

## AN OUTBREAK CAUSED BY MULTIRESTANT ACINETOBACTER BAUMANNII WITH RARELY FOUND SEQUENCE TYPE 502 AND OXA-40 CARBAPENEMASE

**Ivana Goic-Barisic<sup>1</sup>, Martina Seruga Music<sup>2</sup>, Ana Kovacic<sup>3</sup>, Zana Rubic<sup>1</sup>, Anita Novak<sup>1</sup>,  
 Marija Tonkic<sup>1</sup>, Jasna Hrenovic<sup>2</sup>**

<sup>1</sup> University of Split School of Medicine and University Hospital of Split, Split, Croatia  
<sup>2</sup> University of Zagreb, Faculty of Science, Department of Biology, Zagreb, Croatia;  
<sup>3</sup> Institute of Public Health of Split and Dalmatia County, Split, Croatia

### Introduction

Since 2009, University Hospital of Split (UHS) in Croatia has a growing problem in number of infections caused by carbapenem-resistant isolates of *A. baumannii*, now almost endemically present in most of intensive care units inside the hospital.

Here, we report a new outbreak in the Neurology Intensive Care Unit (NICU) that started in March 2017, after a transfer of patient from a hospital in a neighbouring state. First isolate of *A. baumannii* with unusual resistant pattern was collected from tracheal aspirate of the patient with brain stroke transferred from General Hospital of Livno (Bosnia and Herzegovina).

### Materials and methods

In the next eight weeks, 10 new isolates with same resistant pattern were isolated, also from respiratory specimens (tracheal aspirates and BALs) from NICU and Pulmonary Department inside University Hospital of Split. Identification was performed by routine bacteriological techniques and matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) on cell extracts.

The antibiotic susceptibility profile was determined according to MICs values obtained by Vitek2 system and gradient E-test also for colistin and carbapenems. Isolates were collected and subjected to further multilocus sequence typing analyses according to MLST (Oxford scheme).

Multiplex polymerase chain reaction (PCR) using specific primers for *bla*OXA-51-like, *bla*OXA-40-like, *bla*OXA-23-like, *bla*OXA-58-like and *bla*OXA-143-like genes was performed to investigate carbapenem resistance.

### Results

The antibiotic susceptibility profile was identical in all ten isolates. They were resistant to meropenem, gentamicin, amikacin, ciprofloxacin, levofloxacin and trimethoprim/sulfamethoxazole, but susceptible (MIC 1.5 - 2 mg/L) to imipenem, colistin (0.19 mg/L) and ampicillin/sulbactam (2 mg/L).

The MLST results have revealed that all isolates belong to the ST (sequence type) 502, within the clonal complex 92 and IC 2, rarely described in the literature, and for the first time detected in Croatia. With multiplex polymerase chain reaction (PCR) the presence of OXA-51-like and OXA-72 oxacillinase was confirmed.

**Table 1.** Multilocus sequence typing of three selected clinical isolates of *A. baumannii* according to MLST Oxford scheme (<http://pubmlst.org/abaumannii/>).

