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Diagnostic accuracy of LIAISON MeMed VB® for bacteremia in the Emergency Department

Precisión diagnóstica de LIAISON MeMed BV® para la bacteriemia en el servicio de urgencias

Dear Editor,

Patients in accident and emergency departments (A&E) with infection represent 15–20% of all patients seen daily in Spain.[1] The severity of clinical presentation and short-term (30 days) mortality rates have increased over the last ten years, particularly in patients who meet sepsis criteria, have significant comorbidities, are immunocompromised, older or have significant bacteraemia confirmed from the A&E. The mortality rate in these patients is two to three times higher than in other patients with the same condition.[1]

In this scenario, the early and appropriate administration of antibiotic therapy (AB), control of the source of infection, and immediately making other decisions (for example, requesting additional tests, obtaining blood cultures and other microbiological samples and the intensity of haemodynamic support), have a direct impact on the survival of patients with severe bacterial infection and bacteraemia.[2]

In recent years, there has been an ever greater search for tools to help with early predicting of diagnosis, prognosis and, along with the possible bacterial aetiology, the suspicion of bacteraemia. Biomarkers of inflammatory response and infection (BMIRI)[3,4] have proven useful in predicting and detecting the existence of true bacteraemia, both as independent predictors[3,5,6] and as part of predictive models of bacteraemia.[7–9] Of all the BMIRI, procalcitonin (PCT) is also very sensitive and specific in predicting bacterial infection and in guiding towards the pathogen causing the infection, its clinical course (to sepsis and septic shock) and mortality risk.[3,5]

A new test has recently been described based on abnormal concentrations of different proteins produced in the immune response. Called LIAISON® MeMed®, the test scores based on a model that correlates the results of three soluble host proteins, making it possible to distinguish between the bacterial or viral origin of an infection.[10] However, to date, no studies have been published assessing the ability of LIAISON® MeMed® to predict bacteraemia. This diagnostic test includes a score based on the combination of the concentration of three circulating proteins in blood of BMIRI induced by both viruses and bacteria: (1) tumour necrosis factor-related apoptosis-inducing ligand (TRAIL), which is elevated as an expression of viral infection and decreased in bacterial infection; (2) interferon gamma-induced protein 10 (IP-10), which is increased more in viral and to a lesser extent in bacterial infections; and (3) C-reactive protein (CRP), which shows an opposite pattern to IP-10. The presence of unrelated host proteins involved in different pathways could improve diagnostic accuracy.[10]

In this context, our aim was to investigate the ability of the MeMed® test to predict bacteraemia in adult patients in A&E in whom infection is suspected and to compare its performance with PCT. We conducted this observational, prospective cohort study on adult patients seen in an A&E with a clinical diagnosis of an infectious process from whom we were able to take samples to run laboratory and microbiological tests (blood cultures [BC] in all cases). Cases were included by opportunity (when investigators were on duty). The dependent variable considered was the diagnosis of true bacteraemia (TrB), which was defined, according to criteria already published by the authors in other articles,[8,9] as the isolation of normally pathogenic bacteria in one or both of the two BC with consistent signs and symptoms. Contaminated BC was defined as isolation in a single BC bottle of coagulase-negative *Staphylococcus* (CoNS), *Bacillus* spp., *Streptococcus* from the group viridans, *Micrococcus* spp., *Propionibacterium* spp., *Corynebacterium* spp. or other Gram-positive bacilli when the absence of clinical significance was interpreted in these cases (confirmed based on the history and/or at the discretion of the physician on duty and microbiology).

The predictive ability was analysed with the area under the receiver operating characteristic (ROC) curve (AUC) and the sensitivity (Se), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV) of PCT and the LIAISON® MeMed® test. A total of 345 patients were included, 61 (17.7%) with TrB (the isolated microorganisms considered as TrB or significant bacteraemia are shown in Table 1). The mean age was 66.48 (SD 18.84) years; 58% were male. The MeMed® AUC-ROC for predicting TrB was 0.94 (95% CI: 0.87–1.00; $p < 0.001$), while the PCT AUC-ROC was 0.83 (95% CI: 0.77–0.89; $p < 0.001$). With a cut-off point (CP) >65 points for the MeMed® test, we obtained an AUC-ROC of 0.91 (95% CI: 0.83–0.98; $p < 0.001$), Se: 85%, Sp: 93%, PPV: 97% and NPV: 64%. Meanwhile, with a CP for PCT of ≥0.51 ng/mL, we obtained an AUC-ROC of 0.82 (95% CI: 0.76–0.88); $p < 0.001$), Se: 74%, Sp: 85%, PPV: 93% and NPV: 56%.

In conclusion, in adult patients seen in A&E with clinically suspected infection, the LIAISON MeMed® test has an acceptable ability to predict TrB and performs better than PCT.

CRediT authorship contribution statement

The four authors declare that they were responsible for the design, development and preparation of the article.

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Table 1
Microorganisms isolated in the episodes of true bacteraemia.

Type of microorganism n = 61	True bacteraemia n (%)
Gram-negative bacteria [45 (74%)]	
Escherichia coli[a]	22 (36.1)
Klebsiella pneumoniae[a]	9 (14.7)
Pseudomonas aeruginosa[a]	4 (6.6)
Proteus mirabilis	4 (6.6)
Klebsiella spp (K. oxytoca - K. aerogenes)	2 (3.3)
Salmonella enteritidis	1 (1.6)
Acinetobacter baumannii	1 (1.6)
Morganella morganii	1 (1.6)
Campylobacter jejuni	1 (1.6)
Gram-positive bacteria [15 (25%)]	
Enterococcus faecalis	5 (8.2)
Staphylococcus aureus	4 (6.6)
Streptococcus pneumoniae	2 (3.3)
Enterococcus faecium	1 (1.6)
Streptococcus pyogenes	1 (1.6)
MRSA	1 (1.6)
Streptococcus dysgalactiae	1 (1.6)
Anaerobic bacteria [1 (1%)]	
Fusobacterium nucleatum	1 (1.6)

MRSA: *methicillin-resistant Staphylococcus aureus*.
[a] Includes pathogens that are carriers and non-carriers of extended-spectrum beta-lactamases (ESBL).

Ethical responsibilities

The study was approved by the Hospital Universitario de Toledo Independent Ethics Committee for research with medicines (IECm) (No. 1075/2023).

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Appendix: Castile-La Mancha Health Research Institute (IDISCAM) Toledo University Hospital Complex (CHUT) URGEN-LABQMIC Group

Other members of the IDISCAM CHUT URGEN-LABQMIC Group are: María Torres Fernández, Rafael Rubio Díaz, Laura Morell Jurado, Eva Heredero Gálvez, William Esneider López Forero, María Francisca Calafell Mas, Raúl Canabal Berlanga, Elia Chaves Prieto, María Remedios Asensio Nieto, Álvaro Thomas-Balaguer Cordero, Isabel Nieto Rojas and María Carmen Lorenzo Lozano.

Declaration of competing interest

The authors declare that they have no conflicts of interest in relation to this article.

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