

Biomedical Laboratory Sciences

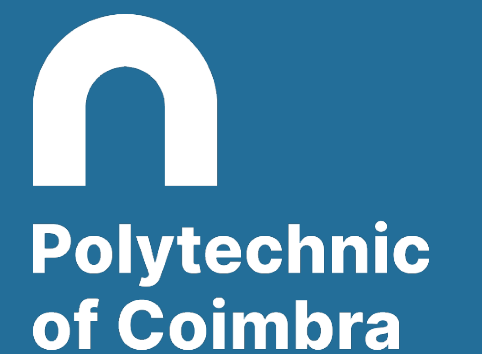
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# Clinical Case



Clinical Microbiology



# Introduction

- Female;
- 32 years;
- Previously diagnosed with chronic kidney disease;
- The patient was on dialysis through central venous catheter (CVC);

# Methods and results

1<sup>o</sup>

Two blood cultures collected from a peripheral vein to BACT/ALERT FA Plus blood culture bottles.

Nutrient medium with polymeric spheres adsorbing antibiotics, and a colorimetric sensor indicating the production of CO<sub>2</sub>.

2<sup>o</sup>

Placed in the BactAlert Virtuo equipment (Biomérieux) , incubated for 5 days at 37°C.

Monitors colorimetric changes indicated by the presence of CO<sub>2</sub> = positive blood cultures.

# Methods and results

The two blood cultures were positive and were transferred to Columbia Agar medium with 5% sheep blood.

Incubated in a capnophilic atmosphere at 37°C for 18/24h.

Found isolated colonies suggestive of **Staphylococcus.**

Gram positive bacterium with appearance of 33 small, yellow, round colonies

# Methods and results

- The automated equipment , **Bruker MALDI-Biotyper** (Beckman Coulter), confirmed the presence of *Staphylococcus aureus* in the patient's sample.
- Antibiotic Susceptibility Testing (AST) were carried out semi-automatically using the **DxM MicroScan WalkAway** (Beckman Coulter) equipment.

# Methods and results

Table 1 - Antibiotic Susceptibility Testing

Isolated:	<b><u>Staphylococcus aureus</u></b>
Gentamicin	<b>S</b>
Trimethoprim	<b>S</b>
Vancomycin	<b>S</b>
Oxacillin	<b>R</b>
Penicillin G	<b>R</b>

Legend table 1 - Degrees of sensitivity:

**S** – Sensitive; **I** – Intermediate; **R** – Resistant

Table 2 - Screening for Carbapenemase-Producing Enterobacteriaceae

Results:	Gene
IMP1	Not detected
VIM	Not detected
NDM	Not detected
<b>KPC</b>	<b>Detected</b>
OXA48	Not detected

# Methods and results

## ➤ Complementary results of biochemistry and hematology:

- Biochemical values are concordant with the previous diagnosis of CKD.
- **Protein C** and **procalcitonin** were increased
- In the blood count - **leukocytosis** and **neutrophilia**, erythrocytes and hemoglobin were decreased, representative of anemia.

# Discussion

## ➤ Results from table 1:

- There is resistance to oxalycin and penicillin G, and sensitivity to vancomycin, trimethoprim and gentamicin.
- The majority of *Staphylococcus aureus* are producers of penicillinases, which are specific  $\beta$ -lactamases to penicillin, causing destruction of the  $\beta$ -lactam ring.



# Discussion

## ➤ Results from table 1:

- The bacterium in question is resistant to oxacillin and penicillin G, which are from the family of penicillins and therefore we are in the presence of methicillin-resistant *Staphylococcus aureus* (MRSA).
- The most indicated antibiotic will be vancomycin.

# Discussion

## ➤ Results from table 2:

- The patient had a positive KPC gene in the test for *Carbapenemase-Producing Enterobacteriaceae* (table 2), meaning that is colonized with KPC in her commensal flora.
- Should not be given  $\beta$ -lactamases antibiotics, because they destroy the commensal flora allowing the growth of this opportunistic bacteria.
- The patient must comply with strict hygiene rules to prevent urinary infections or contaminating other patients with KPC.

# Conclusion

- **Suspected diagnosis of** : Sepsis crisis
- **The patient's final diagnosis**: Persistent bacteremia (septicemia) caused by the presence of methicillin-resistant *Staphylococcus aureus* (MRSA) originated in the CVC. KPC gene is present in the patient's intestinal flora.

# Bibliography

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