid access to benzyl penicillin played a significant role in the initiation of treatment in Birmingham, as so many GPs said they carried the antibiotic in their bag. However, the benefit of a GP carrying the drug in their on-call bag but not using it is debatable. We have shown previously that pre-admission treatment does not significantly delay admission to hospital. Furthermore, we have demonstrated that patients who have not been treated in the community may wait some considerable time once admitted before treatment is started.

Table 1 Reasons for not carrying parenteral chloramphenicol \( (n = 208) \)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>Use penicillin instead</td>
<td>50</td>
<td>24</td>
</tr>
<tr>
<td>Never considered it</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>Not necessary</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>No-one gave it to them/no-one suggested it</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>Fear of side effects</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Delay admission</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2 Sources of information on meningococcal disease that GPs find useful \( (n = 370) \)

<table>
<thead>
<tr>
<th>Source</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular updates</td>
<td>300</td>
<td>81</td>
</tr>
<tr>
<td>Treatment and clinical detail cards</td>
<td>255</td>
<td>69</td>
</tr>
<tr>
<td>Presentation at Postgraduate Medical Centre</td>
<td>218</td>
<td>59</td>
</tr>
<tr>
<td>Patient leaflet</td>
<td>174</td>
<td>47</td>
</tr>
<tr>
<td>Drug information card</td>
<td>170</td>
<td>46</td>
</tr>
<tr>
<td>Presentation at practice</td>
<td>133</td>
<td>36</td>
</tr>
</tbody>
</table>
Another more likely reason for not using pre-admission benzyl penicillin is difficulties with the initial diagnosis. The GPs in this study raised diagnostic dilemmas as a reason for not giving benzyl penicillin, despite the fact that most stated they had seen a case of meningococcal infection in the past. The signs and symptoms of meningococcal infection are, however, often non-specific, particularly in patients under the age of five years. The characteristic rash might be present but often is not, resulting in difficulties with diagnosis and benzyl penicillin not being given. Unfortunately, the speed with which meningococcal septicaemia occurs is such that a second opportunity to assess and treat the patient does not always present itself. A high index of suspicion and a low threshold for initiating treatment is therefore needed when potential cases of meningitis or meningococcal disease are assessed in the community.

Just over a half of the GPs in this study would not use chloramphenicol for a patient with a suspected penicillin allergy. However, it is known that only a minority of patients reported to be allergic to penicillin are confirmed as such. It is therefore imperative that a patient is not labelled as ‘allergic to penicillin’ lightly and such a report should be scrutinized further. This is especially important as only a small minority of GPs carried chloramphenicol in their on-call bag. It is, perhaps, not surprising that chloramphenicol was carried infrequently by GPs. Given that parenteral chloramphenicol is rarely used, and even then it tends to be in the hospital setting, it is also not surprising that GPs were unfamiliar with the appropriate dosage. This should no longer be the case, as the latest guidelines on controlling meningococcal disease incorporate a section on the use of chloramphenicol for early treatment, including dosages. It was, perhaps, interesting that one of the reasons advanced for not using chloramphenicol was a reluctance to give intravenous antibiotics to a child, especially as the Chief Medical Officer’s recommendations for early use of benzyl penicillin include the fact that the drug should preferably be given intravenously. It is increasingly common for cephalosporins to be used as first line treatment of suspected meningococcal disease, especially in paediatric units. It is possible that GPs who did not carry chloramphenicol did not have access to cephalosporins in an emergency. Whether or not these would be used for penicillin-allergic patients is another matter, as there is a small chance of cross-reactivity between the two types of antibiotics.

Pre-admission antibiotics might influence the likelihood of laboratory confirmation of the disease. However, the increasing use of investigations that do not rely on culture of the meningococcus, such as polymerase chain reaction and serology, should reduce this impact.

As some patients with suspected meningococcal infection self-refer to hospital, the interface between the emergency services and the admitting clinical teams should ensure parenteral antibiotic treatment is started promptly. The use of jointly developed protocols might facilitate this process.

Although the majority of GPs in this study expressed willingness to administer benzyl penicillin to a suspected case, this was not reflected in the number of eligible patients who received such treatment in Birmingham. Such disparity between knowledge and practice has also been described in Rotherham, where, despite increased local awareness because of an outbreak, parenteral benzyl penicillin was only given to a very small proportion of patients where the diagnosis was suspected by the GP. This is in contrast with other areas of antibiotic prescribing in primary care where GPs have been criticized for inappropriate antibiotic usage. The reasons for this apparent discrepancy are not obvious and can only be addressed by a confidential anonymized audit of cases with the full participation of GPs, similar to that carried out in Cardiff recently.

One problem might be that conclusive data to show that pre-admission administration of benzyl penicillin significantly improves both the morbidity and mortality from meningococcal infection are unfortunately not available. One likely reason for the conflicting results reported in studies is lack of stratification by the initial presenting condition of the patient as well as the use of pre-admission benzyl penicillin. However, the consensus remains that patients with suspected meningococcal disease should be given parenteral antibiotics as soon as possible. The role of the GP in both considering the potential diagnosis and initiating early treatment is therefore extremely important for the majority of cases who are admitted via this route. Recently published evidence from Gloucestershire suggests that encouraging local GPs to give parenteral benzyl penicillin to patients suspected of having meningococcal infection before hospital admission pays dividends but that patience and persistence are required. The proportion of patients receiving benzyl penicillin rose from 18 per cent in the period 1982–1988 to 40 per cent in the period 1989–1995. Further work is being carried out in primary care in Birmingham, to encourage such change in behaviour.

Acknowledgements

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References


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