CASE REPORT

Neisseria meningitidis as a cause of facial cellulitisBrent Ozaki,¹ Adam Kittai,² Suzanne Chang²¹The George Washington University, Washington, DC, USA²Department of Internal Medicine, The George Washington University Hospital, Washington, DC, USA**Correspondence to**Brent Ozaki,
bozaki@gwmail.gwu.edu,
brentozaki@gmail.com

Accepted 16 February 2014

SUMMARY

A 68-year-old man presented with facial cellulitis and found to have *Neisseria meningitidis* bacteraemia with no evidence of infection outside of the facial soft tissue. He was treated with a course of intravenous ceftriaxone and transitioned to oral amoxicillin on discharge with significant improvement of his symptoms. *N meningitidis* is best recognised as a causal agent of bacterial meningitis. To our knowledge *N meningitidis* cellulitis has only been described in 12 other cases. In this case series we describe and summarise our case, along with the 12 cases already reported in the literature. We report this case series to highlight the importance of recognising *N meningitidis* in the differential in patients presenting with acute skin and soft tissue infections especially involving the periorbital, head and neck regions.

BACKGROUND

The case illustrates the importance of recognising *Neisseria meningitidis* as an uncommon but notable cause of cellulitis in immunocompetent hosts even in the absence of bacterial meningitis. It should thus be considered in the differential in patients presenting with acute cellulitis especially when the cellulitis affects the periorbital, head and neck regions.

CASE PRESENTATION

A 68-year-old Chilean man presented with 2 days of facial swelling, which began in the lateral upper lip. The patient was presumptively diagnosed with food-related angioedema and treated with diphenhydramine and methylprednisolone then discharged home on a prednisone taper. The facial swelling worsened despite this treatment. On return to the emergency room (ER) the patient was febrile to 38.2°C, with marked erythema and oedema involving the right cheek, jaw and proximal neck. After additional questioning, he reported sustaining a small laceration during a recent shave at a barber. Labs were significant for a leukocytosis of 16 000 with a left shift. A maxillo-facial CT scan demonstrated soft tissue stranding of the right cheek and submandibular gland with no fluid collection. Treatment was begun with intravenous clindamycin but the erythema and oedema worsened, thus antibiotic coverage was broadened to vancomycin and piperacillin-tazobactam. The patient was then admitted to the medicine floor.

INVESTIGATIONS

On hospital day 2 blood cultures returned with Gram-negative diplococci, subsequently speciated as *N meningitidis*.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis for acute cellulitis of the facial region includes *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Streptococcus pyogenes*. *Haemophilus influenza* type B was once a common cause of facial cellulitis especially in children, but has now become rare due to widespread vaccination.¹ As this case demonstrates, *N meningitidis* should also be considered in the differential of acute cellulitis.

TREATMENT

Antibiotics were narrowed to intravenous ceftriaxone 2 g four once daily blood cultures returned with *N meningitidis* and the erythema and oedema improved, after which the patient was discharged home on oral amoxicillin with the input of the infectious disease team.

OUTCOME AND FOLLOW-UP

During the patient's hospital stay, it was noted that the patient had a diffuse headache without meningeal signs and, due to the atypical bacteria, a lumbar puncture was performed to rule out meningitis. Cerebrospinal fluid (CSF) analysis revealed no evidence of infection. With improvement of his cellulitis, and improvement in his white cell count (WCC) count to 6000, the patient was discharged on oral amoxicillin 500 mg three times a day for 14 days, and told to follow-up with his primary care physician in Chili. It was advised that he be evaluated for endocarditis as well as complement deficiency as these conditions have been previously documented in association with *N meningitidis* cellulitis.²

DISCUSSION

Facial cellulitis is a diagnosis commonly seen by internists, but rarely caused by Gram-negative organisms. *N meningitidis* is best recognised as a causal agent of bacterial meningitis. This infection can result in a variety of cutaneous sequelae including petechiae, ecchymosis and a maculopapular rash.³ Cellulitis is an uncommon manifestation of neisserial infection, with few reported cases in the literature. In children, six cases of *N meningitidis* have been reported.⁴⁻⁹ Of these children, one case was associated with meningitis.⁴ In adults, there have been six reported cases, only one of which was immunocompromised.^{8 10-13} Nearly all patients were reported to have concurrent bacteraemia. With the exception of one patient who died of concurrent complications and sepsis, all patients achieved complete resolution of their symptoms with antibiotic treatment. Table 1 provides a brief summary of cases of cellulitis caused by *N meningitidis* listed chronologically. Taken together these presentations suggest that *N meningitidis* has a

CrossMark

To cite: Ozaki B, Kittai A, Chang S. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-203774