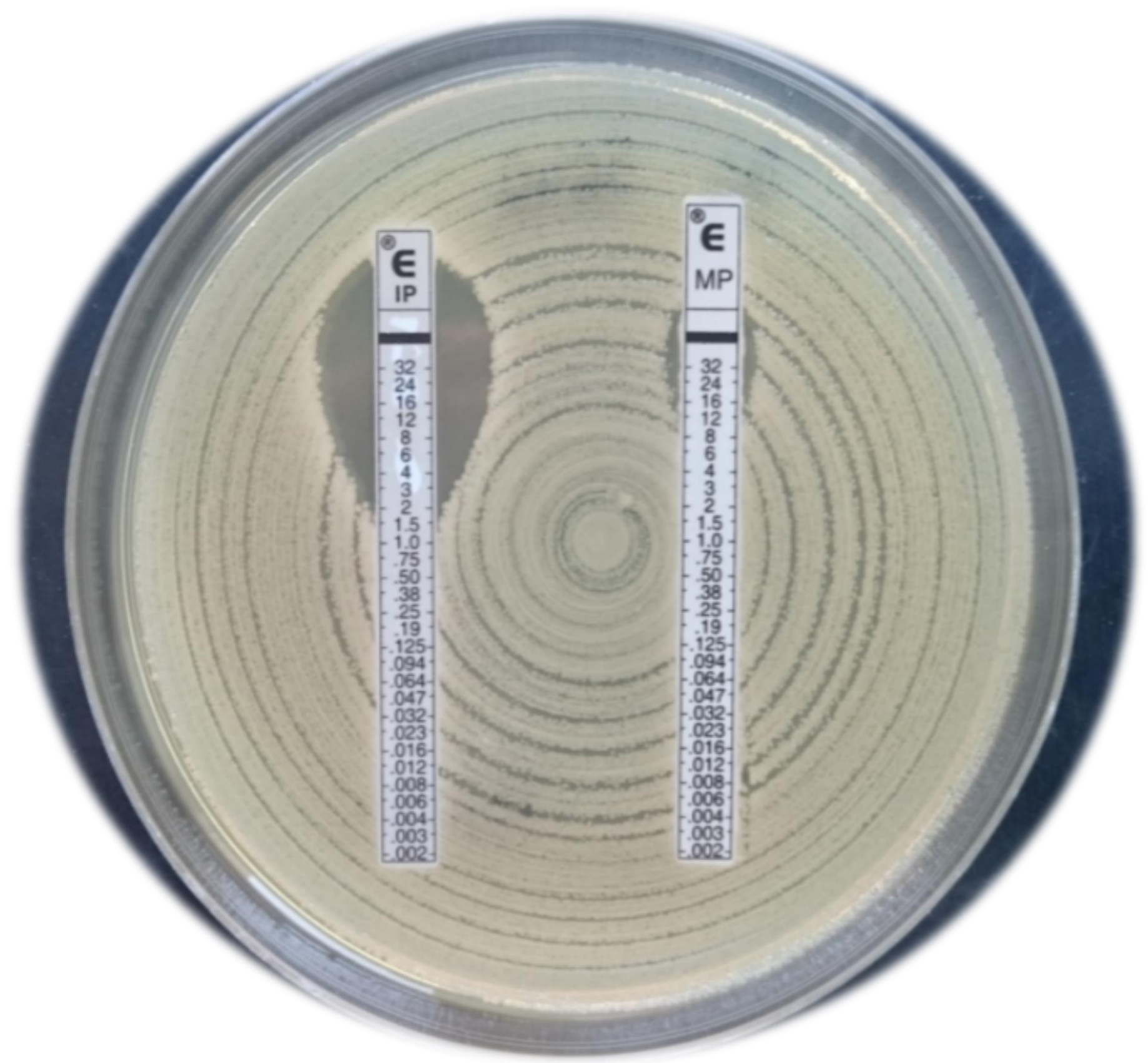
Isolate	Gene locus/allele							Sequence type	Clonal complex	IC type
	gltA	gyrB	gdhB	recA	cpn60	gpi	rpoD			
<b>2777</b>	1	12	3	2	2	100	3	502	92	2
<b>3058</b>	1	12	3	2	2	100	3	502	92	2
<b>3084</b>	1	12	3	2	2	100	3	502	92	2

### Conclusion

Previous outbreak caused by carbapenem resistant *A. baumannii* producing OXA-72 carbapenemase in UHS was associated with high level of resistance to both (imipenem and meropenem) carbapenems. This is the first report of OXA-72 with unusual resistant phenotype in UHS.

According to MLST results this monoclonal outbreak belongs to rarely described ST 502, within the clonal complex 92 and IC 2, and for the first time is detected in Croatia.

These observations reinforce the continued importance of rapid epidemiological surveillance and enhanced control measures following international patient transfers to prevent spread of new multiresistant clones inside hospital.



**Figure 1.** Unusual resistance pattern with MIC for imipenem inside susceptible range according EUCAST rules and high level of resistance to meropenem.

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