

Case	(437) Post-meningitis empyema: true or false?
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## CASE PRESENTATION

59-year-old female with history of hospital admission one month ago due to bacterial meningitis who was taken to the Emergency Department with left hemispheric symptoms.

The patient was explored and primary brain computed tomography (CT) scanning was performed. Non-enhanced brain CT showed increased cerebrospinal fluid (CSF) density in left parasagittal frontal space which make us think about a meningeal complication, as empyema.

Hence, contrast brain CT was acquired proving leptomenigeal uptake (typical of meningitis) but no other pathological contrast enhancement.

## DISCUSSION

Meningitis is a both meningeal and cerebrospinal fluid inflammation. It could be acquired by blood, due to near adjacent infectious processes (sinusitis, otitis or mastoiditis), fractures or penetrating wounds. Bacteria are the most commonly infectious agents found, being *Streptococcus pneumoniae* the most frequent pathogen.

These microorganisms as well as pus and detritus invade CSF, which is aseptic and clear in a normal individual. It disturbs subarachnoid vessels and brakes blood-brain barrier. Once meningitis is treated, patients usually get better without problems.

However, if damage persists and there is no clinical improvement they could develop some complications, such as: hydrocephalus, cerebritis, abscess, cerebrovascular alteration, ventriculitis or empyema.

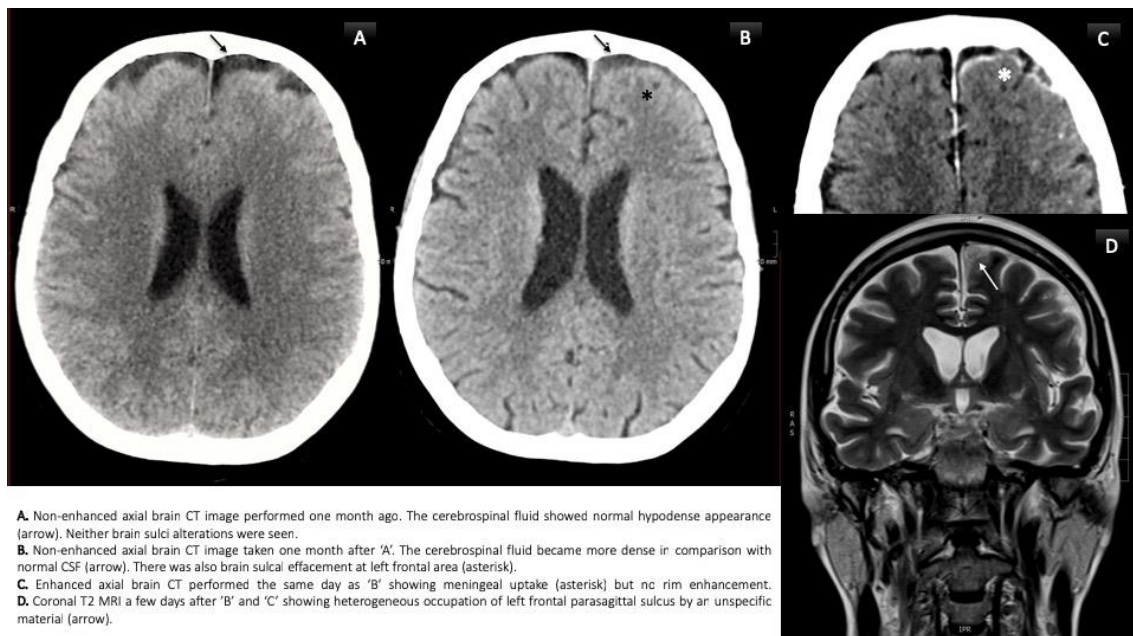
Empyema is an extra-axial, subdural or epidural, encapsulated, thick and purulent collection. It is hypodense and causes effacement of adjacent sulci at non-enhanced CT. Even though empyema has low density, it is slightly more dense in comparison with normal CSF. Both sulcal effacement and a more hyperdense collection than CSF were seen in our patient. Empyemas typically show a thick enhancement rim at contrast studies.

Therefore, enhanced CT was performed showing meningeal uptake but not thick rim enhancement in subdural or epidural spaces. Thus, the extra-axial collection was studied by Magnetic Resonance Imaging (MRI). There was partial occupation of left frontal parasagittal sulcus by an unspecific heterogenous material with neither brightness at diffusion sequences on MRI nor rim enhancement on contrast sequences.

It all was found to be detritus and rests of meningeal inflammation due to the leaky blood-brain barrier.

## CONCLUSION

Meningitis is a common disease with serious complications, such as empyema. Correct diagnosis of complications is decisive to improve patient prognosis. Nevertheless, knowing the pathophysiology of this disease is also important in order to avoid imaging pitfalls.



**A.** Non-enhanced axial brain CT image performed one month ago. The cerebrospinal fluid showed normal hypodense appearance (arrow). Neither brain sulci alterations were seen.  
**B.** Non-enhanced axial brain CT image taken one month after 'A'. The cerebrospinal fluid became more dense in comparison with normal CSF (arrow). There was also brain sulcal effacement at left frontal area (asterisk).  
**C.** Enhanced axial brain CT performed the same day as 'B' showing meningeal uptake (asterisk) but no rim enhancement.  
**D.** Coronal T2 MRI a few days after 'B' and 'C' showing heterogeneous occupation of left frontal parasagittal sulcus by an 'unspecific material' (arrow).

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