

Device associated meningitis: Our experience in two cases

K Sriram (Resident)

Department of Microbiology

Introduction

- Meningitis (inflammation of the meninges) has varied etiology.
- Can be a sequelae of hospital stay or as a complication of a surgical procedure or insertion of any medical device
- Devices used for management of critical patients may be the very reason for them becoming critical
- We will discuss, two such cases of device associated meningitis

Case 1 (HOPI)

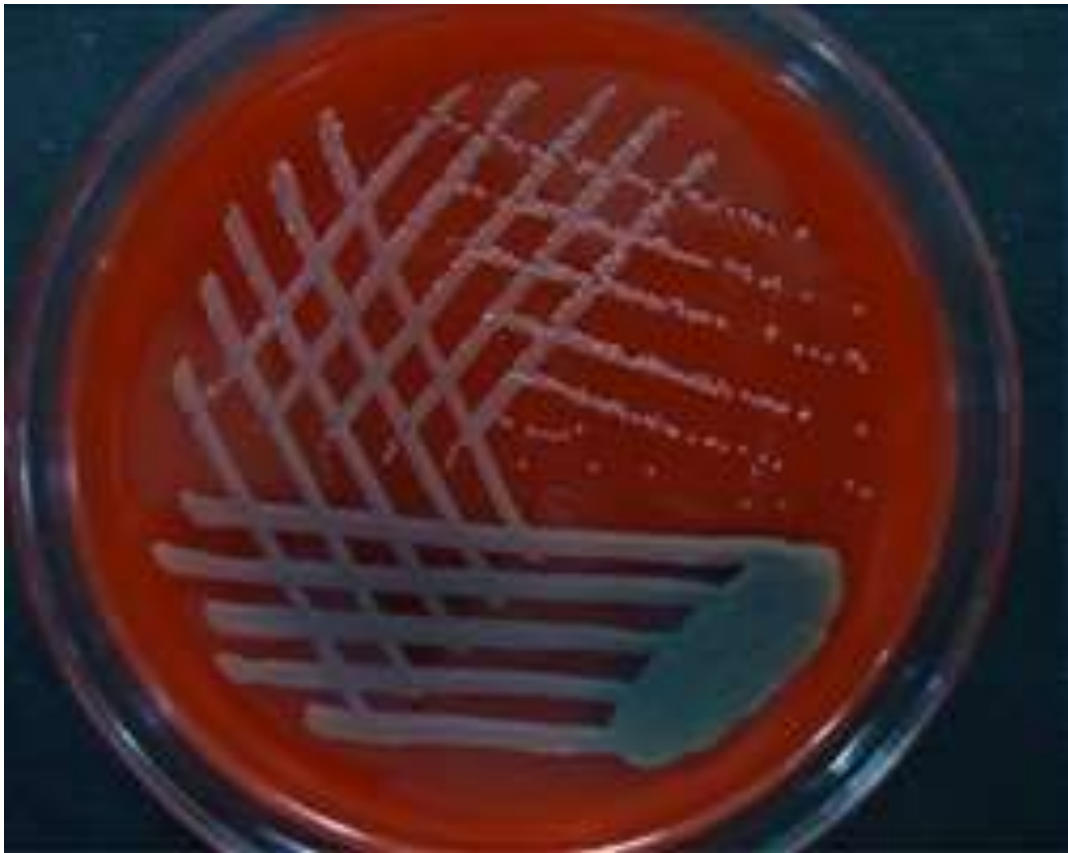
- 7 month old male presented with progressive increase in head size since 25 days with swelling at Ventriculo-peritoneal shunt site x 4 days, irritability and refusing feeds
- K/C/O hydrocephalus, operated with Endoscopic septostomy with VP shunt placement performed 4 months ago
- CT brain showed marked non-communicating hydrocephalus with dilatation of bilateral lateral and 3rd ventricles with internal septations
- Case diagnosed as obstructive hydrocephalus secondary to stenosis of aqueducts
- On admission pt. was started on Ceftriaxone and Vancomycin as empirical treatment

Cont.

- VP shunt replaced (Day 2)
- CSF was tapped and sent for biochemistry and routine microscopy, revealing raised proteins(1539.9mg/dL), decreased glucose(5mg/dL), TLC 2500/mm³; Differential Count (Neutrophils)-90%, lymphocytes-10%
- Sample received at Dept. of Microbiology for investigation (Day 3)
- CSF gram staining and culture yielded no growth
- Patient developed fever spike on (Day 4)
- Ceftriaxone was stopped and antibiotic was escalated to Meropenem

- CSF sample showed Gram negative rods interspersed among few pus cells on direct microscopy (Day 7)
- On blood and chocolate agar, it yielded smooth glistening low convex colonies and on MacConkey media, non lactose fermenting colonies were isolated
- Organism was oxidase positive, did not ferment any of the carbohydrates
- It was negative for MR, VP, indole and urease production
- TSI was showing reactions of a non fermenter organism

