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A Study To Assess The Correlation Of Serum HDL As A Prognostic Marker In Sepsis.

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ABSTRACT

Sepsis is defined as life threatening organ dysfunction caused by a dysregulated host response to infection. This study assessed use of serum HDL cholesterol as a prognostic indicator in sepsis and compared its levels with APACHE 2 score for predicting mortality in sepsis patients. 50 Patients admitted at KIMS Hospital, Bengaluru were included and followed up.. Serum HDL levels was evaluated on the day of admission and repeated on day 5. APACHE 2 score was calculated for all patients on day of admission to estimate the risk of death. Most common causes of sepsis were MODS (64%) and acute lung injury (64%). Gram negative organism (26%) were most common among the positive blood cultured subjects compared to the gram positive organisms (2%). Mean APACHE II score among the participants was 14.66. The mean serum HDL at the time of admission was 27.78 mg/dl and on 5th day of admission was 33.97mg/dl. Serum HDL levels on day 1 were higher in survivor group than non-survivor group. HDL levels increased in survivor group compared to non-survivor groups on day 5. Serum HDL on admission at the cut off value of 24mg/dl is a predictor of mortality among sepsis patients .

Keywords: MODS: MULTI ORGAN DYSFUNCTION SYNDROME, Serum HDL, APACHE II.

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INTRODUCTION

Sepsis is a common and deadly disease [1,2,14]. More than two millennia ago, Hippocrates wrote that sepsis was characterized by rotting flesh and festering wounds [3]. Several centuries later, Galen described sepsis as a laudable event required for wound healing [4]. Once the germ theory was proposed by Semmelweis, Pasteur, and others in the nineteenth century, sepsis was recast as a systemic infection referred to as “blood poisoning” and was thought to be due to pathogen invasion and spread in the bloodstream of the host [5,6] However, germ theory did not fully explain sepsis: many septic patients died despite successful removal of the pathogen [7].

MATERIAL AND METHODS

A Total of 50 Sepsis Patients in ICU at KIMS Hospital, Bengaluru obtained by Purposive Sampling Technique were included. Data collection started after obtaining approval and clearance from the institutional ethics committee. Study subjects underwent detailed history, clinical examination including relevant investigation. All the patients were followed prospectively during their entire course of stay in the hospital. Serum HDL levels was done on the day of admission and repeated on day 5. APACHE 2 score was calculated for all patients on day of admission to estimate the risk of death.

Inclusion Criteria

- Subjects with age greater than 18 years.
- Subjects willing to give informed consent.
- Subjects satisfying the criteria for sepsis according to International guidelines for management of sepsis and septic shock were included in the study.
- Subjects who have not received parenteral antibiotics in outside hospitals.

Exclusion Criteria

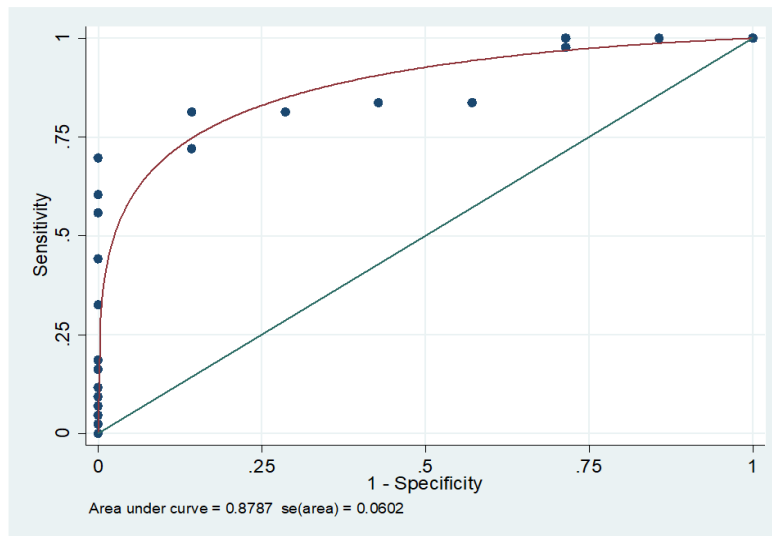
- Subjects not willing to give informed consent.
- Subjects on treatment with statins.
- Subjects with Chronic liver disease, chronic kidney disease, thyroid dysfunction, diabetes, severe anaemia and malignancy.
- Subjects with known chronic inflammatory condition like Human immunodeficiency virus disease, SLE (Systemic lupus erythematosus) and RA (Rheumatoid arthritis).

