

Streptococcal Intracranial Empyema with Concurrent Covid-19 Infection

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Abstract

Presentation

An 11-year-old male with a subdural empyema on a background of Covid-19 infection was initially treated for Paediatric multisystem inflammatory syndrome temporally associated with COVID-19 (PIMS-TS).

Diagnosis

Streptococcal meningitis with subdural empyema and mass-effect.

Treatment

Initially treated for PIMS-TS including 48-hours ceftriaxone, methylprednisolone, aspirin and omeprazole. His third presentation saw him commenced on broad-spectrum antibiotics and mannitol. He required intubation, ventilation and transfer to a tertiary centre for craniectomy and insertion of an intracranial drain for 20 days. He required a prolonged course of treatment and multidisciplinary input.

Discussion

His intracranial infection had an overlapping clinical and laboratory presentation with PIMS-TS. He required an extensive treatment course including emergency surgery. He currently has a mild right hemiparesis and mild dysphasia. Cerebral abscesses can arise and present insidiously. PIMS-TS is a novel condition, and an important diagnosis in the Covid-19 pandemic. While diagnostic criteria for PIMS-TS have been published to guide clinicians, its presentation may overlap with other conditions.

Introduction

An 11-year-old male (patient X) with a subdural empyema, on a background of Covid-19 infection was initially treated for Paediatric multisystem inflammatory syndrome temporally associated with COVID-19 (PIMS-TS).

Case Report

Patient X presented with intermittent nausea, vomiting, headache, and dizziness, on a background of Covid-19 diagnosed 7 days previously. He was discharged from the Emergency Department after a normal examination.

He represented four days later and was admitted with pyrexia for over 5 days (2 days, >40°C), headache, myalgia, anorexia, malaise, non-purulent conjunctivitis, subjective photophobia, vomiting and decreased oral intake, with a normal neurological examination. He was Kernig's negative with no meningism. He was treated for PIMS-TS ¹ based on clinical and laboratory presentation following discussion with the Infectious Diseases team. He received 48-hours ceftriaxone, three days methylprednisolone (2mg/kg), single dose IVIG 2g/kg and was commenced on aspirin and omeprazole. He was discharged well on a prednisolone regime, aspirin, and omeprazole with safety netting.

Patient X presented a third time, 7 days after being discharged with a one-day history of fever, frontal headaches responsive to analgesia, lethargy, photophobia, and vomiting. He had normal systemic and neurological examinations on initial presentation. He was treated with IV fluids, anti-emetics, ceftriaxone, acyclovir, analgesia, and plan for neuroimaging. He acutely deteriorated in the department with a Glasgow Coma Scale (GCS) which fluctuated between 8-11/15 over a 2-3-hour period between decision to expedite CT-brain, discovery of subdural collection and decision to intubate, ventilate and transfer. See investigations included in table 1. (Next page).

	Day 1 Initial presentation No bloods	Day-4 PIMS admission 2 nd presentation	Day-6 PIMS admission	Day-14 13:09	Day-14 18:16	Day-14 23:00
Hb	-	11.5	10.3↓	12.3	-	-
WCC	-	15.6	15.1↑	48.9↑	-	-
Platelets	-	277	298	468↑	-	-
Neutrophils*	-	11.7↑	10.87↑	43.52↑	-	-
Lymphocytes	-	1.89	2.57	1.96	-	-
CRP*	-	103.8↑	81.9↑	98.6↑	-	-
PT*	-	12.3↑	11.4↑	11.4↑	-	-
INR*	-	1.2↑	1.1	1.1	-	-
APTT	-	26	24	23	-	-
Fibrinogen*	-	6.5↑		5.0↑	-	-
D-Dimer*	-	0.78↑	0.52↑	1.37↑	-	-
Ferritin	-	193	-	-	-	-
Albumin*	-	38	31↓	38	-	-
Triglycerides*	-	-	2.52↑	-	-	-
LDH*	-	712↑	260	452↑	-	-
CK	-	46	28↓		-	-
Na	-	136	138	132	-	-
K	-	4.0	4.2	4.3	-	-
Cl	-	95	100	93	-	-
Urea	-	4.6	6.0	6.5	-	-
Bili	-	13	9	28	-	-
ALT*	-	109↑	51↑	102↑	-	-
Troponin	-	<5	<5	<5	-	-
Glucose (mmol/l)	-	-	5.7	8.3	8.8	7.2
pH	-	-	7.507↑	7.408	7.446	7.459↑
Lactate	-	-	1.2	2.54↑	3.38↑	1.76
HCO ₃			29.1↑	25.09	22.6	25.3
Heart rate	89	68	58	129	82	78
Blood pressure	123/79	120/65	117/71	124/88	124/64	121/-
Respiratory rate	28	20	16	32	24	17
Oxygen saturation	99%	97%	100%	99%	96%	97%
Temperature	38.1°C	38.4°C	36.3°C	37.9°C	36.1°C	38.3°C

Table 1: Blood investigations (* denotes results which support criteria for PIMS-TS diagnosis).

His CT brain demonstrated a left subdural empyema. 6mm in maximal depth overlying left cerebral hemisphere and extends medially along the falx. Significant mass effect with approximately 8mm midline shift and effacement of the left lateral ventricle.

The chest x-ray was normal. Echocardiogram was normal with plan for repeat echocardiogram in 6 weeks. The Blood and urine cultures were negative. Respiratory panels including Covid-19 were negative. PCR for Neisseria Meningitidis was negative.

The differential diagnoses included: Meningitis (IVIG-aseptic, bacterial, viral) and Covid PIMS-TS. The final diagnosis was Streptococcal meningitis with subdural empyema and mass-effect, see figure 1. A culture of left parietal pus obtained intraoperatively grew Streptococcus Constellatus which was sensitive to benzylpenicillin and vancomycin.

Figure 1: *intraoperative image of craniectomy with empyema.*



Discussion

Patient X had a severe intracranial infection on a background of Covid-19 infection, requiring intubation, ventilation, transfer to a tertiary unit, craniectomy and intracranial drain which was removed after 20 days. He currently has a mild right hemiparesis and mild dysphasia.

Cerebral abscesses can arise as a complication of another infection. The clinical symptomatology can be subtle and they may present insidiously². PIMS-TS is a novel and important diagnosis in the current Covid-19 pandemic, but clinical and laboratory presentation may overlap with other conditions.

Declaration of Conflicts of Interest:

The authors have no conflicts of interest to declare.

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