



# Early management of meningococcal disease

## *Do attitudes of GPs influence practice?*

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### BACKGROUND

Survival from early meningococcal disease might be improved if general practitioners followed guidelines by immediately administering parenteral antibiotics (before hospital referral).

### METHODS

Structured telephone interviews with 20 GPs who had previously treated meningococcal cases.

### RESULTS

General practitioners knew guideline recommendations for early management of meningococcal disease: early parenteral antibiotics would be given by about half the GPs entertaining a diagnosis of meningococcal infection. Barriers to immediate treatment were: diagnostic uncertainty, regarding the case as nonurgent, and practising close to a hospital.

### DISCUSSION

Diagnosing meningococcal disease is difficult in general practice. Early antibiotic administration for suspected cases is appropriate even in close proximity to referral hospitals.

Evidence for the immediate administration of parenteral antibiotics for meningococcal infection is weak. There are no randomised trials, although some observational studies show better outcomes.<sup>1,2</sup> Nevertheless it is assumed that there is potential for antibiotics to prevent rapid deterioration,<sup>3,4</sup> and guidelines aimed at general practitioners recommend that deaths from meningococcal disease can be reduced by administering the first dose of parenteral antibiotics early – even before hospital referral.<sup>5–7</sup> However, adherence to these guidelines remains low.<sup>8,9</sup> Only about one-quarter of patients with meningococcal infection referred to hospital by their GP were also given antibiotics before admission.<sup>8,9</sup>

We decided to explore the knowledge, attitude and practice of GPs giving initial parenteral antibiotic doses with a view to determining the barriers to this.

## Methods

We interrogated a state health meningococcal disease dataset to identify cases seen by a GP less than 24 hours before admission, and attempted to conduct a 15 minute telephone interview with the GP. Out of 71 potential cases, 12 had no GP contact details available, two did not meet the study case definition upon verification with GPs, 13 were not seen at a general practice, 10 GPs did not call back, and five were unable to give interviews.

Reminder calls were made to surgeries that did not reply, unless they had originally been sent written requests.

Interviews were conducted with the remaining 29 GPs, of whom nine did not meet the study criterion of having considered the meningococcal diagnosis. This left 20 GPs. The interview format was based on the PRECEDE-PROCEED model<sup>10,11</sup> to provide a framework for determining the barriers to providing early parenteral antibiotics. We encouraged free discussion as well. The format was pilot tested with GPs not qualifying for the study. Some qualitative information is included from all 29 interviewed GPs.

We verified whether parenteral antibiotic was administered, and classified the management of each case into categories: within guidelines; appropriate but outside the guidelines (mostly for rural GPs who immediately took over the management at a nearby hospital); inadequate index of suspicion; and inadequate management. We asked about future practice with the question: 'If you had a child with an obvious meningococcal rash, what would you do?'

## Results

The 20 GPs interviewed were mostly Australian trained (75%), male (75%), with postgraduate medical qualifications (65%) and considerable working experience (89%

**Table 1. Knowledge, attitude and practice indicators**  
(n=20 for each; responses not mutually independent where total does not add up to 20)

<b>1. In response to: 'If you had a child with an obvious meningococcal rash, what would you do now?' – mention made of using:<sup>a</sup></b>	
1 Benzyl-penicillin	17
2 Ceftriaxone	4
3 Inappropriate antibiotic (negative indicator)	2
4 Intramuscular injection okay to use	18
<b>2. Are you aware that difficulties in taking blood cultures should NOT stop the giving of first dose parenteral antibiotic?</b>	
1 Yes	19
2 No	1
9 Unclear answer	0
<b>3. Should IM penicillin still be given in a suspected meningococcal case, with a past history of a simple rash following penicillin use?</b>	
1 Yes <sup>b</sup>	11
2 No	4
3 Unsure	0
4 Would use alternative antibiotic instead	5
<b>4. In a case of suspected meningococcal disease in your practice, how much do you think there is really to be gained by giving the first dose parenteral antibiotic before sending the patient off to hospital?</b>	
1 Significant gains	10
2 Moderately important	2
3 Debatable	1
4 Very little	2
5 Nothing	1
7 Academic	1
8 Depends on severity	3
<b>5. Do you see any need to change your current practice?</b>	
1 No	18
2 Possibly	1
4 Unsure	1
<b>6. Are there any particular aspects of meningococcal disease management that you would like more information on?<sup>c</sup></b>	
1 No information needed	17
3 Information on suspicious signs/symptoms <sup>d</sup>	0
9 Other types of information not listed	2
<b>7. Antibiotic administration for actual case based on interview</b>	
A Confirmed antibiotic administration	9
B Management interpreted to be within guidelines OR appropriate for the situation <sup>e</sup>	11
<b>8. If you had a child with an obvious meningococcal rash, what would you do now?<sup>f</sup></b>	
1 Give parenteral antibiotic	18
2 Continue immediate care in hospital	0
3 Depends on severity	1
9 Unsure	1

a = categorisation of free format responses (respondents were not prompted for antibiotic type/knowledge of appropriateness of IM injections); all mutually independent

b = appropriate response according to guidelines<sup>1</sup>

c = options not specifically prompted

d = a number of other GPs indicated the general need for information/guidance on picking up early cases during free-format discussions

e = (see text for details)

f = categorisation of free-format responses

graduated before 1990).

Most GPs were aware of the appropriate antibiotics and the acceptability of using the intramuscular route of administration (*Table 1*). Some referred to parenteral antibiotics not recommended by guidelines. Some were uncertain about alternative management when there was possible penicillin allergy. Most perceived their knowledge of meningococcal disease to be adequate enough not to need further enhancement. Yet only about half thought there were unequivocal benefits from giving the first dose of antibiotic.

Diagnostic uncertainty was the most commonly offered reason for not giving the antibiotic early (four of 11 cases not given the antibiotic). Next was regarding the case as nonurgent, or having a hospital close by (three cases each).

Important environmental factors were time management (4 GPs); hospital proximity (especially if <30 minutes away, as was the case in 90%); and a close working relationship with local hospital triage personnel (although one GP observed that no antibiotic had yet been administered 1.5 hours later at a cursory follow up visit).

General practitioners administered the initial antibiotic when the presentation was typical, the patient obviously unwell, or deteriorating. If a rash was present the antibiotic was given immediately in 47% of cases, and in no cases when not. Other reasons for not giving the antibiotic included advice from a nearby emergency department; perceived disapproval from the National Prescribing Service of antibiotics generally; (potential) difficulties with intravenous access; and not having the antibiotic immediately to hand. Most GPs had seen Queensland Health meningococcal guidelines, but only 20% had seen the national guidelines.<sup>5</sup>

Most GPs worked with practice nurses (70%) and other GPs (85%). All had benzylpenicillin available at the time of the interview (although some did not at the time of treating their meningococcal case).

Interaction with colleagues may have reinforced appropriate behaviour. Most commonly this had been through informal

chats with a number also attending meetings on meningococcal disease.

## Discussion

This study had some unavoidable weaknesses: the numbers were low (precluding meaningful statistical analysis), and there was probably selection bias, so that the GPs may not have been representative. Nevertheless we overcame inherent validity issues by interviewing GPs who had actually managed a meningococcal case recently.

We found twice as many GPs would administer antibiotics early for suspected meningococcal cases compared to the 26% reported previously in Queensland,<sup>9</sup> 23% in New Zealand,<sup>12</sup> and 27% in the United Kingdom.<sup>13</sup>

The GPs' knowledge was generally up-to-date, although the presence of a rash – associated with early antibiotic administration both in this study and in the literature<sup>14,13</sup> – is an unreliable marker for meningococcal infection.<sup>5,15,16</sup> Practice setting factors did not appear to pose important barriers to managing meningococcal disease. General practitioners wanted help in diagnosing early presentations of meningococcal disease, a concern echoed by the literature.<sup>14,1</sup>

A recent Australian publication<sup>15</sup> overviews the complex and difficult issue of diagnosing meningococcal infection early. Further specific information should be made accessible to GPs; such promotional campaigns can improve rates of giving of pre-hospital antibiotics earlier (up to 86%), as demonstrated in the UK.<sup>17,18</sup>

### Implications of this study for general practice

- Parenteral antibiotics should be given before hospital referral for patients suspected of having meningococcal disease (even if a referral hospital is nearby).
- Most GPs are aware of guideline recommendations for early management of meningococcal disease, but only about half thought there were unequivocal benefits from giving the first dose antibiotic.
- Barriers to immediate treatment were: diagnostic uncertainty, regarding the case as nonurgent, and practising close to a hospital.

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