Methicillin Resistant *Staphylococcus aureus* Bacteremia and Spondylodiscitis in neutropenic patient

CASE PRESENTATION

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INFECTION CONTROL COMMİTEE

Introduction

- Blood Stream Infections cause high morbidity and mortality in patients with HC
- Prolonged hospitalisation and poor prognosis
- BSI Associated Mortality Ranging 5% -60% in cases of Multidrug-resistant (MDR) BSI

Gill J, et al. Microorganisms. 2023;11(3):742.

Case

- 54 Y,
- Male
- Kayseri
- Follow in hematology department

Clinical History

- Acute Myeloid Leukemia-M4 (September, 2021)
- Remission Induction/Consolidation Chemotherapy

- Relapse AML (June, 2022)

- Cytotoxic Chemotherapy (FLAG:Fludarabine, Cytarabine, İdarubicine, G-CSF)

- Planning HSCT  Febril Neutropenia Episode (July, 2022)

Symptoms

- ✓Fever (+)
- ✓Chills (+)
- ✓Weakness **(+)**
- ✓Fatigue (+)
- ✓Shortness Of Breath (-)
- ✓Chest Pain (-)
- ✓Nausea (-)
- ✓Vomiting (-)
- ✓Sore Throat (-)
- ✓Cough (+)
- ✓Hemoptysis (-)
- ✓Stomach Ache (-)
- ✓Diarrhea (-)
- ✓Constipation (-)
- ✓Headache (+)
- ✓Dizziness (-)
- ✓Dysuria (-)
- ✓Polyuria (-)
- ✓Polydipsia (-)
- ✓Hematuria (-)
- ✓Hematemesis (-)
- ✓Hematochezia (-)
- ✓Weight Loss (-)

- DM(-), HT(-), CAD (-), COPD(-),

- Smoking(-), Alcohol(-), Operation History(-)
- AML-M4

Physical Examination

GCS:15

Fever: 39.1 °C **NB** : 110/ Min **HH** : 24/ Min **BP** :110/70mmhg

Head-neck: Sclerae , Conjunctivae Normal,oropharynx : Hyperemic ,

No Cervical LAP, No Venous Distension.

Respiratory: Normal

Cardiovascular: S1/S2 Rhythmic, Tachycardic , No Additional Sounds-murmurs

Abdomen : Defense (-) Rebound (-) Tenderness (-)HM(-) Sm(-

costovertebral Angle Tenderness :(-)

Extremity : Pretibial Edema (-/-)

Jugular CVK+ (redness or pain -)

Laboratory

White blood cell count × 10^3/l	0.03	Creatinine, mg/dl	0.60
Neutrophil count × 10^3/l	-	Aspartate aminotransferase, U/l	23
Platelets count × 10^3 /mm3	15	Alanine aminotransferase, U/l	26
INR	1.10	Lactate dehydrogenase, U/l	450

Deep neutropenia for 10 days

- Blood-Urine Culture
- Piperacillin-tazobactam (16.5gr/day)+ amikacin (15 mg/kg/day)
- Continue Fever >72h
- Microbiology lab:Gram positive bacteria grown in blood culture!
- Vancomycin added (30 mg/kg loading, 30 mg/kg divided 2) and drug monitorization
- MRSA isolated from Jugular CVK+peripheral: (Pip-tazo and amikacin stop)

Cinsiyet/Yas/D.Tarihi : ERKEK , 54/ 01.06.1970
Protokol/Dosya/İşlem No : 77002207 / 2664209

Örnek Numarası: : 34386433

Kültür

Numune Türü : İdrar

Tetkiki İsteyen :
Birimi : HEMATOLOJİ SERVİSİ(KVC-06-A606)
Kurum : SOSYAL GÜVENLİK KURUMU

Tetkik İstem Zamanı : 14.07.2022 11:54 Numune Kabul Zamanı: 16.07.2022 12:02
Numune Alma Zamanı: 12.07.2022 18:11 Uzman Onay Zamanı : 16.07.2022 14:38

