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Impact of « Alfred 60^{AST} » on the clinical management of patients affected by enterobacterial sepsis

M. Potvin[1], E. Larranaga Lapique[2], M. Hites[2], D. Martiny[1]

[1]Microbiology Departement, LHUB-ULB, Brussels, Belgium

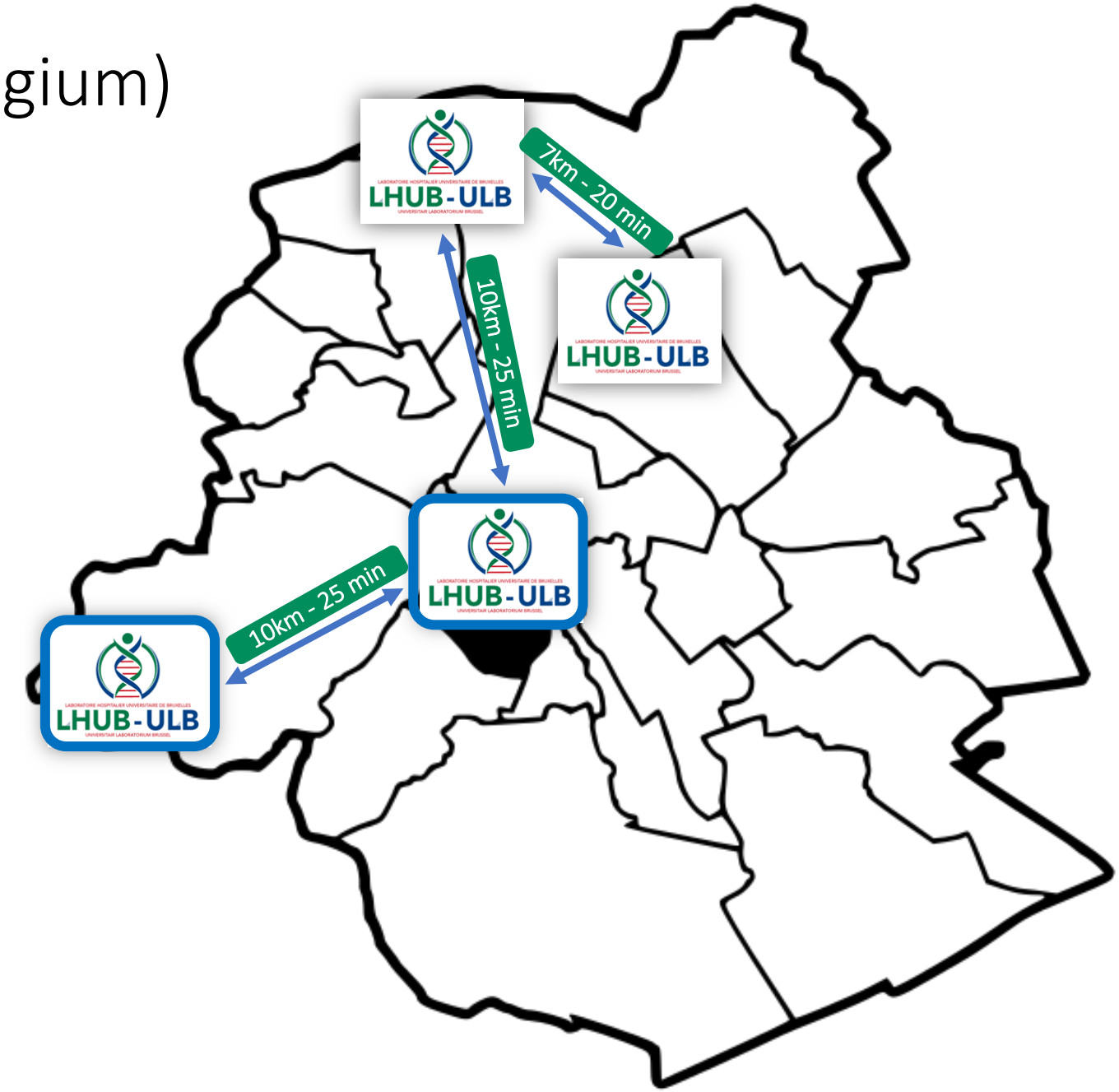
[2]Department of Infectious Disease, Erasme Hospital – Brussels, Belgium)

The LHUB-ULB (Brussels, Belgium)

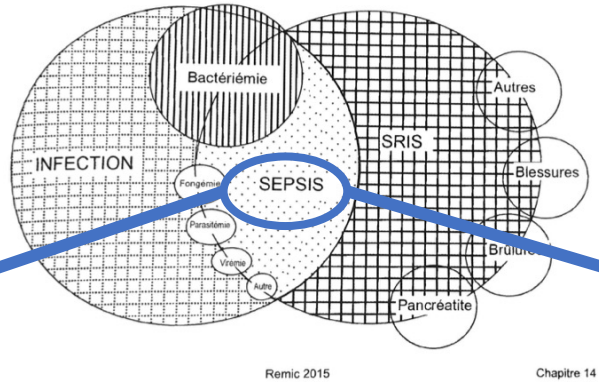
4 laboratory sites

5 hospitals

Brussels Academic Hospital (Erasme)
Saint-Pierre University Hospital (STP)
Brugmann University Hospital (BRU)
Reine Fabiola Children's Hospital (HUDERF)
Jules Bordet Institute of Oncology



Introduction



Diagnosis

Therapeutic strategies

Scores

Rapid ASTs

24-48h

Identification

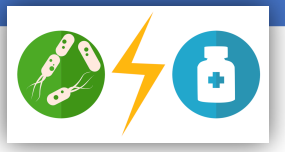
24-48h

AST (Vitek)

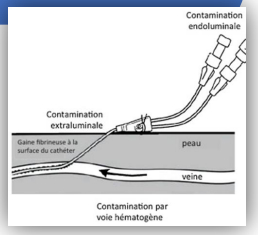
Therapeutic de-escalation

Hemodynamic support

Antibiotic therapy

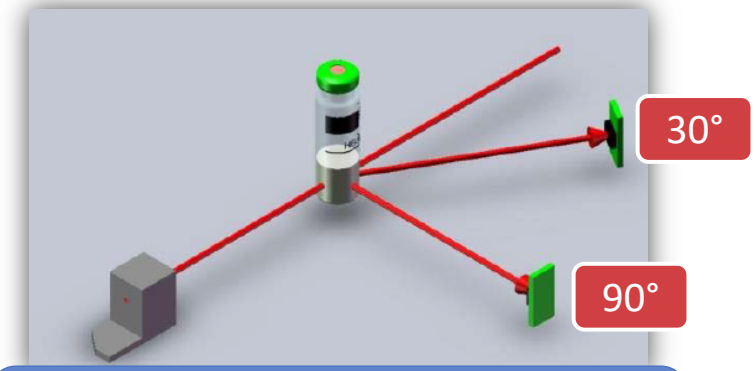


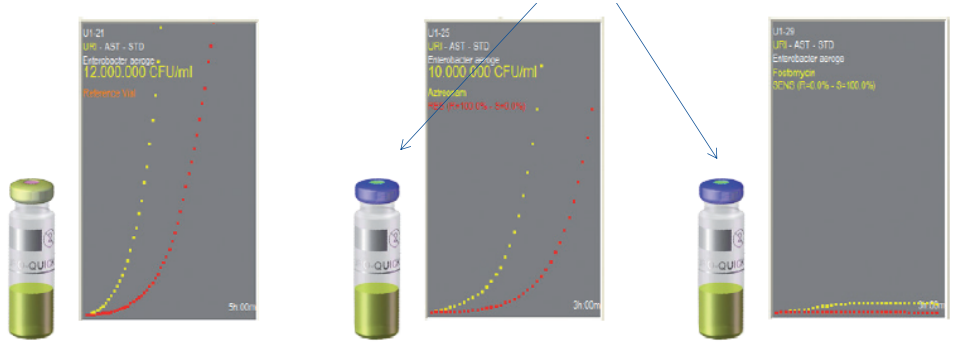
Source identification and control



Empirical antibiotic therapy administration within 1h of sepsis diagnosis

Alfred60^{AST} principle





AST by using light scattering technology

Evaluation of analytical performance

Multicentric study (from December 2019 to April 2020)

249 blood cultures included

Performed ASTs	Categorical agreement (%)	VME (%)	ME (%)	Minor error (%)
Enterobacteriaceae (all antibiotics combined)	633/661 (**95.8**) 633/692 (91.5)✦	1/108 (0.9)	17/543 (3.1)	10/546 (1.8)
Enterococcus sp. (all antibiotics combined)	42/42 (**100**)	0/12 (0)	0/30	0/21 (0)
Staphylococcus sp. (all antibiotics combined)	224/240 (**93.3**) 224/260 (86.1)✦	11/66 (**16.7**)	2/173 (**1.2**)	3/122 (2.5)
Non-fermenting GNB (all antibiotics combined)	58/65 (**89.2**) 58/79 (73.4)✦	2/3 (**66.6**)	5/62 (**8.1**)	0/26 (0)

Global TAT = 13h25 (vs 32h25 **with Vitek**) → **significant reduction of the TAT (19h)**

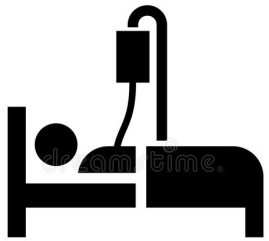
Cupaiolo R et al. Antimicrobial susceptibility testing determined by Alfred 60/AST (Alifax®) in a multi-sites lab: performance's evaluation and optimization of workflow.

Clinical impact – pilot study

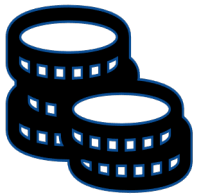
Monocentric study (from February to April 2021)

53 episodes of bloodstream infections included

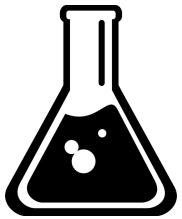
Clinical impact



Financial impact



Impact on the workflow



Clinical impact: M&M

5PM-12 AM

ID > Enterobacteriaceae or Enterococcus sp.

Alfred60^{AST}

Routine methods

J0

Real time communication of the results

Change of therapeutic strategy?

J1

Communication of the results

Clinical impact: results

All episodes of BSI over the study period
(n = 218; 100%)

Blood cultures analysed by Alfred60^{AST}
(n = 53; 24,5%)

Excluded samples
(n = 165; 76%)

Positive blood cultures for Enterobacteriaceae
(n = 42; 19,5%)

+- 20% clinical impact (10/53)

Clinical impact of the Alfred60^{AST} analysis
(n = 10; 4,5%)

- Antibiotic de-escalation (n = 4; 1,8%)
- Antibiotic escalation (n = 4; 1,8%)
- Switch of antibiotic class (n = 2; 0,9%)

No clinical impact
(n = 32; 15%)

Positive blood cultures for *Enterococcus sp.*
(n = 11; 5%)

No clinical impact
(n = 11; 5%)

Clinical impact – pilot study

Monocentric study (from February to April 2021)

53 episodes of bloodstream infections included (24% of all episodes of BSI)

Clinical impact

- Faster switch of treatment in **20%** of cases
- Only for BSI caused by Enterobacteriaceae

Financial impact

- **Higher cost +++** (short bench life of reagents; technical issues)
  - AST « Enterobacteriaceae »: €22.55 → €31.00 (+38%)
  - AST « *Enterococcus sp.* »: €12.30 → €24.60 (+50%)

Impact on the workflow

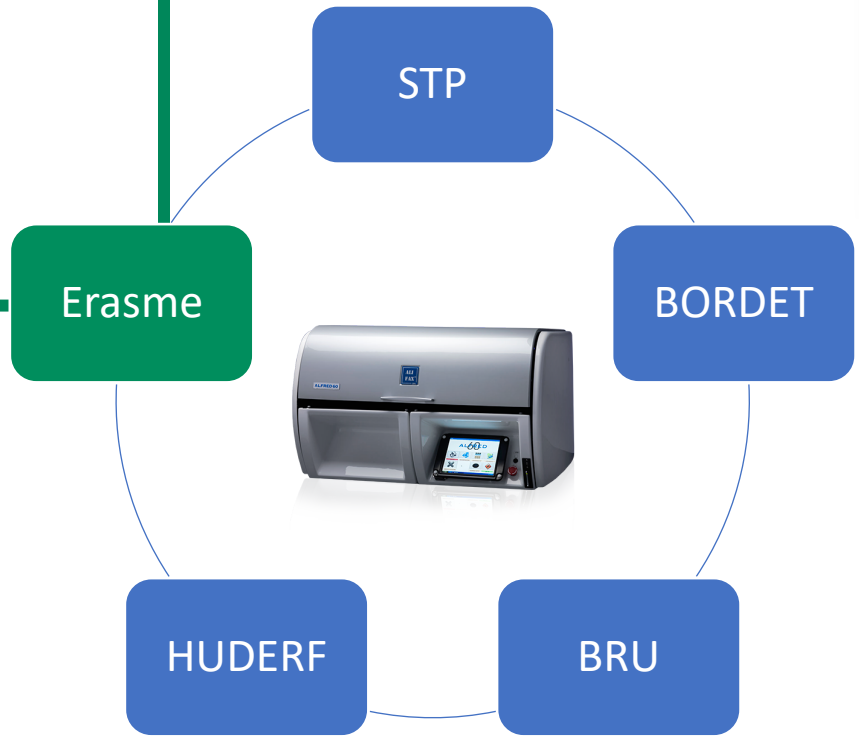
- User-friendly system
- Most convenient time to use the Alfred60AST system: **after 10.30 AM**

Clinical impact - multicentric study

Multicentric study (from December 2021 to April 2022)

77 episodes of bloodstream infections included

- Use of a single instrument for our entire network (12h/24h lab organization)
- Analyses launched daily before 12 AM
- **Real-time communication of the results**



Results

All episodes of BSI caused by Enterobacteriaceae over the study period (n = 326; 100%)

Blood cultures analysed by Alfred60^{AST} (n = 77; 24%)

Excluded samples (n = 249; 76%)

BC from Erasme (n = 48; 61,5%)
- Clinical impact of the Alfred60^{AST} analysis (n = 6; 12,5%)
- No clinical impact (n = 42; 87,5%)

BC from BORDET (n = 8; 10,5%)
- Clinical impact of the Alfred60^{AST} analysis (n = 1; 12,5%)
- No clinical impact (n = 7; 87,5%)

BC from STP (n = 7; 9%)

BC from BRU (n = 13; 17%)

BC from HUDERF (n = 1; 2%)

→ No clinical impact

Results communication <u>before</u> 5 PM

Results communication <u>24/7</u>

Results communication <u>after</u> 5 PM

Discussion, conclusions and prospects

- **Easy-to-use** and fast technology (significant reduction of the TAT of 19h)
- **Limited proportion** of BSI included in the study (24%)
- Globally, low clinical impact (9%)
- High rate of ASTs **results available after working hours** (due to BC transportation delays)
- Higher clinical impact for patients affected by BSI at **Erasme Hospital** (no transit delays, faster ASTs launching)

- **Need for even faster technology** (analysis global time = ± 6-7h → limited possibilities to obtain results during working hours)
- Reduction of the transport time?

- 24/7 involvement of clinicians