Results of the pilot study on molecular characterisation of MDR clinical Acinetobacter baumannii isolates from neighbouring countries

Figure 3.23. *Acinetobacter* spp. Percentage (%) of invasive isolates with combined resistance to fluoroquinolones, aminoglycosides and carbapenems, by country, EU/EEA countries, 2017
Published data from Serbia

Whole-Genome Sequence of a European Clone II and OXA-72-Producing Acinetobacter baumannii Strain from Serbia
Laurent Dortet, Rémy A. Bonnin, Delphine Girlich, Dilek Imanci, Sandrine Bemache, Nicolas Fortineau, Sabine Thierry Naas

First Occurrence of OXA-72-Producing Acinetobacter baumannii in Serbia
Laurent Dortet, Rémy A. Bonnin, Sandrine Bemache, Lélia Escoulet, Daniel Vittecoq, Delphine Girlich, Dilek Imanci, Nicolas Fortineau, Thierry Naas

Carbapenem-resistant Acinetobacter baumannii from Serbia: revision of CarO classification
Novovic K, Mitrović S, Vaselić Z, Filjić S, Besagni D, Lovric B

OXA-72-Mediated Carbapenem Resistance in Sequence Type 1 Multidrug (Colistin)-Resistant Acinetobacter baumannii Associated with Urinary Tract Infection in a Dog from Serbia.
Misic D, Asanin J, Spergser J, Szostak M, Loncaric I

Published data from Bosnia and Herzegovina 2011-2015

MEDICINSKI GLASNIK, VOLUMEN 8, NUMBER 2, AUGUST 2011

LETTER TO THE EDITOR
Multidrug-resistant Acinetobacter baumannii- the pathogen with no borders?
Ivana Goić-Barišić1, Vanja Kaliterna2
1Department of Clinical Microbiology, Split University Hospital and School of Medicine, University of Split, 2Department of Microbiology and Parasitology, Educational Public Health Institute of Dalmatia County
Corresponding author: Ivana Goić-Barišić, Department of Clini-

ORIGINAL ARTICLE
Emergence of extensive drug-resistant (XDR) Acinetobacter baumannii in the Clinical Center University of Sarajevo, Bosnia and Herzegovina
Amela Dedelj-Ljubović1, Dana Granov1, Mirsada Hukić2,3
1Department of Clinical Microbiology, Clinical Centre University of Sarajevo, 2Department of Medical Science, Academy of Sciences and Arts of Bosnia and Herzegovina, 3International Burch University, Sarajevo, Bosnia and Herzegovina

Outbreak in Croatia caused by a new carbapenem-resistant clone of Acinetobacter baumannii producing OXA-72 carbapenemase
Published data from Bosnia and Herzegovina 2017-2018

Molecular characteristics and antibiotic resistance of Acinetobacter baumannii beta-lactamase-producing isolates, a predominance of intrinsic blaOXA-51, and detection of TEM and CTX-M genes.

Ibrahimagić A¹, Kamberović F², Uzunović S¹, Bedenić B³ ⁴, Idrizović E¹.

Arrival of carbapenem-hydrolyzing-oxacillinases in Acinetobacter baumannii in Bosnia and Herzegovina.

Petrović T¹, Uzunović S², Barišić J³, Luxner J⁴, Grisold A⁵, Zarfel G⁶, Ibrahimagić A⁷, Jakovac S⁸, Slačanac D⁹, Bedenić B¹⁰.
Carbapenem resistance of *A. baumannii* in Croatia for the period 2005 - 2008.

**2002 – 2009**

*A. baumannii*
- IMI R < 10%
- OXA 107
- European clone 1

Croatian Committee for Antibiotic Resistance Surveillance
Resistance to carbapenems in Croatia 2009-2017

Croatian Committee for Antibiotic Resistance Surveillance
Published data from Croatia

BRIEF COMMUNICATION

First Report of Molecular Characterization of Carbapenem-Resistant Acinetobacter baumannii in Different Intensive Care Units in University Hospital Split, Croatia

I. GOIC-BARISIC 1, B. BEDENIC 2
M. TONKIC 1, S. KATIC 3, S. KALENIC 3
V. PUNDA-POLIC 1

Occurrence of OXA-107 and ISAba1 in Carbapenem-Resistant Isolates of Acinetobacter baumannii from Croatia