Tetkik Adı	Sonuç	Birim	Referans Aralığı/ Karar Sınırı	Önceki Sonuçları	
İdrar Kültürü -				(21.06.22)	(14.06.22)
Kültür Sonucu : Üreme olmadı					
EUCAST 2022'e göre kısıtlı antibiyogram bildirimi yapılmaktadır.					
Kan kültürü-1 -Perifer	K			(25.06.22)	(12.06.22)
Açıklama : SVK					
ORTA DUYARLI; DOZA BAĞLI DUYARLI OLARAK DEĞERLENDİRİLMELİDİR.					

Mikroorganizma : Staphylococcus aureus — **Metisilin Dirençli (MR)+**
Koloni sayısı :

Antibiyogram	Duyarlı	Orta Duyarlı	Dirençli	Mic
Benzylpenicillin			✓	>=0,5
Clindamycin	✓			0,25
Erythromycin	✓			0,5
Levofloxacin		✓		<=0,12
Linezolid	✓			2
Methicillin			✓	
Teicoplanin	✓			<=0,5
Trimethoprim/Sulfamethoxazole	✓			<=10
Vancomycin	✓			1

EUCAST 2022'e göre kısıtlı antibiyogram bildirimi yapılmaktadır.

Kan kültürü-2 -	K			(14.06.22)	(29.07.21)
Kültür Sonucu : 20034386433 NOLU BARKODLA AYNI ANTİBİYOGRAMA SAHİPTİR.					
Açıklama : 20034386433 NOLU BARKOD İLE 2 ADET KAN KÜLTÜRÜ GÖNDERİLDİĞİ İÇİN YENİ KAYIT AÇILMIŞTIR.					
PERİFER					
EUCAST 2022'e göre kısıtlı antibiyogram bildirimi yapılmaktadır.					

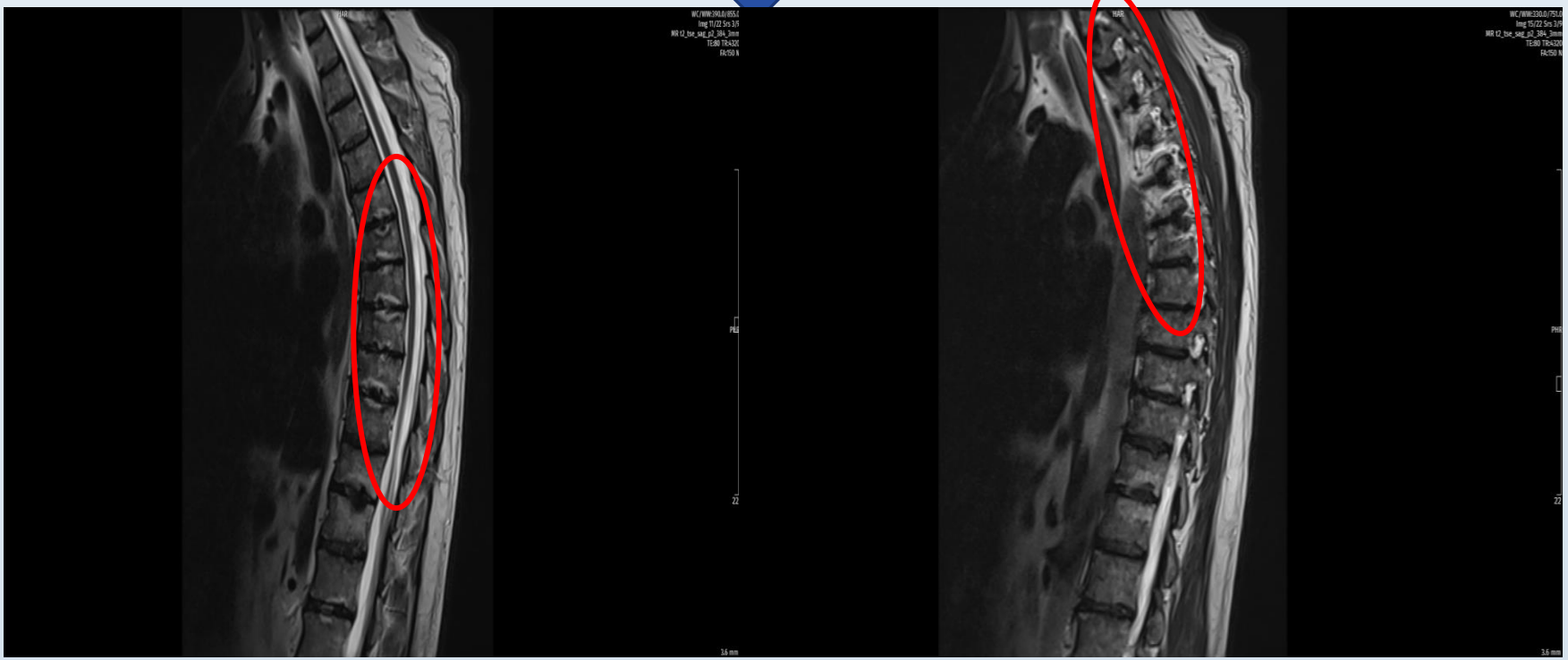
- CVK Removed

- Fever Discontinue
- Bacteremia Still Continue (7th day of treatment)

- Cardiology (Ecocardiography) → No Vegetation
- Radiology (Abdomen Usg) → No Abscess
- Patient Had Back Pain

- Patient Had Back Pain

- MRI
- Heterogeneous Contrast Enhancement was Observed in the Bone Marrow of T**6-7, T7-8, T8-9, T9-10, T10-11, T11-12** Vertebral Corpus
- Compatible with pyogenic spondylodiscitis+vertebral osteomyelitis



- Treatment was Changed to **Daptomycin** (8 mg/kg/24 h) **(Nephrotoxicity)**

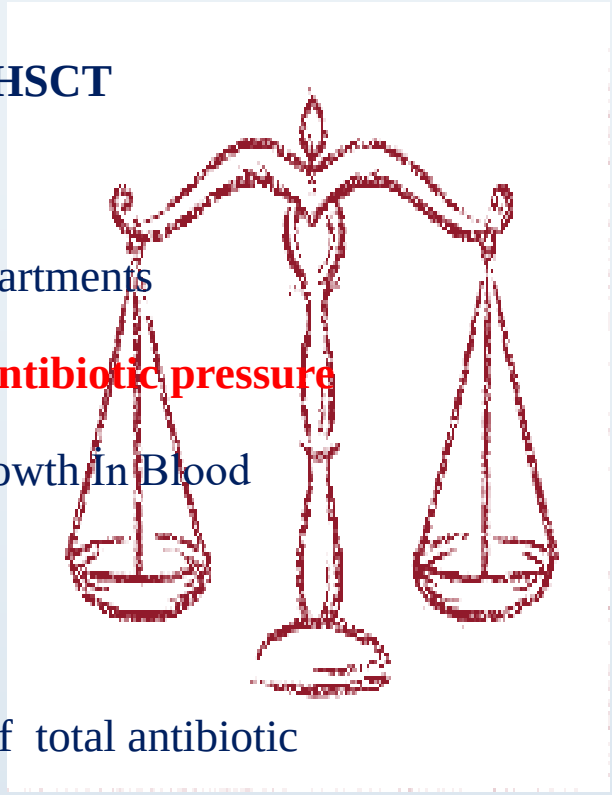
Table 2. Parenteral Antimicrobial Treatment of Common Microorganisms Causing Native Vertebral Osteomyelitis