RESULTS AND DISCUSSION

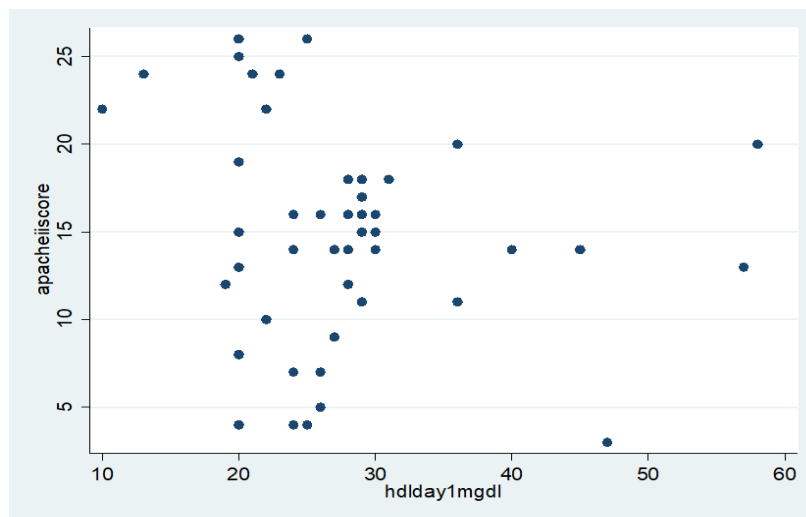
In our study mean (SD) age of the study was 49.24 (18.30) years. In our study participants 36% were females and 64% were males. Positive survival outcome was found in 94.44% of the female and 81.24% of the males. Mortality was higher among males (18.75%) compared to females (5.56%). APACHE II score is calculated by considering various biochemical parameters. Mean (SD) APACHE II score of the study participants was 14.66 (5.98) years (Survivors - 13.16 (5.00) years, non- survivors - 23.85 (1.46) years).

The reference range for normal High Density Lipoprotein Cholesterol is 40-50 mg/dl. The results of our study showed a cut off of 24mg/dl on admission for predicting the mortality among sepsis patients. The HDL levels taken on subsequent days of admission shows a decreasing trend in non survivors group and shows an increasing trend in survivor group. This shows that a serial Serum HDL levels in the patients admitted in Intensive care unit is a good predictor of mortality among the sepsis patients. The sensitivity and specificity of the serum HDL levels in our study is 81.40% and 85.71% respectively and Area under the Curve (AUC) is 0.8787 with 95% CI 0.760- 0.996. The mean of the Day 1 HDL in our study among survivors is 29.18mg/dl whereas among non survivors is 19.14mg/dl. There is a significant difference in the serum HDL levels between the survivors and non survivors group. The mean of day 5 HDL is 33.97md/dl which is more than the mean of day 1 HDL. There is a significant difference in day 5 HDL levels among survivors and non survivors.

ROC Curve To Estimate Cutoff Value For HDL At Admission For Prediction Of Overall Mortality



Pearson's Correlation Test To Estimate The Relationship Between HDL Levels And Apache 2 Scores At Admission



Various medical conditions were assessed in our study to find out the possible cause of sepsis and the association with survival outcome of the participants. MODS, acute kidney injury, hypotension, acute lung injury, dialysis, severe organ insufficiency, post-operative conditions were assessed. Out of which only patients with MODS, hypotension and post dialysis are significantly associated with survival outcome. Blood culture results showed a variety of gram positive and gram-negative organisms like Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Klebsiella species whereas majority had a normal blood culture.

Apart from blood culture, urine culture, sputum culture, ET tube culture, CVP tip culture, swab culture were also done to identifying underlying condition as the cause of sepsis. In urine culture the common organisms found were Klebsiella species and candida species. Klebsiella species were the most commonly found organism in all the cultures.

The relationship between serum HDL levels on admission and APACHE 2 scores were seen in our study and our results showed that there was inverse correlation.

The vitals were measured regularly among all the participants. The mean temperature among the subjects were 100.62 F which is higher than the normal body temperature. This difference is also

significantly associated with the survival outcome among the study participants. The mean arterial pressure were also studied among the participants and there was a significant difference in the parameter between the survivor and non-survivor groups.

This study was conducted in a tertiary hospital set up in Bangalore. The results of this study can be generalized to the patients admitted in the similar set up in large cities. This study puts forth the serum HDL levels as an independent predictor of mortality among sepsis patients admitted in the ICU [9,10].

CONCLUSION

In this study most common causes of sepsis were Multiple organ dysfunction syndrome (64%) and acute lung injury (64%). Gram negative sepsis (26%) was the most common among the positive blood cultured subjects compared to the gram-positive sepsis (2%). The most common gram-negative organism identified was *Pseudomonas aeruginosa* while *Staphylococcus aureus* was the most common among gram positive organism. Serum HDL levels on day 1 were higher in survivor group than non-survivor group. The mean serum HDL at the time of admission was 27.78 mg/dl and mean serum HDL on 5th day of admission was 33.97mg/dl in survivors group. HDL levels increased in survivor group compared to non-survivor groups on day 5. Hence serum HDL can be used as a prognostic indicator for the severity of sepsis. Serum HDL levels inversely correlated with APACHE -2 score done on day 1. This study concludes that serum HDL can be used as a cheap and reliable prognostic indicator of severity of sepsis in developing countries such as India[11-15].

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