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Case Study

Usefulness of PCR for diagnosing Meningococcal Septic Arthritis

We report the case of a 60-year-old female patient who presented meningoencephalitis due to Neisseria meningitidis serogroup B in November 2018. She was admitted at the emergency department for febrile confusion lasting two days associated with one episode of vomiting. There was no visual disturbance, headache, photophobia or phonophobia. On physical examination, neck stiffness was observed but no other neurological focal sign was present. There was no cutaneous rash. Cerebral CT-scan was unremarkable. Blood cultures were negative. Given the presence of confusion and neck stiffness, a lumbar puncture with analysis of cerebrospinal fluid was performed, showing leucocyte count at 3080/µL (normal range <5), protein at 277 mg/dL (normal range 15-45), glucose at 23 mg/dL (normal range 40-70), lactic acid at 13 mmol/L (normal range <2.4). Cerebrospinal fluid culture evidenced N. meningitidis serogroup B sensitive to ceftriaxone, ciprofloxacin, and rifampicin. The patient was initially treated with intravenous ceftriaxone 4g daily. Five days after the current admission, she developed oligoarthritis involving the left shoulder, right knee, and right ankle associated with low-grade fever. A right knee joint aspiration was performed and showed an inflammatory fluid (leucocyte count at 18100/µL). Microbial cultures were negative. Since the joint aspirate did not show any signs of ongoing local infection, non-steroid anti-inflammatory drugs were added to treatment and ceftriaxone was prolonged until day 10. Real-time Polymerase Chain Reaction (qPCR) identified N. meningitidis in the articular fluid. Ceftriaxone was administered for 10 days and relayed onwards with oral ciprofloxacin for a total of 6 weeks. There was no deficiency in complement factors. Table 1 summarizes all results.

Arthritis-related to N. meningitidis disease can occur with or without meningitis particularly in the setting of meningococcal disease [1,2]. Its prevalence is evaluated between 2 and 12.5% in the setting of meningococcal infection [3,4]. It is difficult

Table 1: Summary of results.

Day	Test	Results
Day1	CSF cytology and biochemy	leucocyte count: 3080/ microL (93% neutrophils) protein: 277 mg/dL glucose: 23 mg/dL lactic acid: 13 mmol/L
	CSF culture	N. meningitidis serogroup B Sensitive to ceftriaxone, ciprofloxacin, Rifampicin
	Full blood count (FBC)	Leucocytes: 16,400/ microL and neutrophil count 14,400/microL
	CRP	430 mg/L
Day 3	FBC	Leucocytes 12,000/microL Neutrophils count 9,400/microL
	CRP	75 mg/L
Day 5	FBC	Leucocytes 12,200/microL Neutrophils count 9,700/microL
	CRP	110 mg/L
Day 6	Right knee joint aspirate cytology	leucocyte count: 18100/microL (64% neutrophils)
	Right knee joint aspirate direct examination and culture	Negative
	qPCR	N. meningitidis serogroup B
Day 10	FBC	Leucocytes 12,300/microL Neutrophils count 9,600/microL
	CRP	160 mg/L
Day 14	FBC	Leucocytes 8,400/microL Neutrophils count 6,500/microL
	CRP	60 mg/L

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to differentiate septic and immune-mediated meningococcal arthritis (IMA), particularly after several days of antibiotherapy and a delayed occurrence of arthritis. However, making the adequate diagnosis is mandatory to adapt the antibiotherapy duration.

Clinical and biological characteristics were used to differentiate both entities. Schaad, in 1980, postulated that late-onset arthritis in N. meningitidis disease could evocate diagnosis of IMA [2]. Goedvoelk et al., evocated delayed fever and delayed increase of ESR and/or CRP as clues for the diagnosis of IMA [5]. In a recent publication, Masson-Behar et al. differentiate IMA and septic by articular fluid culture: a negative culture was suggestive of IMA [6]. There are few description of the use of PCR for diagnosing septic meningococcal arthritis: Rousseau et *al* described the use of a 16S universal PCR and O'Sullivan et *al* have reported the use of a multiplexed FilmArray® meningitis/encephalitis panel (MEP) for diagnosing meningococcal septic arthritis [7,8]. Given the high probability of septic meningococcal arthritis, we preferred to use a real-time PCR (qPCR). Its usefulness for diagnosing meningitis or invasive meningococcal disease is well known [9]. The sensitivity of qPCR for detecting N. meningitidis is more than 3 times higher than culture (on CSF and blood cultures), making this exam the best test to exclude septic arthritis related to N. meningitidis [9].

Besides the initial misleading non-severe presentation of meningococcal meningitis, this case underlines the difficulties for differentiating IMA and septic meningococcal arthritis on the basis of clinical and classical microbiological clues. We report here the first use of a qPCR for detection of N. meningitidis in the articular fluid.

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