- Colony on Blood and MacConkey media



Culture report

Identification Information		Analysis Time: 5.83 hours	Status: Final		
Selected Organism		99% Probability Achromobacter xylosoxidans	Bionumber: 4041001101500001		
Antimicrobial	MIC	Interpretation	Antimicrobial	MIC	Interpretation
Piperacillin/Tazobactam	<= 4	S	Gentamicin	>= 16	R
Ceftazidime	2	S	Ciprofloxacin	0.5	S
Cefoperazone/Sulbactam	<= 8	S	Levofloxacin	0.25	S
Cefepime	16	I	Minocycline	<= 0.5	S
Aztreonam	>= 64	R	Tigecycline		
Imipenem	2	S	Fosfomycin		
Meropenem	1	S	Colistin		
Amikacin	>= 64	R	Trimethoprim/ Sulfamethoxazole	<= 20	S

- Repeat isolation of the same organism was noted in subsequent specimen (CSF)

Cont.

- The condition developed after the reinsertion of the device
- Potential breach in aseptic precautions while handling the device could have been a reason for the condition
- Treatment:
 - Inj. Meropenem x 21 days
 - Inj. Colistin x 18 days
 - Inj. Linezolid x 14 days
 - Inj. Levofloxacin x 12 days
- Following the treatment the CSF sample sent was normal

Case 2 (HOPI)

- 26 year old male, K/C/O Von Hippel –Lindau syndrome, presented with complaints of pain abdomen associated with multiple episodes of vomiting
- Patient presented with Constipation x 3 days, failure to pass flatus x 2 days
- Per-abdomen examination revealed diffuse tenderness all over the abdomen, no presence of guarding/rigidity
- A month ago the patient was operated on for hemangioblastoma, following which he developed hydrocephalus, to treat the hydrocephalus, a VP shunt was put in place a month ago

Cont.

- Further evaluation revealed intestinal obstruction
- Patient taken up for exploratory laparotomy(Day 2) to resolve the obstruction, noted collection at the shunt site, removed the VP shunt and Omayya reservoir placed(Day 3)
- Pt. then developed signs of meningitis and ventriculitis
- CSF sample sent for microbial investigation and routine biochemical analysis(Day 4) : (No growth)
- Omayya reservoir removed, External ventricular drain was put in place(Day 7)

Cont.

- CSF Sample received at microbiology department (Day 7)
- Direct Gram staining revealed gram negative spherical to short bacilli
- Culture yielded, off-white convex colonies on blood and chocolate agar and pale pink colored colonies on MacConkey media
- Organism was citrate and urease positive but none of the carbohydrates were fermented.
- MR and VP test were negative

Colonies on MacConkey and Blood agar



Culture report

Identification Information		Analysis Time: 5.80 hours	Status: Final		
Selected Organism		99% Probability Acinetobacter baumannii complex	Bionumber: 0201010103500310		
Antimicrobial	MIC	Interpretation	Antimicrobial	MIC	Interpretation
ESBL			Netilmicin	≥ 32	R
Ampicillin/Sulbactam			Tobramycin	≥ 16	R
Cefoxitin			Levofloxacin	≥ 8	R
Ceftizoxime			Doxycycline	≥ 16	R
Ceftazidime/Avibactam	≥ 16	R	Tetracycline	≥ 16	R
Ceftolozane/Tazobactam	≥ 32	R	Chloramphenicol		
Cefepime	≥ 32	R	Colistin	2	I
Meropenem	≥ 16	R	Polymyxin B	2	S

- Repeat isolation of the same organism was noted in subsequent specimen (CSF)

Cont.

- The worsening condition developed following exploratory laparotomy and device change
- Possible infringement in maintenance bundles while handling of medical device.
- Treatment:
 - Inj. Vancomycin x 15 days
 - Inj. Colistin x 15 days
 - Inj. Meropenem x 7 days
- Following the treatment the CSF sample sent was normal

Discussion

- WHO stated that for every 100 admitted patients 7 in developed and 10 in developing countries will acquire at least one health care-associated infection
- There are varying types of hospital associated infections be as it may either due to a surgical procedure or following a medical device insertion
- *Acinetobacter baumannii* complex and *Achromobacter xylosoxidans* are among some of the organisms associated with health care associated infections.

- *Acinetobacter baumannii* and *Achromobacter xylosoxidans* are organisms that are resistant to antibiotics used in daily practice and also to some drugs reserved for antibiotic escalation.
- Bedside care of medical devices becomes a must in preventing the patient from contracting a device associated infection.

Conclusion

- Insitu devices of the patient should be monitored as per protocol and one should be vigilant about device associated infections.
- Hand hygiene becomes a saving grace in regulating doctor to patient microorganisms transfer.
- Rapid and accurate reporting of such rare isolates with their specific susceptibility plays an important role in prompt management of such patients.

*Thank
you*

