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Original Research Paper

Clinical profile and prognostic indicators of septicemia: A descriptive observational study from In laks and Budhrani Hospital, Pune.

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ABSTRACT
Background: The World health organisation and world health assembly have declared sepsis as a public health problem. Sepsis is major world wide cause of morbidity and mortality and causes a large burden of disease with negative impact in a community. Important aspects of sepsis management are early diagnosis as well as timely and specific treatment (e.g., antibiotics) in the first few hours of triage. **Objective:** To study the clinical course of septicemia cases and to determine the prognostic factors of septicaemia. **Methodology:** It is a descriptive observational study carried out at ICU and IPD of Department of General Medicine, Inlaks and Budhrani Hospital, Pune during October 2014 -April 2016 involving 100 cases of septicaemia. **Results:** Majority of the cases were from above 70 years age group i.e. 16% males and 12% females. Most common causes of sepsis as per our study are pneumonia (22%). We observed significant association between temperature and MODS score in our study. There was significant association between MODS score and hypotension. We observed significant association between MODS score and mortality in our study. **Conclusion:** APACHE II and MODS score both have a strong significance with the mortality rates in sepsis.
Key words: Septicemia, sepsis, clinical profile, APACHE 2, MODS etc.

INTRODUCTION
"Sepsis, defined as a life-threatening organ dysfunction caused by a dysregulated host-response to infection, is a worldwide highly prevalent syndrome, associated with significant morbidity and mortality".[1] Critical and most rationale aspects of sepsis management are early diagnosis along with timely and specific treatment with the use of appropriate antibiotics in the first few hours of triage. [2] However, the correct diagnosis and differentiation form other non-communicable causes is challenging. Moreover, the correct use of antibiotics, still represents a major issue for treating physicians. 'The incorrect application of antimicrobial therapies led to an increased risk for opportunistic infections, resistances to multiple antimicrobial agents and toxic side effects, which not only increase mortality but also healthcare costs'. [3,4] "It has been estimated that 30–50% of antibiotics used during the hospital stay are unnecessary or inappropriate, because patients have non-bacterial infection or because the patients could have been treated with shorter courses".[5] As a result, improving antibiotic treatment through more accurate diagnosis and improved antibiotic therapy management has a lot of potential. [5] Early diagnosis and prompt antimicrobial therapy is crucial in the management of sepsis in order to save the life of the patients. "Sepsis is a systemic inflammatory response syndrome (SIRS) that affect all organs. Hence, host responses including cytokine, cell markers, receptor biomarkers, coagulations, vascular endothelial damage, vasodilation, organ failure and scientific advancement in the field of molecular biology can equip us to screen wide range of protein markers in acute phase of sepsis development that helps in identifying relevant biomarkers to diagnose sepsis" [6] The common indicators used to diagnose sepsis include WBC, CRP, and interleukin-1 (IL-1). PCT offers superior diagnostic and prognostic value compared to CRP and can tell the difference between bacterial and viral meningitis. [7] Even while cytokines like TNF-, IL-1, and IL-6 are raised during sepsis, they lack the sensitivity or specificity needed to be used as clinical indicators. [8] Blood culture is the gold standard for

confirming a bacteraemic condition since it can isolate and identify the causing agent and then test for antibiotic sensitivity, but the delayed bacterial culture process underlines the need for an early sepsis diagnosis. [9] Thus, this study was done by evaluating the clinical features and prognostic factors affecting the course of septicemia currently in use today in the clinical setting.

Objective

- To study the clinical course of septicaemia cases
- To determine the prognostic factors of septicaemia

MATERIAL AND METHODS

Study Design- Descriptive observational study

Study Setting: Department of General Medicine, Inlaks and Budhrani Hospital, Pune.

Study Population-Patients admitted in IPD and ICU during the period October 2014 -April 2016 (18months) and satisfying the case definition of sepsis. Definition was proposed by consensus conference committees in 1992 and 2001[10]

Inclusion criteria-

Criteria for Selection of Cases

1. Patients giving consent in participation of study
2. Presence or suspicion of infection, coupled with evidence of systemic response to the infection manifested by a systemic inflammatory response of the following:

A. Alteration of body temperature: either < 36 ° c or > 38 ° c

B. Increased heart rate - > 90/min

C. Increased respiratory rate (> 24 /min) or a Evidence of hypoventilation (PaCO2 < 32 mmHg).

D. Changes in WBC count <4000/cmm or >12000/cmm or increased number of immature polymorphonuclear leucocytes

Note: These criteria are incorporated in definition of sepsis-by-Sepsis Consensus Conference 2001[10]

