Unusual association of diseases/symptoms

A complicated simple fall – an atypical case of serogroup Y meningococcal pneumonia with secondary septicaemia and literature review

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Summary

An elderly lady was admitted for pain management and rehabilitation following a fall. During her stay she developed a new heart murmur and sepsis. Subacute bacterial endocarditis was excluded, empirical ciprofloxacin was initiated and later converted to aztreonam with gentamicin for clinical deterioration. Subsequent investigations revealed meningococcal Y septicaemia secondary to pneumonia, with a possible oropharynx focus. Upon discharge she had returned to baseline state. The case reflects an unusual and increasing cause of pneumonia. A steady increase of infective serogroup Y isolates over the past 12-years in England, with tendency towards elderly makes it a significant differential among the general medical population. This trend corresponds with the US, but is yet unknown whether to be a periodic cycle or true change in dominance and, or, virulence among serogroups. If the latter were true, it would support the inclusion of serogroups beyond meningitides C in the vaccination program.

BACKGROUND

The case illustrates an unusual and increasing cause of pneumonia. A steady increase of serogroup Y isolates from infection over the past 12-years in England, and its tendency to affect older patients, makes it a significant differential in the general medical population. This increasing trend corresponds with that in the US, but it is yet unknown whether this is a consequence of a periodic cycle or a true representative of change in dominance and, or, virulence among serogroups. If the latter were true, it would support the inclusion of serogroups beyond meningitides C in the vaccination program, which could potentially reduce morbidity and mortality. MenACWY vaccination is currently limited to people travelling abroad to high risk areas or postinfection. This case also highlights the importance of oral hygiene as part of patient education and clinical examinations.

CASE PRESENTATION

An 80-year-old lady was admitted following a simple fall with full recollection of the events. She was admitted for pain relief for fractures to her seventh rib on the left, and conservative management of left inferior and superior pubic rami fractures. Previous medical history included glaucoma, asthma, polymyalgia rheumatic treated with prednisolone 5 mg once daily, hypertension, depression and penicillin allergy. She lived with her daughter and was independent in her daily living activities.

By day 2 of her admission she developed respiratory distress, chest x-ray (CXR) showed left basal changes, white cell count (WCC) was raised at $27 \times 10^9/l$, neutrophils at $24 \times 10^9/l$ and C reactive protein (CRP) at 337 mg/l. She was treated with clarithromycin for pneumonia. She was improving till day 6 when she developed

diarrhoea with pseudo-obstruction on abdominal XR, WCC $20 \times 10^9/l$, neutrophils $18 \times 10^9/l$, CRP 66 mg/l, but negative stool cultures, and treated conservatively. By day 13 she was clinically well and began rehabilitation with physiotherapy.

By day 21 she developed fever, a new heart murmur and bilateral basal crackles, with WCC $42 \times 10^9/l$, neutrophils $39 \times 10^9/l$ and CRP 94 mg/l. The CXR showed new basal pneumonia and empirical ciprofloxacin was initiated following three sets of blood cultures. Two transthoracic echocardiograms and a subsequent transoesophageal echocardiogram revealed no vegetations. On day 23 she developed acute respiratory failure, WCC $22 \times 10^9/l$, neutrophils $20 \times 10^9/l$, CRP 547 mg/l, requiring oxygen, fluid resuscitation and ciprofloxacin converted to empirical aztreonam and gentamicin, as two of three blood cultures confirmed gram negative bacteraemia.

Figure 1 A photograph of her oral cavity showing chronic changes.

INVESTIGATIONS

In the following week, to identify the source of sepsis she underwent a CT chest and abdomen. This showed pleural effusion, atrophic pancreas, simple left renal cyst and

Figure 2 Serogroup isolates of *N meningitidis* in England and Wales (1998–2009).

caecal mass. Later the gram negative organisms were identified as *Neisseria meningitidis*, and on retrospective questioning she admitted to a sore throat and mild arthralgia for the past 2 weeks. The maxillofacial team were consulted along with orthopantomography revealing chronic dentition changes, which the patient declined treatment (figure 1). An Indium-111 label WCC scan confirmed an oropharynx and an incidental caecal lesion.

DIFFERENTIAL DIAGNOSIS

- ▶ Subacute bacterial endocarditis
- ▶ Intra-abdominal collection
- ▶ Upper respiratory tract infection

TREATMENT

The Health Protection Agency (HPA) later advised us that the *N meningitidis* serogroup typing was Y. Our patient and her close contacts were given the MenACWY vaccine, in addition to a stat dose of ciprofloxacin 500 mg for the latter.