Microorganism	First Choice[a]	Alternatives[a]	Comments[b]
Staphylococci, oxacillin susceptible	Nafcillin[c] sodium or oxacillin 1.5–2 g IV q4–6 h or continuous infusion or Cefazolin 1–2 g IV q8 h or Ceftriaxone 2 g IV q24 h	Vancomycin IV 15–20 mg/kg q12 h[d] or daptomycin 6–8 mg/kg IV q24 h or linezolid 600 mg PO/IV q12 h or levofloxacin 500–750 mg PO q24 h and rifampin PO 600 mg daily [122] or clindamycin IV 600–900 mg q8 h	6 wk duration
Staphylococci, oxacillin resistant [123]	Vancomycin IV 15–20 mg/kg q12 h (consider loading dose, monitor serum levels)	Daptomycin 6–8 mg/kg IV q24 h or linezolid 600 mg PO/IV q12 h or levofloxacin PO 500–750 mg PO q24 h and rifampin PO 600 mg daily [122]	6 wk duration

- **A biopsy could not be performed** (trombocyte<10,000/mm3 and the patient did not give consent for the procedure)
- Consider as MRSA spondylodiscitis

2015 IDSA Clinical Practice Guidelines for the Diagnosis and Treatment of Native Vertebral Osteomyelitis in Adults. Clin Infect Dis. 2015;61(6):e26-46.

- Since the patient had high risk of **relapse, urgently need HSCT**
- **It will be late after the osteomyelitis treatment**
- A Council with **Infectious Disease** And **Hematology** Departments
- It was decided to perform stem cell transplantation with **antibiotic pressure**
- On The **17th** Day Of Treatment (Total), There Was No Growth In Blood Cultures, HSCT protocol was started
- **+rifampycin was added**
- Unrelated-allogeneic HSCT was performed on **28th day** of total antibiotic treatment
- Daptomycin treatment was extended to **12 Weeks**
- **Control MRI: No Enhancement**
- **HSCT-1 Year Control (Bone Marrow Smear): Remission**



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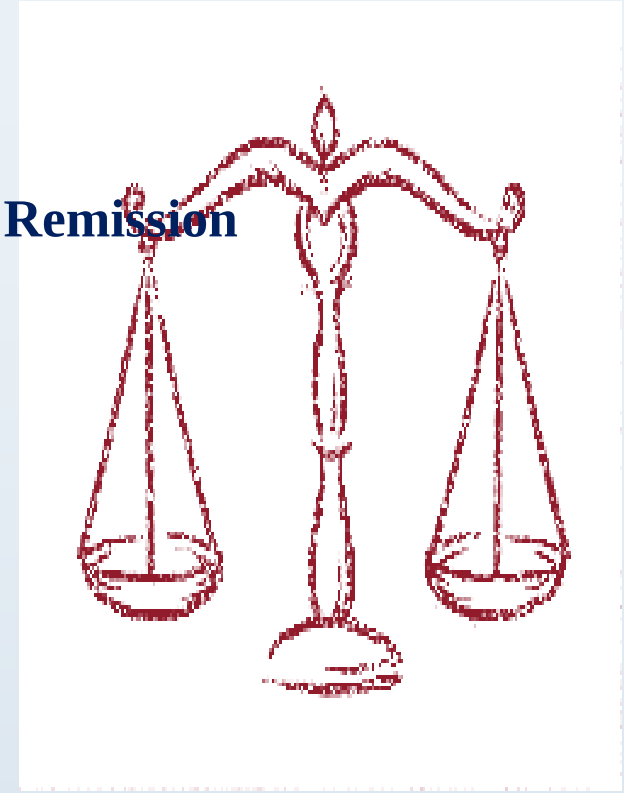


