Candida meningitis – The conundrum of treatment duration and management

Tamara Hoban, Hilary Humphries, Karina O'Connell, Karen Burns, Fidelma Fitzpatrick, Edmond Smyth, Binu Dinesh
Department of Microbiology. Beaumont Hospital

Background

Candida albicans can be a rare and difficult to treat cause of nosocomial meningitis and ventriculitis. We report a case of *Candida albicans* meningitis and ventriculitis related to ventriculo-peritoneal shunt (VPS) insertion.

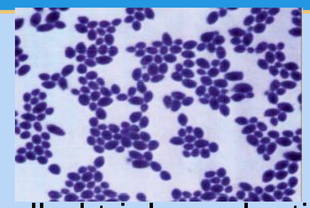
Case Presentation

A 65 year old man, presented with disorientation, fevers and decreased Glasgow Coma Scale (GCS) of eight, five months after a lengthy critical care stay for COVID-19 pneumonitis. CT brain showed communicating hydrocephalus. He underwent emergency external ventricular drain (EVD) insertion with sterile CSF and subsequent insertion of ventriculo-peritoneal shunt (VPS) and EVD removal. Three weeks later, a sudden drop in GCS required EVD re-insertion with sterile CSF. However, pyrexia with haemodynamic and neurological impairment ensued and four days later, CSF from EVD and VPS cultured *Candida albicans*. Bilateral EVDs were placed and the VPS subsequently removed with *C. albicans* cultured again. MRI brain showed persistent hydrocephalus with septation and loculation of the bilateral lateral ventricles.

The patient was commenced on IV liposomal amphotericin B (AmBisome®) and flucytosine which was continued for 25 days after the first sterile CSF. Subsequently treatment was switched to IV fluconazole due to refractory hypokalaemia.
CSF sterility was achieved following nine days of antifungals. Thereafter, CSFs for cytology, culture, beta-D-glucan, protein and glucose were repeated; initially 72 hourly for week one and subsequently weekly thereafter.
Treatment duration and VPS insertion was guided by CSF beta-D-glucan. VPS was inserted 51 days post CSF sterility and antifungals were planned for continuation for six weeks post VPS insertion.

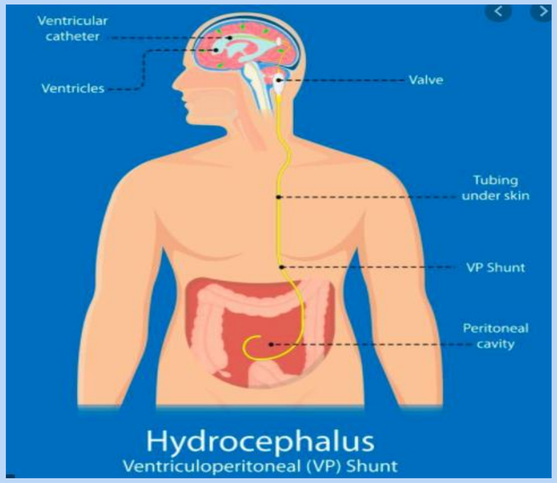
CSF Results Table

Date	Leucocytes	Protein	Glucose	Beta-D-Glucan	Culture
01/11/21	240	139	1.6	161pg/ml	*C. albicans*
04/11/21	44	187	2.3	Insufficient	*C. albicans*
09/11/21	unsuitable	344	1.7	137pg/ml	NG 48^0
11/11/21	unsuitable	284	2.2	81pg/ml	NG 48^0
13/11/21	61	380	2.0	Insufficient	NG 48^0
25/11/21	61	148	3.5	74pg/ml	NG 48^0
10/12/21	9	94	3.5	70pg/ml	NG 48^0
16/12/21	unsuitable	327	4.6	61pg/ml	NG 48^0
27/12/21	35	124	4.8	Insufficient	NG 48^0
30/12/21	48	160	4.5	41pg/ml	NG 48^0/Fungal PCR -ve



Discussion

There are no randomised controlled trials evaluating appropriate treatment duration for complex device-related *Candida* central nervous system (CNS) infections. IDSA Clinical Practice Guidelines (2016) recommend anti-fungal treatment until all signs and symptoms of infection have resolved, CSF has normalised and no radiographic evidence of ongoing infection.
However, there are no reliable markers to guide duration of antifungal treatment and VPS shunt re-insertion to minimise risk of subsequent VPS fungal infection.
Here, we relied on serial beta-D-glucan levels with a cutoff of <80pg/ml to guide treatment duration and determine when VPS insertion was deemed appropriate.



References

1. *Pappas PG, Kauffman CA, Andes DR, Clancy CJ, Marr KA, Ostrosky-Zeichner L, et al. Clinical Practice Guideline for the Management of Candidiasis: 2016 Update by the Infectious Diseases Society of America. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America. 2016;62(4):e1-50.*