

Case presentations

Multidrug-resistant Gram-negatives

Anna-Karin Smekal

Senior Consultant Clinical Microbiology

Specialist Physician Infectious Diseases

Karolinska University Hospital

Stockholm

NordicAST WS 220524

CASE 1

- ***55 year old woman treated for a community acquired pneumonia in ICU in Sri Lanka is transferred to a hospital in Stockholm. No antibiotic or oxygen treatment but has a urinary catheter at admission***
- **Day 1:** No signs of infection

Culture findings from Day 1:

Screening cultures for MDR:

- MRSA negative
- VRE positive (vanA)
- ESBL/CPE-screening feces: *K. pneumoniae* OXA-48 **AND** *E.coli* NDM

Urine culture:

- *A. baumannii*- colonisation?

CASE 1

- **Day 3:** *Fever and CRP 300*

Culture findings from Day 3:

Urine culture:

- *A. baumannii- MDR, carbapenemase producer, OXA -23 pos*

Blood cultures 4/4:

- *Gram-negative rod. RAST 6 h no zones for any antibiotics*

CASE 1: Multidrug-resistant *A. baumannii*

- Blood culture: *A. baumannii*, carbapenemase-producing, OXA-23
- Antibiogram:

Meropenem	6 mm	R
Imipenem:	6 mm	R
Trimetoprimsulfa:	6 mm	R
Ciprofloxacin:	6mm	R
Amikacin:	9 mm	R
Gentamicin:	13 mm	R
Cefiderocol:	18 mm, below the PK/PD breakpoint (IE)	

Treatment recommendation
to ID consultant:
Cefiderocol + Colistin

CASE 1: MDR *A. baumannii*

- *The patient received colistin + ceftiderocol, BMD with colistin MIC of 1 mg/L.*
- *2 days later the ID consultant requested MIC testing for fosfomycin, tigecycline, ceftazidime-avibactam (caz-avi), ceftolozane-tazobactam (tol-taz), imipenem-relebactam (imi-rel), aztreonam and rifampicin*
- **Are all of these requests for MIC testing appropriate?**
- **What will you do?**

Mentimeter question 1:

- **What will you do?**
- 1. I perform all the requested MICs, the ID consultant is the one to know this.
- 2. I only perform MICs that we consider relevant in the lab. Our job is to guide the ID consultant.

Mentimeter question 2:

- **For which of the following antibiotics will you perform MIC testing?
(multiple answers possible)**
- 1. Imipenem-relebactam
- 2. Fosfomicin
- 3. Tigecycline
- 4. Ceftolozane-tazobactam
- 5. Ceftazidime-avibactam
- 6. Rifampicin
- 7. Aztreonam

If you need help:

- **Start by looking at the Acinetobacter tab in the NordicAST/EUCAST breakpoint table**
- **Dash(-):** No breakpoints exist, susceptibility testing is not recommended. Report as R directly.
 - In the case of *Acinetobacter* spp: **fosfomicin, tol-taz, caz-avi, aztreonam, rifampicin**
- **IE = insufficient evidence** that the organism is a good target for therapy with the agent. On request/after discussion do MIC testing and report the MIC-value without S/I/R-categorisation.
 - In the case of *Acinetobacter* spp: **tigecycline**. (but in this case it does not help much)
- **Imipenem-relebactam:** Report as R directly as the the isolate is R to imipenem and the betalactamase inhibitor does not add any effect.

CASE 1: MDR *A. baumannii*

- *The patient received colistin+ cefiderocol and the urinary catheter was removed. Clinical improvement.*
- *On day 10 of treatment colistin ended because of renal impairment. CRP 11.*
- *Treatment with cefiderocol continued for 14 days.*

CASE 2

- *70 year old patient transferred from ICU in Turkey (on vacation) after a perforated colon diverticulitis that needed surgery and ICU care. Multiple pressure wounds.*
- *Day 1: No sign of infection*

Culture findings from Day 1:

Screening cultures for MDR:

- MRSA/VRE negative
- ESBL/CPE-screening urine + feces: *K. pneumoniae* NDM + OXA-48 **AND** *S. marcescens* OXA-48

Multiple wound cultures:

- *K. pneumoniae* NDM + OXA-48

CASE 2: *K. pneumoniae* (NDM+OXA-48)

- Day 14: High fever, CRP 250, coughing, short of breath, needs oxygen. CT thorax with pneumonia and early signs of lung abscess formation

Culture findings from Day 14:

Cultures from multiple wounds, urine and sputum:

- *K. pneumoniae* NDM + OXA-48
- *S. marcescens* OXA-48

New screening culture

ESBL/CPE-screening feces:

- *K. pneumoniae* NDM + OXA-48
- *Citrobacter* sp OXA-48
- *K. aerogenes* OXA-48

Antibiogram:

Piptazo:	6 mm	R
Cefotaxime	6 mm	R
Ceftazidim	6 mm	R
Meropenem	7 mm	R
Imipenem	12 mm	R
Amikacin	6 mm	R
Trimetoprimsulfa	6 mm	R
Ciprofloxacin	6 mm	R
Tol-taz	6 mm	R
Caz-avi	6 mm	R
Imi-rel	6 mm	R
Mero-vab	6 mm	R
Colistin	16 mg/L	R
Cefiderocol	23 mm	S

CASE 2: *K. pneumoniae* (NDM+OXA-48)

- *The ID consultant calls and wants MIC on fosfomycin and tigecycline.*

Mentimeter question:

What will you do?

- 1. I perform all the requested MICs, the ID consultant is the one to know this.
- 2. I only perform MICs that we consider relevant in the lab. Our job is to guide the ID consultant.

CASE 2: *K. pneumoniae* (NDM+OXA-48)

We suggested the combination of **cefiderocol + aztreonam+ ceftazidime-avibactam** without any further MIC- testing.

The patient was treated with this combination successfully for 10 days with total recovery.

CASE 2: *K. pneumoniae* (NDM+OXA-48)

Mentimeter question:

Do you understand the rationale behind this treatment combination (cefiderocol+aztreonam+ Ceftazidime-avibactam)?

1. Yes
2. No
3. Parts of it

Antibiogram:

Piptazo:	6 mm	R
Cefotaxime	6 mm	R
Ceftazidim	6 mm	R
Meropenem	7 mm	R
Imipenem	12 mm	R
Amikacin	6 mm	R
Trimetoprimsulfa	6 mm	R
Ciprofloxacin	6 mm	R
Tol-taz	6 mm	R
Caz-avi	6 mm	R
Imi-rel	6 mm	R
Mero-vab	6 mm	R
Colistin	16 mg/L	R
Cefiderocol	23 mm	S

CASE 2: *K. pneumoniae* (NDM+OXA-48)

- NDM-producing isolates are aztreonam S from the beginning

	AMX	AMC	TZP	CTX	CAZ	IMP	ETP	MER	ATM
KPC	R	S/I	R	R	R	S/I/R	I/R	S/I/R	R
KPC + ESBL	R	I/R	R	R	R	I/R	I/R	I/R	R
IMP/VIM/NDM	R	R	I/R	R	I/R	S/I/R	I/R	S/I/R	S
IMP/VIM/NDM + ESBL	R	R	I/R	R	R	I/R	R	S/I/R	R
OXA-48/OXA-181	R	R	S/I/R	S/I	S	S/I	S/I	S/I	S
OXA-48/OXA-181 + ESBL	R	R	I/R	R	R	I/R	I/R	I/R	R

AMX, amoxicillin; AMC, amoxicillin–clavulanic acid; TZP, piperacillin–tazobactam; CTX, cefotaxime; CAZ, ceftazidime; IMP, imipenem; ETP, ertapenem; MER, meropenem; ATM, aztreonam.

CASE 2: *K. pneumoniae* (NDM+OXA-48)

Antibiotic	ESBL _A	ESBL _M / AmpC	ESBL _{CARBA} KPC	ESBL _{CARBA} OXA-48	ESBL _{CARBA} MBL	MDR PA	MDR AB	<i>S. maltophilia</i>
Ceftolozane-tazobactam	+	-	-	-	-	+	-	-
Ceftazidime-avibactam	+	+	+	+	-	+/-	-	-
Meropenem-vaborbactam	+	+	+	(+/-)	-	(+/-)	(+/-)	-
Imipenem-relebactam	+	+	+	-	-	+	(+/-)	-
Cefiderocol	+	+	+		+	+	+/-	+

CASE 2: *K. pneumoniae* (NDM+OXA-48)

