ROLE OF BIOMARKERS IN DIAGNOSIS OF SEPSIS; C-REACTIVE PROTEIN & PROCALCITONIN.

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Introduction
Sepsis is the body's overwhelming and life-threatening response to infection that can lead to tissue damage, organ failure, and death. Bacterial infection can cause sepsis. Sepsis with acute organ dysfunction, namely severe sepsis, is a major threat to life. Early institution of an appropriate antimicrobial regimen in infected patients is associated with a better outcome, and hence early diagnosis of sepsis is of primary importance. [1] Bacterial infection involves the activation of complex immune mechanisms and release of a wide array of inflammatory mediators. These mediators could be used as early markers of infection or sepsis. Procalcitonin (PCT) and C-reactive protein (CRP) have been proposed as markers of sepsis in critically ill patients. [2]

Not all patients who appear septic demonstrate an infection so widespread administration of antibiotics to all these patients carries problems of antibiotic resistance, drug toxicity, and increased medical costs. There is a need for an early, effective and accurate diagnosis of sepsis. Blood culture is considered as gold standard for the diagnosis of sepsis. BACTEC takes 6 – 8 hrs for giving the result whereas conventional takes about 24 to 48 hrs. We tried to compare the biomarkers CRP and Procalcitonin (Rapid tests) with the blood culture.[3]

Aims and objectives
To evaluate the PCT and C - reactive protein as a marker of bacterial infection with blood cultures in Intensive care unit (ICU) patients with following objectives
  • To evaluate the role of Procalcitonin in early diagnosis of sepsis.
  • To evaluate role of CRP in early diagnosis of sepsis.
  • Comparision of CRP and Procalcitonin in early diagnosis.

Materials and Methods
Till now 25 blood samples from patient diagnosed with sepsis were collected. Serum samples from all these patients were collected with proper consent and were subjected to estimation of C - reactive protein by Immunoturbidimetric method with prior permission with Institutional ethics committee. Part of the serum sample (2ml) was also subjected for estimation of Procalcitonin by immunofluorescent method. Blood culture was done for all samples.
Results and Conclusion
Out of 25 samples studied, 20 were positive to blood culture (80%) and 5 samples were negative for blood culture by BACTEC. 23 samples were positive to Procalcitonin (92%). 16 samples were positive to C Reactive Protein (64%).
Till now Procalcitonin appears to be a better investigation than C Reactive Protein for the diagnosis of sepsis. We will continue with the study and try to complete 100 samples before arriving at final conclusion.
In the present study conducted so far, the sensitivity of procalcitonin appears 86.9% in diagnosis of sepsis with specificity 100% (Table 10. C-reactive protein have a sensitivity of 87.5% and specificity of 33%.

<table>
<thead>
<tr>
<th>Blood Culture</th>
<th>Procalcitonin</th>
<th>CRP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Positive (20)</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Negative(5)</td>
<td>3</td>
<td>2</td>
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<tr>
<td></td>
<td>23</td>
<td>2</td>
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<tr>
<td>25</td>
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Table 1: Comparison of Procalcitonin and CRP with Blood cultures.

Scope for future work.
We will continue the study for 100 samples, further other biomarkers in the blood like interleukins will be tested for the diagnosis of sepsis. After completion of this project, future endeavors include quantitation of cytokines like interleukins in the blood for the early diagnosis of sepsis.

References: