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Variations in chemoprophylaxis for meningococcal disease: a retrospective case note review, analysis of routine prescribing data and questionnaire of general practitioners

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Abstract

Background

Invasive meningococcal disease is a significant cause of mortality and morbidity in the UK. Administration of chemoprophylaxis to close contacts reduces the risk of a secondary case. However, unnecessary chemoprophylaxis may be associated with adverse reactions, increased antibiotic resistance and removal of organisms, such as *Neisseria lactamica,* which help to protect against meningococcal disease. Limited evidence exists to suggest that overuse of chemoprophylaxis may occur. This study aimed to evaluate prescribing of chemoprophylaxis for contacts of meningococcal disease by general practitioners and hospital staff.

Methods

Retrospective case note review of cases of meningococcal disease was c district from 1st September 1997 to 31st August 1999. Routine hospital a prescribing data was searched for chemoprophylactic prescriptions of rifa questionnaire of general practitioners was undertaken to obtain more de

Results

Prescribing by hospital doctors was in line with recommendations by the Communicable Disease Control. General practitioners prescribed 118% m than was recommended. Size of practice and training status did not affec prescribing, but there were significant differences by geographical area. prescribing occurred in areas with high disease rates and associated pub close contacts did not appear to receive prophylaxis.

Conclusions

Receipt of chemoprophylaxis is affected by a series of patient, doctor and High publicity appears to increase demand for prophylaxis. Some true co appropriate chemoprophylaxis and are left at an unnecessarily increased

Background

Invasive meningococcal disease is a significant cause of morbidity and m Kingdom and the commonest infectious cause of death under the age of 3000 cases were notified with an overall case fatality rate of around 8% risk of a secondary case of meningococcal disease amongst household c 450 and 1650 times that of the general population [3-6]. This is in part e household and kissing contacts frequently carry the same pathogenic str

Chemoprophylaxis is given to close contacts of cases to eliminate naso-p meningococci. Prophylaxis reduces, but does not eliminate, the risk of se prophylaxis is not given to appropriate contacts then preventable second Unnecessary use of prophylaxis is associated with increased antibiotic re effects, and removal of non-virulent meningococci and *N. lactamica;* both immunity and provide a competitive flora against colonisation with virulen [9-11].

UK guidelines identify who should receive prophylaxis [12], and in this st prescribing of prophylaxis by hospital staff and general practitioners aga

Methods

All confirmed and clinical cases [13] of invasive meningococcal disease ar Southern Derbyshire Health Authority between 1st September 1997 and identified from the Notifications of Infectious Diseases database and dat surveillance of meningococcal infections undertaken by the Communicabl Centre, Trent. Data on contacts identified at the time were obtained from Communicable Disease Control's (CCDC) records and were assessed aga guidelines [12]. Data were recorded regarding the method of contact tra telephone, and by whom if face to face contact had taken place), whethe by laboratory investigations, the serogroup of identified organisms and t identified.

General practitioner prescribing data from Prescribing Analysis and Cost (1997 to 31st August 1999 were examined to identify possible chemoprop rifampicin, ciprofloxacin and ceftriaxone. Hospital dispensing data for rifa for chemoprophylaxis in the hospital protocol during this period) were ex March 1999 to 31st August 1999. Computerised data were not available

All 2-day courses of rifampicin were assumed to be for eradication of mer Ciprofloxacin is widely used in general practice, but the only indications f in the British National Formulary are gonorrhoea and chemoprophylaxis f [15]. All prescriptions for single dose ciprofloxacin were assumed to be fo assumption was made for single 250 mg doses of ceftriaxone.

As PACT data do not identify individual patients a questionnaire was sen

Southern Derbyshire. This covered the use of rifampicin, ciprofloxacin and prophylaxis during the study period. The questionnaire also requested the the initials of the index case for the contact, the drug prescribed and the Practices were free to obtain the information by whatever method they f the context of their own practice. This information was linked with the d contacts to identify which contacts had been prescribed prophylaxis. Pra option to indicate if they were unable to retrieve the relevant data.

For those who had received a prescription, an assessment was made an one of the following groups:

• known to the CCDC and prophylaxis recommended

• known to the CCDC, related to a known case of meningococcal disease recommended

• not known to the CCDC but related in time and place to a known case,

• known to the CCDC and not related to a known case of meningococcal

Statistics

Student's t tests on log transformed data were used to compare the mea case by serogroup, whether confirmed or clinical case and method of con Whitney U test was used to compare the level of additional prescribing p response status to questionnaire and training status of the practice. The size of the practice and the number of additional prescriptions per GP wa Spearman rank correlation. Mann Whitney U test was used to determine levels of additional prescribing at local authority level. Linear regression possible relationships between the level of additional prescribing at Loca Towsnend deprivation score and rate of invasive meningococcal disease.