OUTCOME AND FOLLOW-UP

Our patient was admitted for a total of 53 days following a ‘simple fall’ complicated by an atypical presentation of serogroup Y meningococcal pneumonia and secondary

Figure 3 Percentage of serogroup B and C *N meningitidis* in England and Wales over 1998–2009.

Figure 4 Percentage of serogroup Y *N meningitidis* in England and Wales over 1998–2009.

Figure 5 Percentage of different serogroup *N meningitidis* in England and Wales over 1998–2009 across various age groups.

septicaemia, which responded well to a 12 day course of antibiotics. She never demonstrated any neurological symptoms. On discharge she had returned to her baseline physical state with no residual morbidity. The incidental caecal lesion has since been confirmed to be a tubulovillous adenoma.

DISCUSSION

N meningitidis resides in 5–15% adults as normal nasopharynx flora, causing infection in about 1–5/100 000, with six main clinically significant serogroups A, B, C, Y, W135 and X. A Medline search reveals little literature reporting serogroup Y meningococcal disease or meningococcal pneumonia. Data from the HPA, in England and Wales 1998–2009, show serogroup B dominating 73% of all confirmed *N meningitidis* isolates, followed by C at 16%, and Y at a mere 2% (figure 2).¹ However, a careful look at the trend over this period reveals a marked drop in serogroup C from ~30% to <2%, B rising from ~50% to >85%, and Y tripling from <2% to 6%, which could be partially explained by the meningococcal C conjugate vaccine implemented in 1999 (figures 3 and 4). Meningococcal disease tends to have a bimodal age distribution, affecting age groups <4 and >25 more commonly. Interestingly serogroups C, Y and W135 seem to affect >25 age group predominantly, while the trend for serogroup C may be explained by the MenC vaccination program, it does not completely account for the trend seen in serogroup Y and W135 (figure 5). These figures from the HPA correspond to those described by the Centers for Disease Control and Prevention with serogroup Y meningococcal disease at <5% in 1990 rising to >30% in the late 90s, with pneumonia a frequent presentation, and generally affecting older patients.²

N meningitidis group Y disease was described by Yee, to cause meningitis, pneumonitis and arthritis.³ They suggested that the infrequency of group Y in systemic disease to be related to a lack of virulence or high level of antibodies in the community. Galaid, expanded on this by looking at meningococcal disease serogroups of 243 patients in New York City between 1973 and 1978.⁴ By correlating the isolates with source, they found serogroup Y and W135 to be more capable of producing septicaemia without meningitis when compared with group B and C, and that they

are comparable in both incidence and severity compared with serogroups A–C. In a more recent study Racoosin evaluated 132 patients in Chicago, with 50% presenting with meningitis, 30% bacteraemia, 20% meningococcaemia and 15% concurrent pneumonia.⁵ The study describes an increase in serogroup Y disease incidence similar to that described in this report. Compared with non-serogroup Y, serogroup Y patients were older, black and with underlying illness, but showed no significant difference in mortality, ICU stay, or complication rate. Interestingly they described the common underlying conditions, including diabetes 9.5%, chronic lung disease 7.1%, lupus 7.1%, premature birth 7.1% and immunosuppressive medication 7.1%. Demographics of which correspond to our patient. The authors also supported that serogroup Y may be less virulent than others. Overall mortality in all serogroups was 11%, with 93% of this with meningococcaemia, and age >35 the main associated factor carrying threefold risk. Winstead published a nice review of meningococcal pneumonia cases published over 25 years involving 58 patients.⁶ These patients had a median age of 57.5, with bimodal distribution in <30 and >60, and shared similar co-morbidities described by Racoosin.⁵ Interestingly among the 52 serogrouped, 44% were serogroup Y, 19% W-135, 17% B and 15% C.

Learning points

- ▶ Serogroup Y meningococcal septicaemia is on the rise and should be among our differentials when considering meningococcal infections. Clinical implications include postinfection vaccination for both patient and contacts.
- ▶ Not all meningococcal septicaemia presents with classical signs of petechial rash, fever, arthralgia. Symptoms of typical pneumonia may also be due to meningococcal infections.
- ▶ Remember dental hygiene when looking for source of infection.
- ▶ The true incidence of meningococcal pneumonia may be underreported due to missed cases, as it may present clinically as typical pneumonia.

Competing interests None.

Patient consent Obtained.

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