3. Along with above mentioned criteria presence of one or more of the following:

I. Systolic blood pressure < 90 mmHg or mean blood pressure < 70 mmHg

II. Acute oliguria - Urine output < 0.5 ml/kg/hr for at least 1 hr despite adequate fluid resuscitation

III. Pa02 / fiO2 — <250 or, if the lung is only dysfunctional organ, then < 200

IV. Platelet count < 80000/cmm or < 50 % of highest value recorded over previous 3 days V. Unexplained metabolic acidosis - pH < 7.30 or Base deficit > 5 meq /1_, and plasma lactate levels > 1 mmol/L

V. Unexplained metabolic acidosis - pH < 7.30 or Base deficit > 5 meq /L and plasma lactate levels > 1 mmol/L

All the patients Will be treated with appropriate antibiotics either according to suspicion of infection site or documented culture sensitivity.

Exclusion criteria:

1. Patients suffering from chronic kidney disease
2. Chronic liver diseases i.e. Cirrhosis etc.
3. Non-Consenting Patients/Parents/Guardians

Study Duration- Eighteen Months (OCT 2014-APRIL 2016)

Sample size – 100 cases of septicaemia

Statistical Analysis

Statistical analysis was done by using SPSS 22.0 version. Data was presented in percentages. Chi-square test for independent attributes, by Spearman's correlation method (non-parametric technique) and by Co-efficient correlation (r). p value of < 0.05 was considered statistically significant. r = 1 was considered statistically significant.

RESULTS

Age and gender wise distribution of the study population revealed that majority of the cases were from above 70 years age group i.e. 16% males and 12% females. This is followed by 30% from 31-50 years age group i.e. 20% males and 10% females. 24% cases were from 51-70 years (22% males and 2% females). 18% were from 15-30 years (12% males and 6% females). **(Figure 1)** Most common causes of sepsis as per our study are pneumonia (22%), urinary tract infections (20%), abscesses (18%), skin infections (16%). Others in the list are osteomyelitis, peritonitis, pancreatitis and meningitis. **(Figure 2)** APACHE II score was found higher (26-40) in temperature range of 101-105.9 F amongst 42% cases and above 40 score in 12% cases. In 10% patients the score was above 26 with temperature of more than 106 F. We observed significant association between temperature and APACHE II score in our study. MODS score was found higher (5-15) in temperature range of 101-105.9 F amongst 20% cases and above 16 score in 16% cases. In 44% patients the score was above 16 with temperature of more than 106 F. We observed significant association between temperature and MODS score in our study.

(Table 1) Prevalence of hypotension was seen in patients with APACHE II score of >26 i.e. 60% stating association between APACHE II score and hypotension. Prevalence of hypotension was seen in patients with MODS score of >16 i.e. 64% stating association between MODS score and hypotension.

(Table 2) Mortality rate in our study was 58%. Majority of deaths were seen with APACHE II score 26-40 i.e. 28% followed by 16% deaths with score more than 40. 14% deaths occurred with the APACHE II score of 10-25. We observed significant association between APACHE II score and mortality in our study. Majority of deaths were seen with MODS score 16-20 i.e. 38% followed by 14% deaths with score more than 5-15. 4% deaths occurred with the MODS score of more than 20. We observed significant association between MODS score and mortality in our study. **(Table 3)**

DISCUSSION

Age and gender wise distribution of the study population revealed that majority of the cases were

from above 70 years age group i.e. 16% males and 12% females. This is followed by 30% from 31-50 years age group i.e. 20% males and 10% females. 24% cases were from 51-70 years (22% males and 2% females). 18% were from 15-30 years (12% males and 6% females). **(Figure 1)**

Sinha M. et al[11] in 2011 included 40 patients from the intensive care unit with suspected sepsis. Sepsis was confirmed clinically and/or by positive blood culture. Study included 40 ICU patients with suspected sepsis. Patient ages ranged from 18 to 84 years [male female ratio, 28:12].

There was a slightly higher incidence in males affected with sepsis in our study which is similar to other studies. Based on the study by **Martin et al**[12] from the United States, 48.1% of men had sepsis.[108] A multi central trial from 12 medical centers in India by **Todi et al**[13] reported that sepsis was common in males.

Netra S. et al[14] in 2019 evaluated serum PCT in critically ill patients admitted with suspected sepsis and observed that out of 150 cases, females (54%) were affected more with sepsis compared to males (46%). Mean age of study population was 47.97 ± 18.55 years and median age was 46.5 years.

Khan AA et al[15] in 2017 conducted the study with the objective to assess the diagnostic and prognostic value of PCT in sepsis. 60 patients were enrolled in the study. Out of them 32 (53.34%) were male and 28 (46.66) were female. 18 (30%) male and 14 (23.33%) female patients were <50 years of age.

Our findings are almost comparable with the findings of above-mentioned authors.

In our study, most common causes of sepsis as per our study are pneumonia (22%), urinary tract infections (20%), abscesses (18%), skin infections (16%). Others in the list are osteomyelitis, peritonitis, pancreatitis and meningitis. **(Figure 2)**

Ullah AR et al[16] reported that most common source of sepsis was lung infections (42.2%) followed by urinary tract infections (18.7%), soft tissue infections (6.3%) abdominal infections (6%) and in 6.3% patients the source remained unknown.

Anand AK et al[17] reported that most common site of infection was the urinary tract (30.5%) followed by the lungs (21.25%) and skin infection.

A similar observation was made by **Greenberg BM et al**[18] in their study in which they found that the most common source of bacteraemia was the urinary tract with 26% of the suspected cases having the disease at that site followed by the lungs (16.38%). **Leibovici et al**[19] also found that the urinary tract was the most common source of bacteraemia in the elderly. **Marshall et al**[20] also found that UTI (46%) was the most common presumptive source of septicaemia in the elderly hospitalized for septicaemia in the year 1997 in the USA.

In our study, mortality rate in our study was 58%. Majority of deaths were seen with APACHE II score 26-40 i.e. 28% followed by 16% deaths with score more than 40. 14% deaths occurred with the APACHE II score of 10-25. We observed significant association between APACHE II score and mortality in our study. Majority of deaths were seen with MODS score 16-20 i.e. 38% followed by 14% deaths with score more than 5-15. 4% deaths occurred with the MODS score of more than 20. We observed significant association between MODS score and mortality in our study. **(Table 3)**

Anand AK et al[17] reported 19% of patients expired and a significant correlation was found between the outcome of sepsis and the stage of sepsis at the time of admission (P = 0.032).

Similarly, Leibovici et al[19] found that 35% of the patients aged 80 years and above and 30% of the patients aged 60-79 years died during hospital stay.

Ullah AR et al[16] reported death rate of 40.7% which is consistent with our study findings.

Greenberg BM et al[18] also reported mortality with severe sepsis as 40.9% which is consistent with our study findings.

APACHE II and MODS score both have a strong significance with the mortality rates in sepsis, higher the scores higher the mortality rates ($p<0.05$).

CONCLUSION:

We found Pneumonia (22%) to be the most common cause of sepsis followed by UTI (20%) and abscesses (18%). Common clinical findings like high fever, tachycardia, hyperventilation, metabolic acidosis and hypertension were found in significant number of cases. The correlation of these findings with APACHE II and MODS score was found to be significant in our study. We can conclude that although sepsis is mainly a clinical diagnosis and its severity can be assessed by scores like APACHE II and MODS. APACHE II and MODS score both have a strong significance with the mortality rates in sepsis.