Results

During the study period 134 cases (66 male, 68 female) of meningococca these 88 (66%) were confirmed by laboratory diagnosis and 46 (34%) w 75 that were groupable, 50 (67%) were serogroup B, 24 (32%) were se serogroup Y.

The population estimate for 1998 for Southern Derbyshire was 567,457. meningococcal disease was 7.8 per 100,000 per annum. The rate of clini [13] was 11.8 per 100,000 per annum compared to the England and Wa 6.1/100,000 (rate ratio 1.9, 95% CI 1.5–2.5, $p < 0.0001$)

Contact tracing

In 34 (25%) cases the patient or other key informants were interviewed 24 (18%) by another public health physician and in 51 (38%) cases cont by telephone. In 25 (18%) of cases it was impossible to determine the m

952 close contacts were identified for whom prophylaxis had been recom health physician. The mean number of contacts per case was 7.2 and the number of contacts for each case visited by a public health physician was where contact tracing was done by telephone was 8.3 (Students t test o = 0.03). There were no significant differences in the mean number of cor serogroup, by whether face to face contact tracing was performed by the physician in training, nor by whether the case was confirmed by laborato

The degree of contact with the index case was determined for 697 (73.2 shown in Table 1.

Table 1. Nature of contact.

Prescribing

For 568 (60%) contacts chemoprophylaxis was prescribed by hospital sta
general practitioner (GP) was asked to prescribe. For 88 (9%) contacts t
unspecified.

During the six month period for which hospital prescribing data were ava
were identified from the dispensing records. Of these 11 were for the eli
cases. A further five were contacts where chemoprophylaxis was not rec
instance the prescription might have related to one of three recent case
been identified by the CCDC. For six identified contacts no record could b
prescription had been dispensed, although for two of these the GP had p

Of the 296 contacts for whom GPs were asked to prescribe, 277 were pa
Derbyshire. 604 prescriptions for chemoprophylaxis were identified from
(118%) more than recommended by the CCDC. The rates of disease and
prescriptions per GP for each local authority area are shown in Table 2. N
demonstrated by linear regression between the mean number of additio
for each local authority area and the rate of invasive disease (p = 0.30)
score (p = 0.72). The two areas with high rates of disease (including clu
publicity both had significantly higher prescribing The other large authori
disease, but little publicity, had a significantly lower level of additional pr

Table 2. Rates of meningococcal disease and additional prescriptions per
PACT data) by local authority area

At a practice level, there were no significant differences in estimated add
response status to questionnaire, training status or size of practice.

GP Questionnaires

Fifty-seven out of 80 practices (71%) replied to the questionnaire. Of the
practices) were unable to supply data. Data was therefore obtained from
Chemoprophylaxis was recommended for 142 identified contacts who w
practices whilst the practices identified 179 chemoprophylaxis prescriptio

Figure 1 shows whether or not a record of prescribing existed for the co
recommended to have prophylaxis. Figure 2 shows how many of the reco
chemoprophylaxis had been recommended.

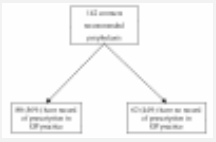

Figure 1. Outcome of recommendations for chemoprop
GP questionnaires

Figure 2. Analysis of prescriptions written by GP practi
questionnaires

In these practices, PACT identified a total of 305 courses of chemoprophy
identified 179. The number of prescriptions for rifampicin, ciprofloxacin a

in Table 3. There is no difference between the ratio of prescriptions reco
rifampicin and ciprofloxacin.

Table 3. Comparison of PACT and GP questionnaire data

Discussion

This study demonstrated that after a case of invasive meningococcal dise
for chemoprophylaxis are dispensed than would be expected from a stric
United Kingdom guidelines [12]. However, some people who are at incre
receive prophylaxis. No practice characteristics examined accounted for c
prescribing between practices, nor did the rate of invasive meningococca
social deprivation in the local authority areas. However, it is plausible tha
publicity in the two areas with highest levels of additional prescribing ma
requests to GPs to prescribe prophylaxis.

There are a number of possible limitations of this study. Firstly, contact a
incomplete. Not all recommendations for prophylaxis may be recorded ar
possible to ascertain the degree of contact from the records. Secondly, c
practices were incomplete. These practices may not be representative. H
numbers of additional prescriptions per GP were similar for responders a
suggests that this has not affected the results.

The mean number of contacts per case of meningococcal disease in our s
found in other studies in the UK[14,16]. Significantly less close contacts
public health physician conducted a face to face interview with the key ir
that contact tracing is more appropriate with less unnecessary prophylax
are interviewed personally. It is, however, possible that there may be a
between the use of telephone interviews and experience at contact trac
to face interviews took place there was no significant difference betweer
identified by the CCDC and public health doctors in training.