Table 1

Age/sex	Site of cellulitis	Source of culture specimen	Serogroup	Other manifestations	Underlying conditions	Reference
64 years/F	Right ankle calf	Cellulitic area	NA	None	CHF, DM, obesity, plasma cell dyscrasia	10
9 years/F	Right periorbital area	Conjunctival exudate	C	Conjunctivitis, bacteremia, pericarditis	None	6
8 months/M	Periorbital area	Blood	C	Bacteremia	None	9
9 months/M	Right periorbital area	Blood	B	Bacteremia	None	5
19 months/F	Right periorbital area	Blood, periorbital aspirate	C	Bacteraemia, conjunctivitis	None	7
45 years/F	Left calf	Blood	Y	Bacteraemia, endocarditis	Hypocomplementemia, mixed connective tissue disease, poor LE circulation	2
76 years/F	Face, neck	Blood	N/A	Bacteremia	DM, steroid dependent asthma	11
44 years/F	Neck	Blood	Y	Bacteraemia, supraglottitis	None	13
83 years/F	Left arm, hand	Blood	C	Bacteraemia	Pulmonary HTN, systemic HTN	8
9 months/F	Left periorbital area	Conjunctival exudate	B	Conjunctivitis	None	8
85 years/F	Left neck, Left shoulder, Left anterior chest	Blood	Y	Bacteraemia, sialadenitis	Stroke, polymyalgia rheumatica, sepsis	12
4 months/F	Left periorbital area	CSF	B	Meningitis	None	
85 years/M	Right periorbital area, right neck	Blood	?	Bacteraemia	None	Present report

CHF, congestive heart failure; CSF, cerebrospinal fluid; DM, diabetes mellitus; HTN, hypertension.

predilection for the periorbital area, especially in children. In adults, it may also favour other structures in the face and neck with rare presentations in the upper and lower extremities.

Our patient had no notable infectious risk factors, with exception of his age as well as a potential site of exposure secondary to a superficial wound the patient sustained in weeks prior to hospitalisation. Therefore, this case highlights the importance of recognising *N meningitidis* as a possible cause of cellulitis in immunocompetent hosts. This is particularly important as typical empiric agents for facial cellulitis do not treat this organism thus missing this diagnosis would leave patients at risk for progressive infection. Additionally, the case provides contributory evidence that neisserial infection, in the setting of acute cellulitis, has a predilection for the periorbital/facial region.

Learning points

- ▶ Best recognised as a causal agent of bacterial meningitis, *Neisseria meningitidis* is also a rare cause of cellulitis in immunocompetent hosts.
- ▶ One potential treatment of *N meningitidis* cellulitis is a course of oral amoxicillin.
- ▶ *N meningitidis* should be included in the differential in patients presenting with acute skin and soft tissue infections especially involving the periorbital, head and neck regions.

Contributors All authors were involved in the creation of this article and approve the final manuscript submitted.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- Swartz MN. Cellulitis. *N Engl J Med* 2004;350:904–12.
- Lin VH, Parekh RS, McQuillan MA, et al. Meningococcal endocarditis presenting as cellulitis. *Clin Infect Dis* 1995;21:1023–5.
- Toews WH, Bass JW. Skin manifestations of meningococcal infection; an immediate indicator of prognosis. *Am J Dis Child* 1974;127:173–6.
- Chand DV, Huyen CK, Leonard EG, et al. First reported case of *Neisseria meningitidis* periorbital cellulitis associated with meningitis. *Pediatrics* 2005;116:e874–5.
- Ferson MJ, Shi E. Periorbital cellulitis with meningococcal bacteremia. *Pediatr Infect Dis J* 1988;7:600–1.
- Newton DA, Wilson WG. Primary meningococcal conjunctivitis. *Pediatrics* 1977;60:104–6.
- Patrick CC, Furuta GT, Edwards M, et al. Variation in phenotypic expression of the Opa outer membrane protein and lipooligosaccharide of *Neisseria meningitidis* serogroup C causing periorbital cellulitis and bacteremia. *Clin Infect Dis* 1993;16:523–7.
- Porras MC, Martinez VC, Ruiz IM, et al. Acute cellulitis: an unusual manifestation of meningococcal disease. *Scand J Infect Dis* 2001;33:56–9.
- Sullivan TD, LaScolea LJ Jr. *Neisseria meningitidis* bacteremia in children: quantitation of bacteremia and spontaneous clinical recovery without antibiotic therapy. *Pediatrics* 1987;80:63–7.
- Ploy-Song-Sang Y, Winkle RA, Phair JP. *Neisseria meningitidis* cellulitis. *South Med J* 1972;65:1243–4.
- Gelfand MS, Cleveland KO, Campagna C, et al. Meningococcal cellulitis and sialadenitis. *South Med J* 1998;91:287–8.
- Cartolano GL, Barbier C, Arnoult L, et al. Fatal acute cellulitis due to *Neisseria meningitidis*. *J Clin Microbiol* 2003;41:3996–7.
- Schwam E, Cox J. Fulminant meningococcal supraglottitis: an emerging infectious syndrome? *Emerg Infect Dis* 1999;5:464–7.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow