


# Impact of a rapid diagnostic system on the management of septic shock patients

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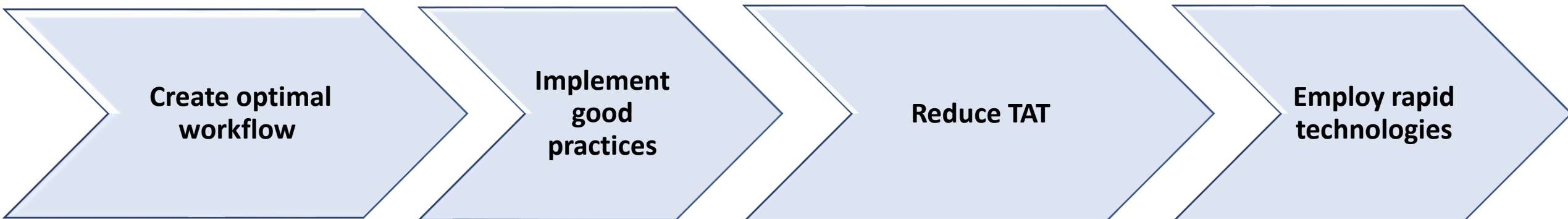


Azienda Ospedaliera S. Giovanni Addolorata – Roma - Italy

# Study Objective

<small>SISTEMA SANITARIO REGIONALE</small>  AZIENDA OSPEDALIERA SAN GIOVANNI ADDOLORATA	<b>Hospital Protocol for microbiological diagnosis of sepsis a/o septic shock</b>	POS (proc operativa standard) e n°0
		DATA 12/02/2018
		REV 0

- To evaluate the **role of rapid diagnostics** in the management of patients in septic shock, using the Accelerate Pheno™ system



TAT = turn around time

# Technology: Accelerate Pheno™ system

- The Accelerate Pheno™ system
  - **Is simple**
    - includes all of the reagents as part of the kit
    - requires less than 5 minutes of hands-on prep time
  - **Is fast**
    - is the only phenotypic test that delivers AST results in ~7 hours
    - allows a significant reduction in time from +BC → delivery of results


	Current TTR	Accelerate Pheno™ system TTR
ID	24 hours from +BC	90 min from +BC
AST	48 hours from +BC	~7 hours from +BC

+BC = positive blood culture  
TTR = time to results

# Patient population

- Septic shock patients were classified based on the following clinical features<sup>1</sup>
  - Infection
  - Hypotension  $\geq 65$ mmHg
  - Lactic acid levels  $> 2$  mmol/L (18 mg/dL)

**Blood cultures are processed 24 h/day, 7 days/week**

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<b>UOC Patologia Clinica</b>		

<sup>1</sup>Singer M, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis3). JAMA. 2016;315(8):801-10.

# Data

Case	Identified pathogen	Days to rapid AST	Days to routine AST	Disease / Condition	Empiric Therapy	Targeted Therapy	Main Action
1	MSSA	1	4	Endocarditis	Pip/tazo + Vancomycin	Oxacillin + Daptomycin + Rifampicin	Targeted
2	<i>E.coli</i> (ESBL)	1	3	Septic shock	Pip/tazo	Amoxicillin/Clavulanic-Acid	De-escalation
3	Klebsiella (KPC)	2	5	Shock due to urosepsis	Pip/tazo	Meropenem	Targeted
4	<i>E. coli</i>	1	2	Shock due to urosepsis	Pip/tazo	Pip/tazo	Confirmed
5	MSSA	1	3	Post-surgery sepsis	Amoxicillin/ Clavulanic-Acid	Oxacillin	Targeted
6	CONS	1	3	Sepsis	Pip/tazo + Fluconazole	Vancomycin	Targeted
7	<i>E. faecalis</i>	1	3	Endocarditis	Pip/tazo vanco	Ampicillin + Ceftriaxone	Targeted
8	<i>E. coli</i>	1	3	Sepsis shock	Ciprofloxacin	Meropenem	Targeted
9	MRSA	1	2	CVC sepsis	Meropenem + Vancomycin	Vancomycin	De-escalation
10	<i>E. faecalis</i>	1	2	Endocarditis	Ampicillin + Ceftriaxone	Ampicillin + Ceftriaxone	Confirmed
11	<i>E. faecium</i>	1	3	Septic shock	Ceftriaxone + Metronidazole	Vancomycin	Targeted
12	MRSA	1	3	CVC sepsis	Pip/Tazo	Vancomycin	Targeted
13	<i>E. coli</i> (ESBL)	1	3	Urosepsis	Amoxicillin/ Clavulanic-Acid	Pip/Tazo	Targeted
14	MSSA	1	3	Sepsis	Daptomycin	Oxacillin	De-Escalation
15	<i>E. faecium</i>	2	3		Ceftriaxone	Teicoplanin	Target
16	<i>E. faecium</i>	1	3		Ceftriaxone	Vancomycin	Target
17	<i>E. faecalis</i>	1	2	Endocarditis	/	Ampicillin + Ceftriaxone	Target
18	MRSA	1	3	CVC sepsis	Vancomycin + Meropenem	Vancomycin	De-escalation

CVC = central venous catheter related

# Summary of Results

- N = 18
  - 6 *S. aureus* (3 MRSA)
  - 1 CoNS
  - 6 *Enterococcus*
  - 4 *E. coli* (2 ESBLs)
  - 1 *Klebsiella* (KPC)
- Time to results (TTR)
  - Accelerate Pheno™ system = 1,1 day
  - Routine procedure 3 days
- Therapy changes
  - Definitive therapy 12/18 = 66,7%
  - De-escalation 4/18 = 22,2%

# Case Example

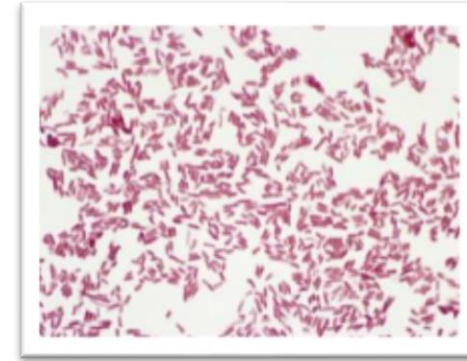
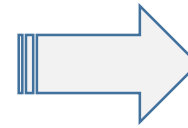
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# Case Example

- 63 year-old female was admitted to the ER due to severe urinary sepsis
- History
  - metastatic bladder cancer
  - peripherally inserted central catheter (PICC) line
  - on-going therapy with cortisone
- Septic shock
  - Lactic acid level: 2,34 mmol/L
  - qSOFA ( $\geq 2$ ): 3
  - SOFA ( $\geq 2$ ): 6
- Haematochemical test and blood culture (BC) were ordered
  - 4,600 WBC and 82,9% neutrophils, CRP 14,6 mg/dL, creatinine 0,6 mg/dL, Na 148 mEq/L, K 2,95 mEq/L, Cl 119 mEq/L, Ca 7,3 mg/dl
- BC drawn when patient was febrile
- Empiric therapy: **Ciprofloxacin**



# Lab Workup



Gram-stain  
result  
**Gram  
Negative**

Saturday 8:00  
BC flagged positive

Start time  
Saturday at 9:00



*Escherichia coli*  
(CAZ S, TZP S, MEM S, CST S)  
10:31 on Saturday (Day 1)  
16:02 on Saturday (Day 1)

Start time  
Saturday at 9:00

**Conventional methods**  
ID: Subculture (18-24h) MALDI TOF  
AST: Subculture(18-24h) BD Phoenix

*Escherichia coli*  
ID: Monday (Day 3)  
AST: Tuesday (Day 4)

ID = identification  
AST = antimicrobial  
susceptibility testing

# Patient Treatment and Outcome

- Doctor on call made a change from ciprofloxacin to meropenem
- Patient improved
- Discharged 17 days after being admitted to the ER and diagnosed with septic shock

# Conclusion

Impact of rapid ID/AST in clinical management of septic shock patients

**For septic shock patients, the Accelerate Pheno™ system was very effective to obtain not only a rapid and accurate microbiological diagnosis, but also to optimize antimicrobial therapy within the context of antimicrobial stewardship principles.**