Ivana Goic-Barisic, Branka Bedenic, Marnja Tonkic, Anita Novak, Stpenan Katic, Sinija Kalenic, Vojda Punda-Polic, Kevin J. Towner

Outbreak in Croatia caused by a new carbapenem-resistant clone of Acinetobacter baumannii producing OXA-72 carbapenemase

European Journal of Clinical Microbiology & Infectious Diseases

M. Vranić-Ladavac, B. Bedenić, F. Minandi, M. Ištok, Z. Bošnjak, S. Frančula-Zašinović, R. Ladavac, P. Visc a

Carbapenem resistance and acquired class D beta-lactamases in Acinetobacter baumannii from Croatia 2009–2010

Authors

M. Vranić-Ladavac, B. Bedenić, F. Minandi, M. Ištok, Z. Bošnjak, S. Frančula-Zašinović, R. Ladavac, P. Visc a
CROCMID 2016 – CROCMID 2019

Figure 3.12. Acinetobacter spp. Distribution of isolates: fully susceptible and resistant to one, two and three antimicrobial groups (among isolates tested against fluoroquinolone, aminoglycosides and carbapenems), EU/EEA countries, 2016

Figure 3.13. Acinetobacter spp. Distribution of isolates: fully susceptible and resistant to one, two and three antimicrobial groups (among isolates tested against fluoroquinolones, aminoglycosides and carbapenems), EU/EEA countries, 2017

Country/ Included isolates/Anti-reported isolates
Study design

• the aim of this pilot study is to compare the genotype resemblance and resistance mechanism of MDR clinical isolates of A. baumannii in region of southeastern Europe

• 12 clinical isolates of carbapenem-resistant A. baumannii
Study design

• three different hospitals in neighbouring countries Croatia (UHS), Bosnia and Herzegovina (UHM), and Serbia (IPHV)

• all collected isolates shared high level of resistance to carbapenems with MIC >32mg/L to both imipenem and meropenem

• beside the carbapenem-resistance, isolates were uniformly resistant to gentamicin and ciprofloxacin, but susceptible to colistin
Study design

• four isolates originated from University Hospital of Split, **Croatia**, were isolated from the tracheal and bronchoalveolar aspirates of patients from adult and paediatric Intensive Care Units in different outbreaks periods from 2009-2018

• all isolates belong to IC 2
Study design

• two isolates were collected from University Hospital Mostar, Bosnia and Herzegovina in the beginning of 2018, from urine sample and wound swab

• six isolates came from different wards of Clinical Centre of Vojvodina, one hospital in university-affiliated medical centre Novi Sad, Serbia and were collected from blood cultures during 2017 and 2018
Study design

- 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
- the relatedness of collected \( A.\ baumannii \) isolates was assessed by using pulsed-field gel electrophoresis (PFGE)
Multiplex PCR results from 12 clinical isolates of *A. baumannii*
Results

• the multiplex PCR confirmed the presence of \textit{bla}OXA-40-like genes in half (6/12) of the collected isolates from neighbouring countries, besides the presence of \textit{bla}OXA-23 gene

• all obtained amplicons of \textit{bla}OXA genes were sequenced on both strands (commercial service Macrogen Europe, The Netherlands)
Neighbour-joining phylogenetic tree inferred on \textit{blaOXA-72} gene
Results

• identical sequences were obtained from 6 clinical isolates harboured OXA-72 oxacillinases confirming long time (more than a decade) of this mechanism of resistance to carbapenems in south-eastern Europe

• the blaOXA-72 gene sequence determined in this study has been marked as Cro1 and deposited in GenBank under number MN366238
Results

• identical sequences were obtained from 6 clinical isolates harboured OXA-23 oxacillinases, as a second confirmed mechanism of carbapenem resistance in *A. baumannii*

• the relatedness of collected *A. baumannii* isolates was assessed by using pulsed-field gel electrophoresis (PFGE) and displayed diversity of genotyping profiles

• MLST is going on....
ECCMID Amsterdam 2019
Thank you

- Ana Kovačić
- Marijo Pirija
- Deana Medić
- Sanja Jakovac
- Tanja Petrović
- Marija Tonkić
- Jasna Hrenović

This research was supported by the Croatian Science Foundation (grant no. IP-2014-09-5656) and awards for excellence (institutional funding) of the University of Split School of Medicine during 2017/18.