There were significant discrepancies between the numbers of prescriptio
those identified by the practices. PACT is an accurate record of prescripti
community pharmacies. Short courses of rifampicin have no other indicati
these are for chemoprophylaxis[14]. By contrast, single dose courses of
for the treatment of gonorrhoea. However, less than 10 isolates of *Neiss*
from general practice in the district each year. [D Bullock, personal comm
will be referred to the genito-urinary medicine service. Even if they were
practice the difference this would make to the overall results presented l
significant amounts of single dose ciprofloxacin were being used for indic
chemoprophylaxis, then the ratio of PACT prescriptions to those recorde
for ciprofloxacin than for rifampicin. As this was not the case, it is likely t
courses were for chemoprophylaxis of meningococcal disease.

The data provided by general practices may have underestimated the pr
chemoprophylaxis. Prescriptions may not be recorded in the records, ma
computer system or may not be retrieved during a search. This may be a
patient is attended by an out of hours service. Although these prescripti
the practice the patient is registered with on PACT, the correspondence
service may not find its way into the main patient record or may not be c
therefore likely that the data from the GP questionnaires underestimate
prescribing.

Hospital prescribing was in line with the recommendations of the CCDC.
GPs had prescribed twice as many courses of prophylaxis (from PACT dat
additional prescribing must be for one of the following reasons:

• for true close contacts who have been missed by the CCDC, which, alth

• for contacts of cases in other districts. In this study only 5% of recomn other districts. It is likely that the reverse is also true, so this could accou proportion of additional prescriptions.

• for people whose degree of contact does not warrant prophylaxis

• for contacts of patients who do not have meningococcal disease (e.g. perceived by the public to have meningococcal disease, but in fact have to occur the GP would be required to prescribe prophylaxis solely on the GPs would consult the Public Health Department in this situation, which recognition of cases of meningitis or reassurance that it was not mening

It is impossible from the data available to further assess the nature of th but it is probable that it results from a combination of the suggested pos

A UK study in 1995 [14] showed over-prescribing by a factor of three, alt PACT data and did not include hospital data or obtain further information may overestimate prescribing and almost certainly include some appropr audit from Denmark[17] also found that unnecessary prophylaxis was pr treatment" in the Danish study was 0.9 person/case (in our study 2.4 pe study interviewed an adult associated with each case and also identified case. Our methodology did not allow this comparison to be performed. C were likely to underestimate the level of additional prescribing because t know about prescriptions supplied outside the immediate household.

Over-prescribing varied by local authority area and was significantly high in local authority areas 1 and 4 wrote significantly more additional presc Both these areas had high levels of disease with local publicity surroundi cases. In the other area (2) with a similarly high rate of disease levels of lower. No evidence of an association between over prescribing and rates meningococcal disease or social deprivation could be found. We speculat levels resulted in higher levels of demand for chemoprophylaxis from pe with the cases, but not true close contacts. This is supported by a lower other high disease rate area. This area (2) has no discrete communities i disease have been identified and the public did not react in the same wa more rural, areas. This over-prescribing is likely to be patient driven, as inappropriate contacts to treat.

On almost 50% of occasions that GPs were asked to prescribe, there is r practice that the prescription was written. There are a number of possibl Firstly, prescriptions may not have been written, leaving some people at increased risk of disease. This is supported by the fact that 10 out of 80 according to PACT data than the number of courses recommended. Secor have been issued but no record kept which has implications for clinical g attended by the out of hours service, the prescription may have been wr not transferred to the main general practice record or not entered on the system. Even if the GP has written a prescription the contact may still no prophylaxis. It is possible that some contacts did not come forward to re did not present it to a pharmacy. The prescription charge may have acte contacts may have found that rifampicin was not immediately available a consequently did not return to collect their antibiotics. Further work is ne extent to which these barriers may operate.

Conclusions

Receipt of chemoprophylaxis is affected by a series of patient, doctor and

Additional prescribing occurs at all stages in the process. High publicity a
demand, although a significant number of contacts appear never to rece
treatment. Our study also raises issues about the quality of documentati
and subsequent supply of antibiotics to contacts. Further research is req
reasons why some contacts seem not to receive prophylaxis.

A number of steps could be taken to ensure that use of chemoprophylax
possible. Face to face interviews with key informants by public health pra
prevent overprescribing. Further research is necessary to clarify this issu
also be avoided by ensuring that general practitioners are aware of the a
advice to help make decisions about prophylaxis. When publicity occurs i
media to ensure that reliable information on the level of the risk of secor
public.