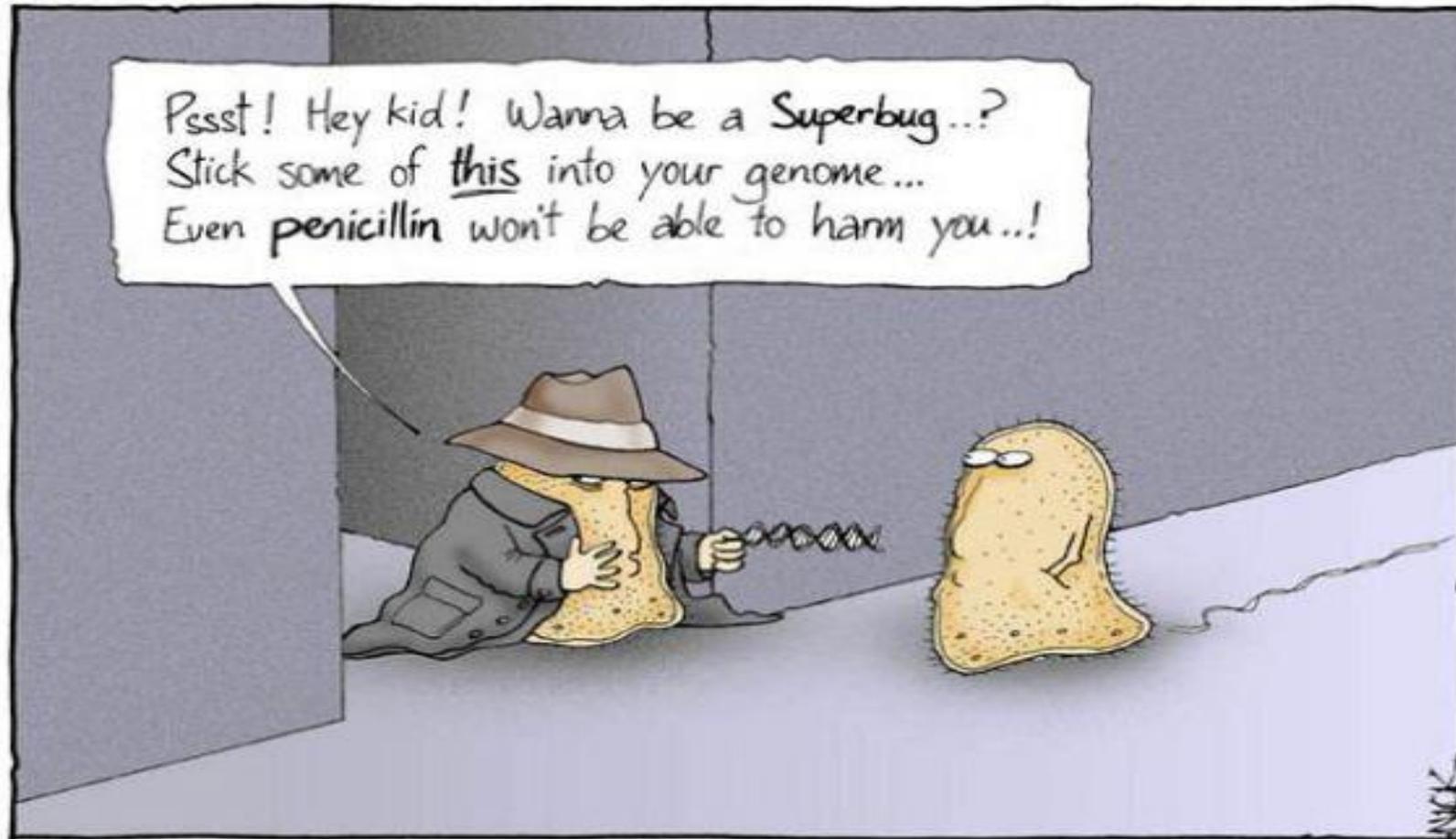
The rationale behind the treatment combination (cefiderocol+aztreonam+ceftazidime-avibactam):

- **Cefiderocol** in combination with other treatment because of lung infection, difficult to treat.

- **Ceftazidim-avibactam**: inhibits the OXA-48/ESBL and thus restores the NDM-isolate sensitivity towards **aztreonam**

<u>Antibiogram:</u>		
Piptazo:	6 mm	R
Cefotaxime	6 mm	R
Ceftazidim	6 mm	R
Meropenem	7 mm	R
Imipenem	12 mm	R
Amikacin	6 mm	R
Trimetoprimsulfa	6 mm	R
Ciprofloxacin	6 mm	R
Tol-taz	6 mm	R
Caz-avi	6 mm	R
Imi-rel	6 mm	R
Mero-vab	6 mm	R
Colistin	16 mg/L	R
Cefiderocol	23 mm	S

Thank you!



It was on a short-cut through the hospital kitchens that Albert was first approached by a member of the Antibiotic Resistance.