FIVE-YEAR EVALUATION OF BACTEREMIA ISOLATES FROM FEBRILE NEUTROPENIA EPISODES

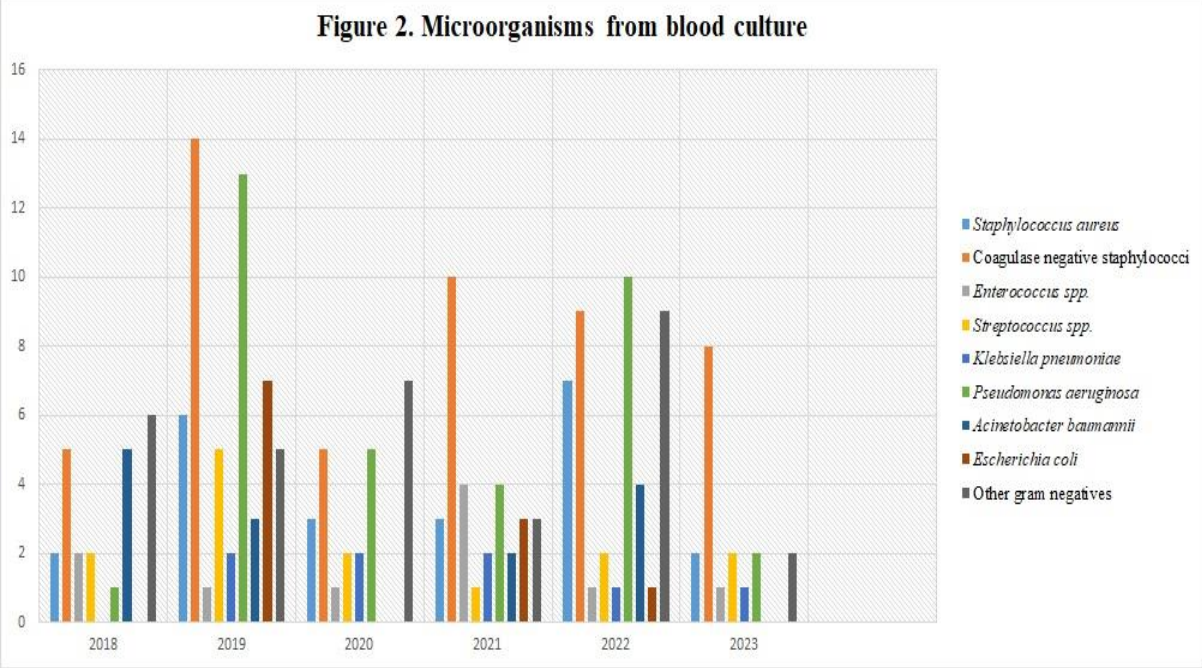


Table 1. Isolates and resistance rates to antibiotics

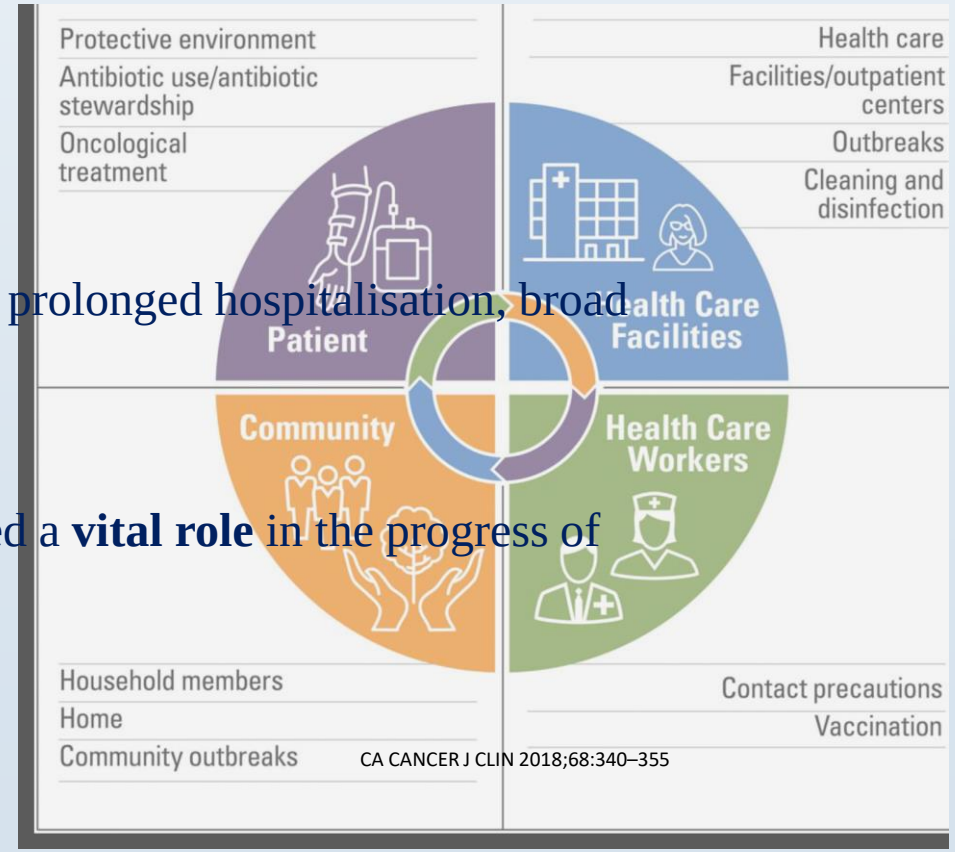
Frequency of microorganisms, n (%)	AMP/SAM (%)	CIP/LVX/MXF (%)	CRO/FEP (%)	TZP (%)	IPM/MEM (%)	AMK (%)	CST (%)	TGC (%)	TMP/SM (%)	MET (%)	VAN (%)
Gram-negatives, n=106											
Klebsiella pneumoniae, n=35	26/35 (74.2)	24/35 (68.5)	30/35 (85.7)	23/27 (85.2)	21/35 (60.0)	19/35 (54.2)	5/35 (14.2)	12/35 (34.2)	18/33 (54.5)		
Escherichia coli, n=32	26/32 (81.3)	14/32 (43.7)	24/32 (75.0)	5/25 (25.0)	10/32 (31.2)	5/32 (15.6)		1/7 (14.3)	17/30 (56.7)		
Pseudomonas aeruginosa, n=14		7/14 (50.0)	14/14 (100.0)	11/14 (78.6)	8/14 (57.1)	1/14 (7.1)					
Acinetobacter baumannii, n=11		11/11 (100.0)	11/11 (100.0)	8/9 (88.9)	11/11 (100.0)	8/11 (72.7)	3/11 (27.2)	3/11 (27.2)	11/11 (100.0)		
Other, n=13	4/13 (30.7)	2/2 (100.0)	3/13 (23.0)	1/8 (12.5)	2/2 (100.0)	3/3 (100.0)			2/11 (18.2)		
Gram positives, n=92											
Enterococcus spp., n=10	9/10 (90.0)	5/10 (50.0)				6/51 (11.7)			0/10 -		1/10 (10.0)
Coagulase negative *staphylococcus*, n=51	-	36/51 (70.5)				3/23 (13.0)			6/51 (11.7)	41/44 (93.2)	1/35 (2.9)
Staphylococcus aureus, n=23	-	10/23 (43.4)								7/23 (30.4)	0/18 -
Streptococcus spp. n=8	1/8 (12.5)	0/8-								0/8 -	

ICP is important for us

Eren-Eryilmaz E, Yildizhan E. ICHS Biennal Sypmosium, April 2024, PP-09

Conclusion

- Infections are common complications in HM treatment
- Cause morbidity and poor prognosis of HM
- MDR pathogens are difficult to treat
- They have multiple RF for MDR
- Multiple invasive device, multiple and prolonged hospitalisation, broad spectrum antibiotic history
- Infection control precautions has played a **vital role** in the progress of cancer treatments



CA CANCER J CLIN 2018;68:340–355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HATIRASI


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