Unusual presentation of more common disease/injury

A 2-month-old girl with bifrontal/bitemporal meningococcal subdural empyema: complete radiological and clinical recovery after treatment

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Summary

This report describes a 2-month-old girl who developed a subdural empyema as a rare complication of meningococcal disease. The initial presentation was compatible with bacterial meningitis and sepsis and remarkable only for a lymphocytic pleocytosis of the cerebrospinal fluid (CSF), which was confirmed at a later occasion. After a week, when the patient continued to have fever, and subsequently developed focal seizure activity, MRI brain revealed a subdural empyema, necessitating craniectomy with a washout. Initial CSF and blood cultures were negative, but PCR analysis of the CSF from the primary lumbar puncture was positive for *Neisseria meningitidis*. She responded well to 6 weeks of intravenous meropenem and CT scan of the brain at the end of the treatment was normal. At 4-month follow-up, she was seizure-free with normal neurological examination and development.

BACKGROUND

Meningitis is an infection of the meninges. Several different bacteria can cause meningitis and *Neisseria meningitidis* is one of the most important because of its potential to cause epidemics. Meningococcal disease was first described in 1805. The causative agent, *N meningitidis*, was identified in 1887. *N meningitidis* is a major cause of invasive bacterial infection in childhood. Children younger than 1 are at greater risk of invasive disease than older children.¹

The most common symptoms are stiff neck, high fever, sensitivity to light, confusion, headache and vomiting. Even when the disease is diagnosed early and adequate

therapy instituted, 5–10% of patients die, typically within 24–48 h of onset of symptoms. Bacterial meningitis may result in brain damage, hearing loss or learning disability in 10–20% of survivors. Subdural empyema following *N meningitidis* infection is a known but rare complication.^{1 2} Adequate treatment of subdural empyema includes appropriate antimicrobial treatment and drainage.³

Meningococcal disease is potentially fatal and should always be viewed as a medical emergency. Antimicrobial therapy must be commenced as soon as possible. Intracranial abscess formation is a highly infrequent complication with meningococcal meningitis but should always be kept in

Figure 1 MRI of the brain showing frontal and temporal subdural effusion.

Figure 2 MRI of the brain showing bifrontal/bitemporal subdural empyema larger on the left side.

Figure 3 CT scan of the brain, before stopping antibiotics, reported within normal limits.

mind particularly if the patient does not respond to antimicrobial treatment. The gold standard for diagnosis is blood culture, which is not very sensitive and can delay the diagnosis. PCR has been shown to have a sensitivity of 97% and a specificity of 99.6% as compared with a sensitivity of 55% for culture. PCR results are usually available within 2 h of the start of the assay.⁴ In a UK-based study with the use of PCR, there was a 56% increase in laboratory-confirmed cases of meningococcal disease as compared with culture-only confirmed cases.⁵

CASE PRESENTATION

A 2-month-old girl presented to the emergency department with high fever, irritability, bulging fontanelle and shock. After initial resuscitation, a full septic screen was done. The septic workup showed normal white cell count (WCC) with a rising CRP (max 366). Lumbar puncture (LP) showed WCC 30 (100% lymphocytes), glucose 0.5 mmol/l and protein 4.9 g/dl. Urine test was unremarkable.

As the initial presentation and investigations were compatible with bacterial meningitis and sepsis, she was commenced on intravenous cefotaxime and amoxicillin. After 1 week of treatment, she continued to have a spiking temperature and therefore LP was repeated that again showed lymphocytic pleocytosis, WCC 40 (100% lymphocyte), glucose 2.5 mmol/l and protein 4.5 g/dl. The blood and cerebrospinal fluid (CSF) cultures were negative.

Meanwhile, the CSF PCR from the first LP was requested and it was available to us on day 8. The results confirmed *N meningitidis* infection and she was started on intravenous meropenem. On day 9, she developed focal fits and was started on phenytoin. MRI was done and it showed bifrontal/bitemporal subdural empyema larger on the left side compared with the right (figures 1 and 2).

She was referred to the neurosurgeons who performed a bilateral decompression craniotomy and washout of the empyema on day 13. The treatment with intravenous meropenem was continued for 6 weeks. During the course of treatment, she also received a blood transfusion for

anaemia (haemoglobin 4.5 mg/dl) and a central venous line was inserted for long-term administration of antimicrobials. She responded well to this treatment and CT scan of the brain after 6 weeks of treatment was reported to be normal (figure 3).

When seen in the outpatient follow-up clinic after 4 months, she was seizure-free with normal neurological examination. Her development was deemed normal for age.

INVESTIGATIONS

- ▶ LP was suggestive of bacterial meningitis.
- ▶ MRI of the brain showed bifrontal/bitemporal subdural empyema, Lt>Rt.
- ▶ CT scan of the brain after 6 weeks of treatment was reported to be normal.
- ▶ Blood test indicated raised inflammatory markers.

DIFFERENTIAL DIAGNOSIS

- ▶ Bacterial meningitis
- ▶ Sepsis.

TREATMENT

- ▶ Appropriate antibiotics, bilateral decompression craniotomy and washout.

OUTCOME AND FOLLOW-UP

- ▶ Complete radiological and neurological recovery.

DISCUSSION

This is an infant with invasive meningococcal infection with negative blood and CSF cultures and no skin manifestations. Subdural empyema as a complication of meningococcal infection is known to happen but is rare. The diagnosis in this case was only confirmed because of a positive CSF PCR. It is very important to establish the diagnosis of meningococcal infection for appropriate treatment, chemoprophylaxis and epidemiological reasons. So we recommend that CSF PCR be considered for all cases of suspected meningococcal meningitis.

Learning points

- ▶ Diagnosis of meningococcal sepsis is very important as it needs appropriate treatment and prophylaxis for those coming in contact with the infected patients.
- ▶ Blood results including cultures may not always confirm meningococcal sepsis and CSF PCR should always be considered.
- ▶ Systematic clinical examination is essential.
- ▶ Appropriate use of investigations should be advocated.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Perez-Pico Victor**, Llausas-Magana E, Leon-Ramirez A, *et al*. Meningococcal meningitis complicated with subdural effusion: a report of two infant cases. *J Infect Dev Ctries* 2007;**1**:74–7.

2. **Edwards MS**, Baker CJ. Subdural empyema: an unusual complication of meningococcal meningitis. *South Med J* 1982;**75**:68–9.
3. **Farmer TW**, Wise GR. Subdural empyema in infants, children and adults. *Neurology* 1973;**23**:254–61.
4. **Richardson DC**, Louie L, Louie M, *et al*. Evaluation of a rapid PCR assay for diagnosis of meningococcal meningitis. *J Clin Microbiol* 2003;**41**:3851–3.
5. **Guiver M**, Borrow R, Marsh J, *et al*. Evaluation of the Applied Biosystems automated Taqman polymerase chain reaction system for the detection of meningococcal DNA. *FEMS Immunol Med Microbiol* 2000;**28**:173–9.

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