

## Purification Therapies – From Research to Clinical Evidence



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Aferetica held the 3<sup>rd</sup> "Purification Therapies" Workshop in Milano from September 30<sup>th</sup> to October 1<sup>st</sup>. The event involved more than 400 participants from all over Europe to discuss on different critical care topics and in particular on overwhelming inflammatory diseases. One of the many sessions focused on the diagnostic side of the overwhelming inflammatory disease in particular. During this session, Aferetica brought together experts to discuss the challenges in this field. Among them were Dr Caironi, a professor at the faculty of medicine department of anaesthesia and critical care at the University of Milan, Dr Pereira from the intensive care medicine department of Hospital Vila Franca de Xira in Lisbon and Dr Castellano, professor at the University of Milan. Here below a summary of their presentation during the event:

### Dr P Caironi – Biomarkers, dream or reality?

In the last decade, many markers for use in critical care have been introduced in clinical practice. A biomarker can serve as a marker, mediator of disease or as a way to measure the severity of the disease. One of the main limitations related to the use of biomarkers in critical care is that they lack specificity. Dr Caironi recommends future research on biomarkers to focus on three aspects: first of all, for the early detection of specific organ dysfunction and secondly the possibility to identify specific phenotypes, both biological and clinical phenotypes. The last step would be the possibility of performing serial measurements for the prediction of organ failure.

For example, a multi-centric study conducted in 14 hospitals in Europe aimed to assess the clinical benefit of serial measurements of Pancreatic Stone Protein (PSP) at the Point-of-Care for the early recognition of nosocomial sepsis. Results showed that PSP levels increased 5 days before diagnosis as per the standard of care (SOC), making it a promising biomarker for the early detection of ICU-acquired sepsis<sup>1</sup>. The availability of rapid POC devices and the possibility to measure several biomarkers in a single test gives promising opportunities to further improve critical care management in the near future.

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### Dr J Pereira – PSP and the diagnosis of sepsis

Sepsis is a medical emergency as the patient's condition can deteriorate within hours so it is important to recognise sepsis early on and start as soon as possible antibiotic treatment. However it is also key to not overdiagnose sepsis as it is associated with antimicrobial resistances and toxicity related to antibiotic use. The challenge which the physicians are currently facing is the identification of true sepsis cases.

Biomarkers can help physicians in improving accurate clinical decision making. A biomarker can diagnose, monitor and provide a prognosis on the patient's clinical outcomes. In addition, measuring them with Point-of-Care technology (POCT) can be very helpful in clinical practice, in particular when there is a doubt about the diagnosis, thus supporting the decision to rule-in or rule-out the use of antibiotics.

What about Pancreatic Stone Protein (PSP)? According to a recently published meta-analysis<sup>2</sup>, PSP showed higher diagnostic accuracy compared with CRP and PCT for the identification of infection in hospitalised patients (ICU and ED setting).

According to Dr Pereira's practical experience, a PSP value of  $\geq 250$  ng/ml in critically ill patients was the most accurate to detect infection\*. In addition, lower levels of PSP were also useful to confirm the absence of infection and also the decision to withhold antibiotics. As shown in a multi-centric study, PSP was also shown to significantly increase before the patients started showing symptoms, up to 72 hours before sepsis diagnosis according to the standard of care<sup>1</sup>.

Dr Pereira concluded his lecture by highlighting PSP as a promising biomarker for the early detection of sepsis, with results easily and rapidly obtainable with a POC device.

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### **Dr G Castellano – PSP and diagnosis of COVID-19**

It is known that severe COVID-19 is associated with over activation of the immune system, including endothelial dysfunction and organ failure. Bacterial superinfection is a severe and frequent complication among these patients. Early identification of bacterial superinfection is key for timely antibiotic therapy and appropriate care.

PSP for the early detection of infection is a C-type lectin protein which is secreted by the acinar cells of the pancreas and is known for its involvement in the activation of the immune system by binding and activating neutrophils. In severe COVID-19 patients with bacterial superinfections, the increase of PSP levels were strongly correlated with disease severity, in comparison with CRP and PCT.

Dr Castellano also shared his clinical experience using PSP on the abioSCOPE® in the nephrology department: in COVID-19 patients requiring haemodialysis, a trend for PSP to increase along with the severity of the disease was observed.

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