Hospital Universitario
Virgen Macarena, Seville

ESCMID
COLLABORATIVE CENTRE

ESGBIS
ESCMID STUDY GROUP FOR BLOODSTREAM INFECTIONS AND SEPSIS
European Society of Clinical Microbiology and Infectious Diseases

IDs and CMs working together and in multidisciplinary teams

L. Eduardo López Cortés

Lorena López Cerero

NEUMOBBCOMBACTE

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD
Instituto de Salud Carlos III
Unión Europea
Fondo Europeo de Desarrollo Regional
"Una manera de hacer Europa"

reipi-isciii
RED ESPAÑOLA DE INVESTIGACIÓN EN PATOLOGÍA INFECCIOSA

Why do IDs and CMs work together?

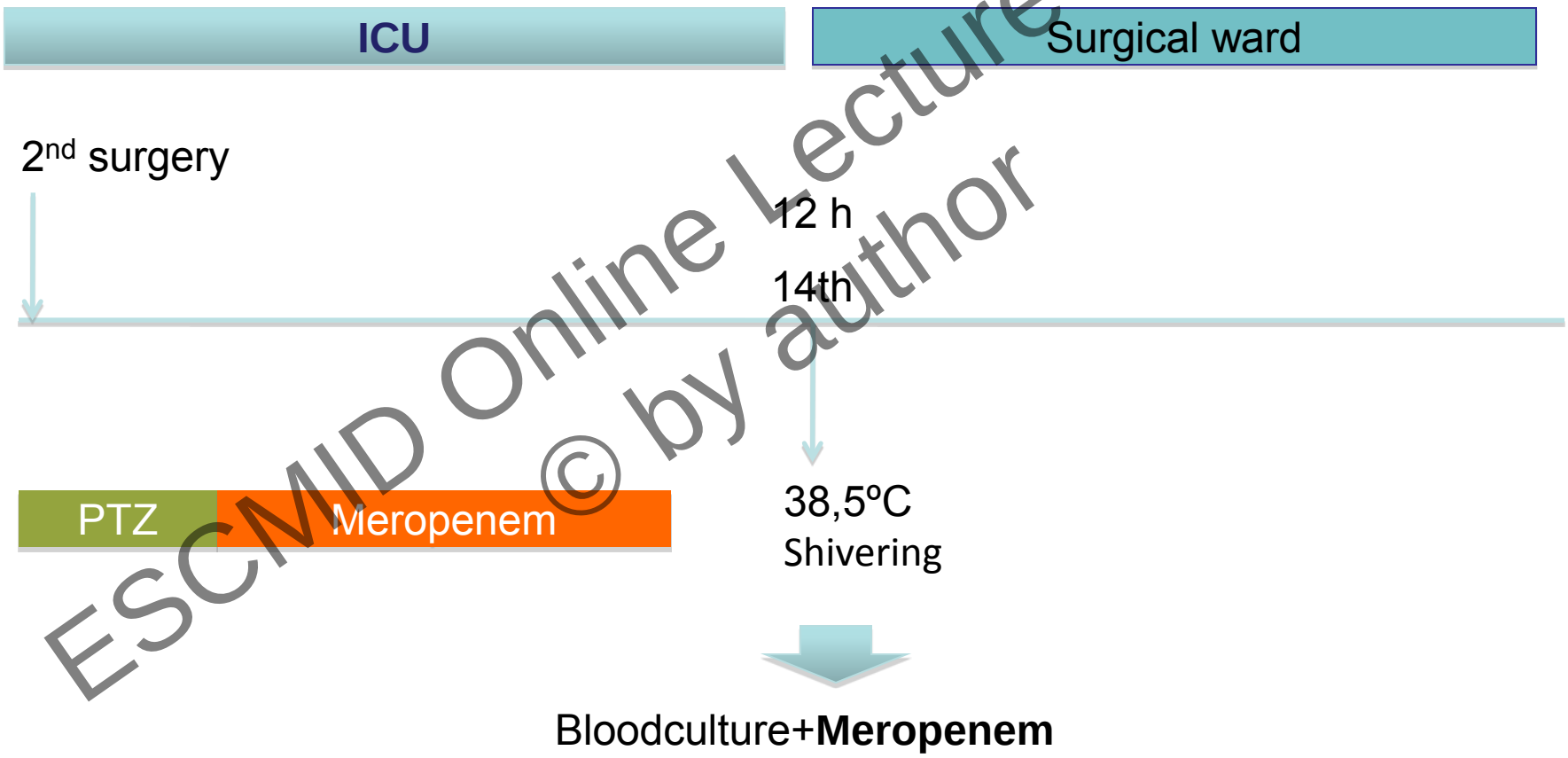
- Timely initiation of effective antimicrobial therapy is crucial to improving patient prognosis
- Antibiotic treatment should be accelerated, ceased or de-escalated according to clinical outcome and microbiological results
- Rapid detection of MR transmission is crucial
- Good clinical information permits low-cost microbiological diagnosis

Case 1

Case 1

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- June 15th, 2016: Daily IDs and CMs meeting (11.30 am) → ***Streptococcus* spp. in BC (2/4 bottles)**
  - General Surgery ward
  - Male, 70 y. Colorectal carcinoma (2016). Surgery in May, 2016
  - Anastomosis dehiscence → tertiary peritonitis → 2nd surgery → ICU
  - Treated with piperacillin/tazobactam, and later meropenem for 16 days.
  - Patient admitted to surgery ward from ICU <u>without antibiotics</u>.
  - June 14th → 38.5ºC, shivering → blood cultures → meropenem 1g/8h.
  - **Previous** cultures (abscess): *K. pneumoniae*, ESBL-*E. coli.*



Case 1

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- 12.10 am → ID to surgery ward:
  - 38.2ºC in this moment. Sweaty. Blood pressure: 96/57 mmHg. 130 bpm.
  - Not felling well. Pain under the surgical wound.

- **Taking into account the clinical story and present clinical situation….**
  1. Wait until final identification
  2. Add vancomycin or teicoplanin
  3. Add daptomycin
  4. Nothing, *Streptococcus* spp. represents a colonization/contamination
  5. All of them

ICU

Surgical ward

2nd surgery

10 h

16 h

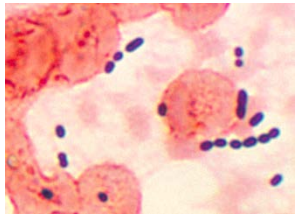
14th

PTZ

Meropenem

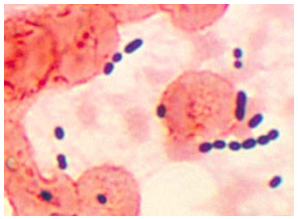
Blood culture

Positive



Gram positive cocci

Streptococcus



	Meropenem	Vancomycin
S. pyogenes	+++	+++
S. agalactiae	+++	+++
S. mitis/sanguis	+++	+++
S. pneumoniae	++?	+++
E. faecalis	+++	+++
E. faecium	+--	+++
Peptostreptococcus sp	+++	+++

ICU

Surgical ward

2nd surgery

10 h

14th

16 h

18 h

10 h

15th

PTZ

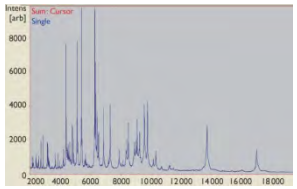
Meropenem

Bloodculture

GPC

Streptococcus

Maldi TOF



E. faecium

Blood:

E. faecium

Ampicillin R

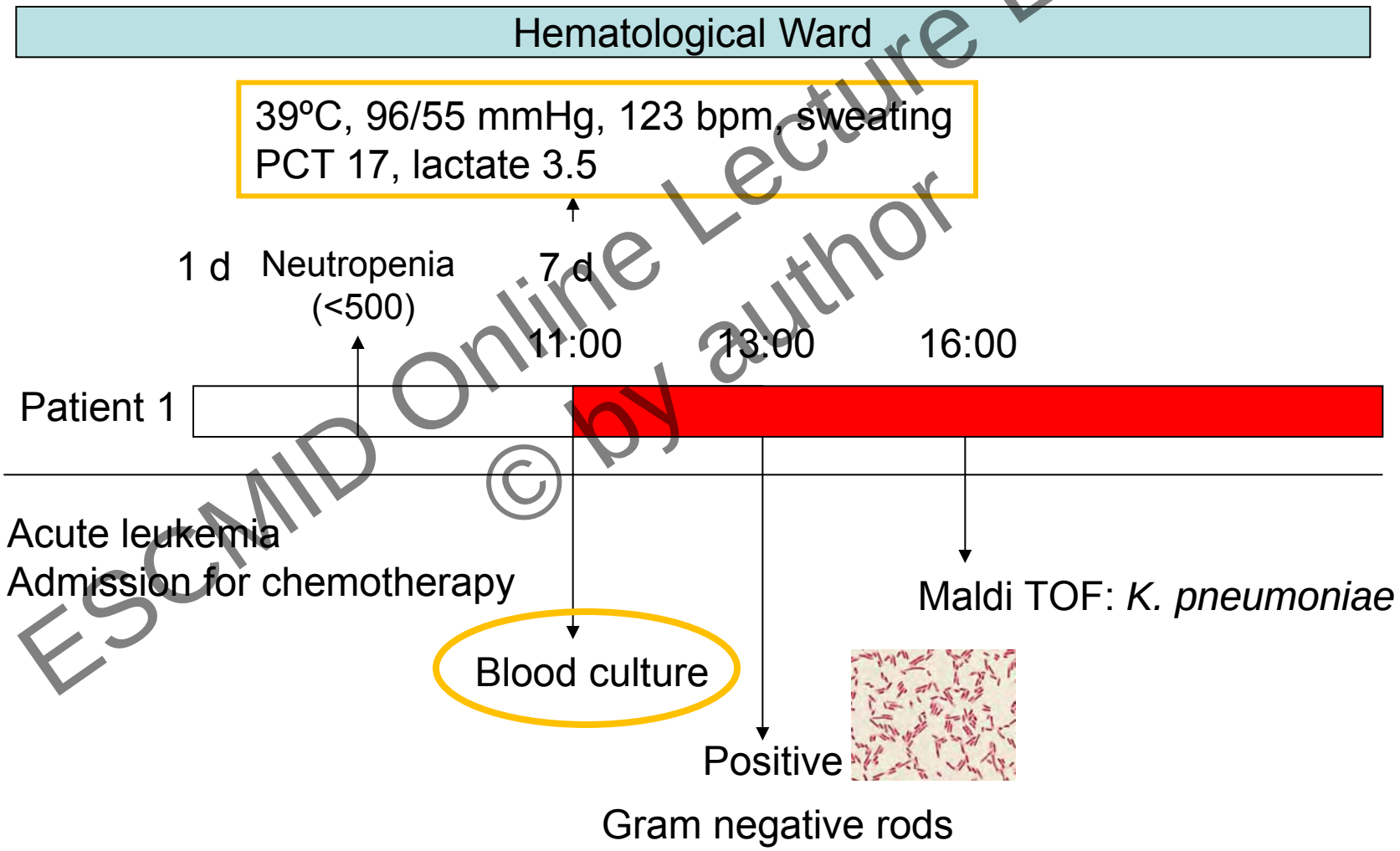
Vancomycin S

Abdominal abscess → **previous**

ESBL *E. coli* + *E. faecium*

Case 2

Case 2



Case 2

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- **In this momment, you would…:**
  1. Start piperacilline/tazobactam 4g/8h
  2. Start piperacilline/tazobactam 4g/8h + amikacin 1g/24h
  3. Start ceftriaxone 1g/24h + metronidazole 500 mg/8h
  4. Start meropenem 1g/8h
  5. Start linezolid 600 mg/12 h
  6. Wait and see...

Case 2

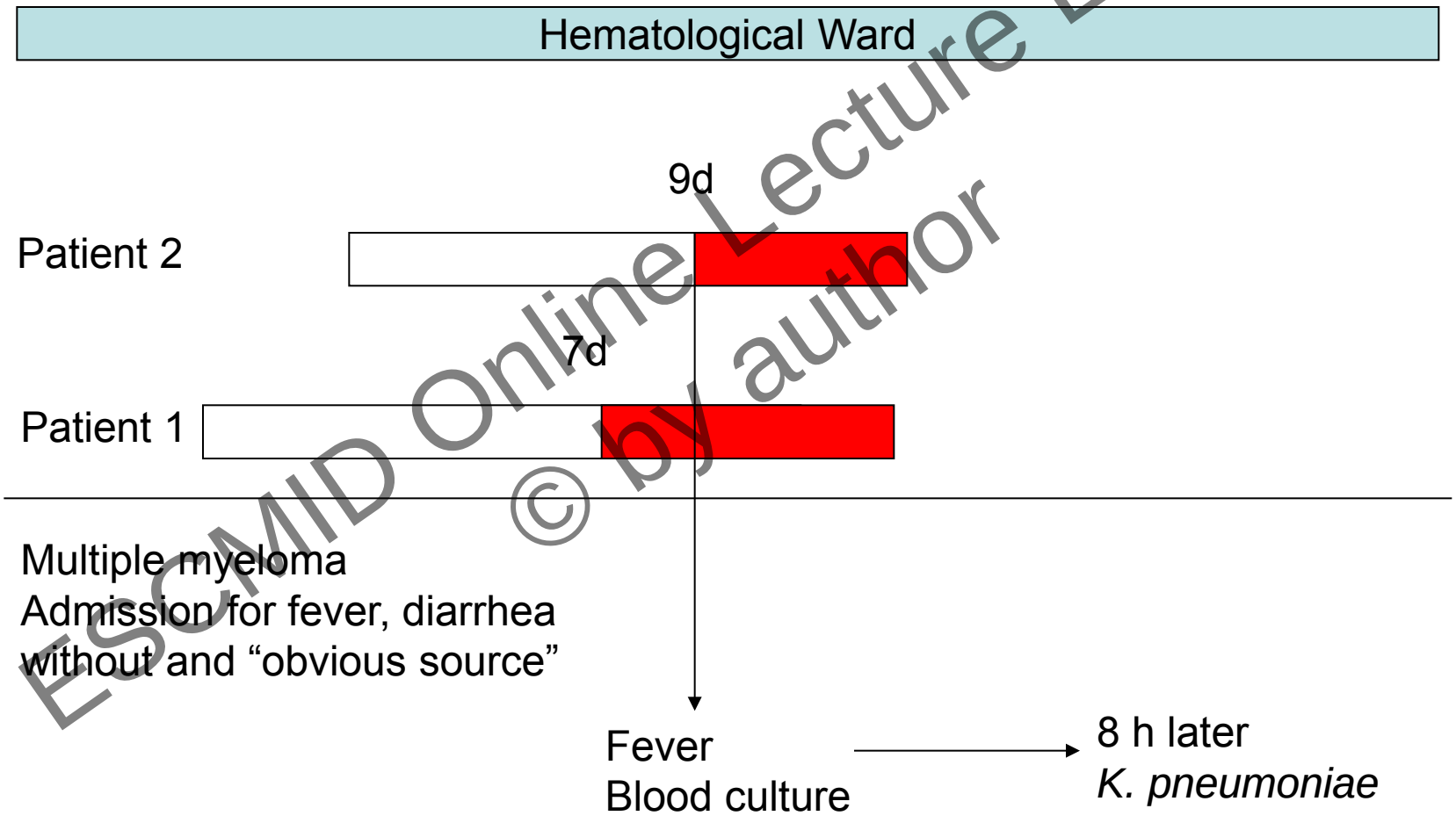
Antibiotic	MIC (mg/l)	Category
Amox/clav	>16/8	R
Piper/tazo	32	I
Cefuroxime	>16	R
Ceftazidime	>16	R
Cefotaxime	>16	R
Aztreonam	32	R
Cefepime	16	R
Ertapenem	>1	R
Imipenem	2	S
Meropenem	S	S
Gentamycin	>4	R
Tobramycin	>4	R
Trimetropin-sul	>4	R
Fosfomycin	>64	R
Colistin	<=0.5	S

Patient 1

Bacteremia
K. pneumoniae

- How often do you find this phenotype?
- Do you think there are some anomalous or unlikely results?
- Would you change the empiric therapy?

Case 2



Patient 1

Antibiotic	MIC (mg/l)	Category
Amox/clav	>16/8	R
Piper/tazo	32	I
Cefuroxime	>16	R
Ceftazidime	>16	R
Cefotaxime	>16	R
Aztreonam	32	R
Cefepime	16	R
Ertapenem	>1	R
Imipenem	2	S
Meropenem	2	S
Gentamycin	>4	R
Tobramycin	>4	R
Trimetropin-sul	>4	R
Fosfomycin	>64	R
Colistin	<=0.5	S

Patient 2

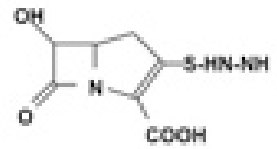
Antibiotic	MIC (mg/l)	Category
Amox/clav	>16/8	R
Piper/tazo	>64	R
Cefuroxime	>16	R
Ceftazidime	>16	R
Cefotaxime	>16	R
Aztreonam	32	R
Cefepime	16	R
Ertapenem	>1	R
Imipenem	4	I
Meropenem	2	S
Gentamycin	>4	R
Tobramycin	>4	R
Trimetropin-sul	>4	R
Fosfomycin	>64	R
Colistin	<=0.5	S

Some epidemiological questions

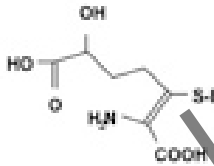
- Both isolates are very similar, so can we assume direct transfer between patients?
  - Outbreak?
  - Likely reservoirs?
  - Other measures?
  - Both isolates show resistance to ertapenem
  - Are they producers of carbapenemases?

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

Rapid microbiological tests

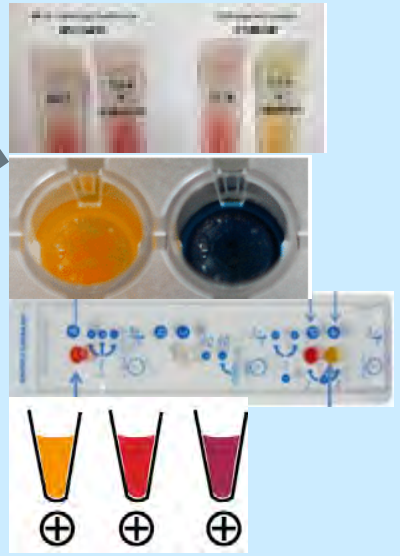


Hydrolysis of imipenem
+pH indicator



Color change

Name of test	Manufacter	Time
Carba NP test	In house	2h 30 min
Blu Carba test	In house	2h
RAPIDEC® CARBA NP	BioMérieux	2 h
β CARBA™ test	Biorad	30 min



Isolate from patient 1

Negative

Isolate from patient 2

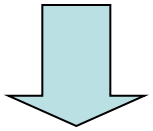
Positive

What would be your choice for targeted therapy in these cases?

Patient 1

Antibiotic	MIC (mg/l)	Category
Piper/tazo	32	I
Ertapenem	>1	R
Imipenem	2	S
Meropenem	2	S
Amikacin	1	S
Colistin	<=0.5	S
Ciprofloxacin	>4	R

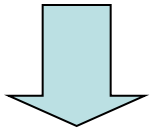
ESBL+porin loss



Patient 2

Antibiotic	MIC (mg/l)	Category
Piper/tazo	>64	R
Ertapenem	>1	R
Imipenem	4	I
Meropenem	S	S
Amikacin	1	S
Colistin	<=0.5	S
Ciprofloxacin	>4	R

ESBL+OXA-48



Case 3

Case 3

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- June 7th, 2016: Daily IDs and CMs meeting (11.30 am)
  - Room 324/1: Gram negative bacilli in BC (3/4 bottles)
  - Male, 34 y. Diabetes, metastatic bladder carcinoma (2014) treated with chemo and radiotherapy. Charlson: 7
  - Double nephrostomy.
  - **Admitted on 6th**: Fever through 38.5ºC, and obstruction of left nephrostomy.
  - No signs of severe sepsis. Leukocitosis, RCP 234 mg/L, normal renal function.
  - ER: ceftazidime 2g/8h was started.
- **Would you like to have any other information?**

Information about…

Hospital Universitario Virgen Macarena, Seville

ESCMID COLLABORATIVE CENTRE

a) Antibiotics in the last year?

b) Last change of nephrostomy?

c) Previous cultures?

d) Known colonization?

e) Previous admissions in the last year?

f) Trips out of Spain?

Information about…

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

a) Antibiotics in the last year?: ciprofloxacine (x2), ceftriaxone, fosfomycin and amoxicilillin/clavulanate.

b) Last change of nephrostomy?: 2 months ago.

c) Previous cultures?: *E. coli* (salvage phenotype)

d) Known colonization?: no.

e) Previous admissions in the last year?: 4 admissions.

f) Trips out of Spain? No.

Case 3

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

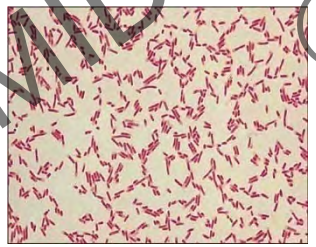
Male, 34 y.

Diabetes, metastatic bladder carcinoma (2014) treated with chemo and radiotherapy. Charlson: 7. Double nephrostomy

Day 0 Day 1

CEZTAZIDIME

Blood culture



Gram negative bacilli

Fever 38.5ºC,

obstruction of left nephrostomy.

No signs of severe sepsis. Leukocitosis, RCP 234 mg/L, normal renal function

Case 3

Hospital Universitario
Virgen Macarena, Seville
ESCMID
COLLABORATIVE CENTRE

- Fell not bad. Sitting on the bed.
- Hemodinamically stable. 105 bpm, 18 bpm.
- Obstruction has been solved by urology team.

- **Taking into account the clinical story and present clinical situation and new microbiological data….**
  1. Would you change the empirical therapy?
  2. Wait until identification?
  3. Wait until susceptibility data?
  4. Add amikacin 15-30 mg/kg/day 1 dose?
  5. Change to carbapenems?

ESBL risk factors?

a) Nephrostomy carrier

b) Diabetes mellitus

c) Previous admissions in the last year

d) Charlson Comorbity ≥ 4

e) Previous therapies with betalactams or quinolones

f) All of them

Hospital Universitario
Virgen Macarena, Seville
ESCMID
COLLABORATIVE CENTRE

Specie-specific resistance determinants

- Do you know any characteristic of *S. marcescens*?...

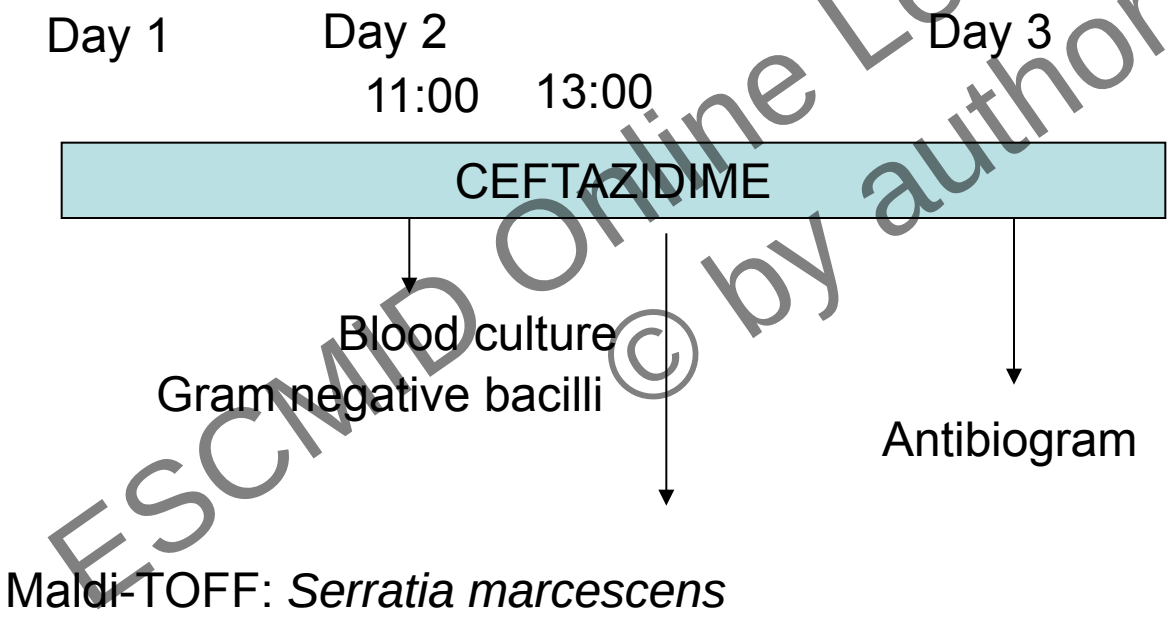
Hospital Universitario
Virgen Macarena, Seville
ESCMID
COLLABORATIVE CENTRE

Case 3

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

Male, 34 y.

Diabetes, metastatic bladder carcinoma (2014) treated with chemo and radiotherapy. Charlson: 7. Double nephrostomy



Piper/taz	S
Ceftazidime	S
Cefotaxime	S
Cefepime	S
Ertapenem	S
Ciprofloxacin	S
Cotrimoxazol	S

What would be your choice for targeted therapy ?

Case 4

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- June 22nd, 2016: Daily IDs and CMs meeting (11.30 am)
  - Room 348/2: Gram positive coccus in BC (3/4 bottles)
  - Man, 48 y. Smoker, diabetes, hypertension, admitted because of an acute myocardial infarction
  - **Admitted on 16th**: peripheral catheter in ER without later change
  - Evaluated by Internal Medicine doctors the previous day ceftazidime 2g/8h + vancomycin 1g/12h was started
  - But…they did not remove the catheter because it hadn´t "signs of phlebitis"
  - June 22nd: 38.5ºC, some shivering, BP 100/65 mmHg. No phlebitis.
- **What would you do in this momment?**

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

a) Change vancomycin for daptomycin (stop ceftazidime)

b) Add cloxacillin 2g/4-6h to vancomycin (stop ceftazidime)

c) Add cefazoline 2g/8h to vancomycin (stop ceftazidime)

d) Stop ceftazidime

e) The empirical therapy is OK. Nothing to change

Case 4

Hospital Universitario
Virgen Macarena, Seville
ESCMID
COLLABORATIVE CENTRE

Day 1 Day 6

11:30 14:00

Vancomycin

Fever
Blood culture

Catheter
ER

Gram positive cocci

Maldi TOFF: *S. aureus*

Rapid detection of *mecA*: negative

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- Options:
  a) Stop vancomycin
  b) Continue with combinated therapy until final susceptibility inform
  c) Change to daptomycin
  d) Change to linezolid

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- **A negative result for mecA detection can predict the success of cloxaciline?**

  a. Yes, because all the MRSA have *mecA* and the susceptibility of the aglutination is very high.

  b. I don´t know the susceptibility of these types of test

  c. There is other resistance determinants different to *mecA*

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

- June 23th, 2016
  - **And what about targeted therapy?**

HEMOCULTIVO/LIQUIDOS ESTERILES

SE AISLA:

(1) Staphylococcus aureus.

Antimicrobiano	*S/I/R*	*CMI (ug/ml)*
Penicilina	R	<=.12
Amoxicilina/clavulan	S	<=4/2
Oxacilina	S	<=.25
Gentamicina	S	<=1
Tobramicina	S	<=1
Amikacina	S	<=8
Levofloxacina	S	<=1
Eritromicina	S	<=.5
Clindamicina	S	<=.25
Tetraciclina	S	<=1
Rifampicina	S	<=.5
Tmp/Smx	S	<=2/38
Linezolid	S	<=1
Daptomicina	S	<=1
Teicoplanina	S	<=1
Vancomicina	S	1

Case 4

Hospital Universitario Virgen Macarena, Seville
ESCMID COLLABORATIVE CENTRE

Anything more to do beyond antibiotic therapy?

a) Remove the catheter

b) Follow-up blood cultures in 48-72 hours

c) Rule out septic trombophlebitis

d) Transthoracic echo if fever persists > 3 days or persistent bacteraemia appears

e) Adjust duration to clinical complexity (from 2 to 6 weeks)

f) All of them

Questions??

llopez@us.es

luiselopezcortes@gmail.com