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Tables and Figures

Figure 1: Distribution according to age and gender

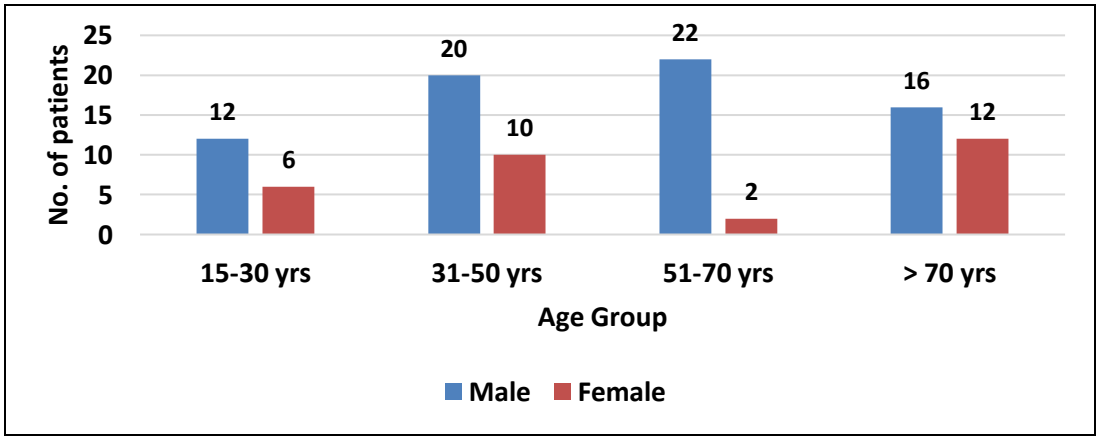

Figure 2: Distribution according to etiology

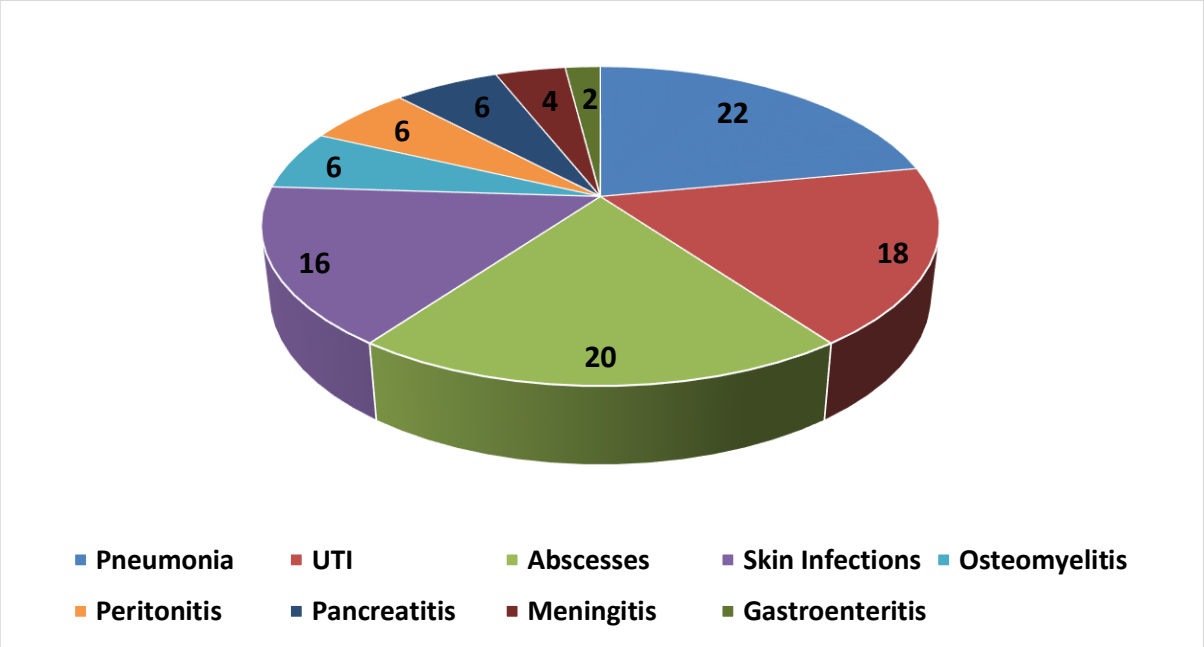

Table 1: Correlation of Temperature on presentation with Severity of Disease (n=100)

Temperature:	**<96.8 F**	**96.8-100.9 F**	**101-105.9 F**	**106 F & Above**	**p-value**
APACHE II Sore:	**No. of patients**				
<10	0	0	0	0	**0.0030 Significant**
10-25	0	12	20	0	
26-40	2	2	42	8	
>40	0	2	12	2	
MODS Score:	**No. of patients:**				
<5	0	0	0	0	**0.029 Significant**
5-15	0	12	20	2	
16-20	0	6	14	44	
>20	0	0	2	0	

Table 2: Association of APACHE II and MODS score with hypotension (n=100)

(n=100):	Hypotension:		Total:	p-Value:
APACHE II	**Yes**	**No**		
< 10	0	0	0	0.030 Significant
10 – 25	24	10	34	
26 – 40	32	2	34	
>40	28	4	32	
MODS	**Yes**	**No**	**Total**	
< 5	0	0	0	0.004 Significant
5 – 15	22	12	34	
16 – 20	38	2	40	
> 20	24	2	26	

Table 3: Association of APACHE II and MODS score with outcome (n=100)

Score (n=100):	Outcome:		Total:	p-Value:
APACHE II	**Survived**	**Expired**		
< 10	0	0	0	0.009
10 – 25	26	14	40	
26 – 40	16	28	44	
> 40	0	16	16	
MODS	**Survived**	**Expired**		
< 5	0	0	0	0.007
5 – 15	40	14	54	
16 – 20	4	38	42	
> 20	0	4	4	