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THE RELATİONSHİP BETWEEN LİPİD PROFİLE AND CRP İN SEVERE SEPSİS WİTH PATİENT PROGNOSİS

Ebrahim Hazrati[1], Mahtab Noorifard[2] , Mohamad Afsahi[3] , Alireza Rohi[4] , Mohamadreza Rafiei [5]*

1,2,4. Department of Anesthesiology & Critical care, AJA University of Medical Sciences ,Tehran, Iran

3. Associate professor, Department of Anesthesiology & Critical care, AJA University of Medical Sciences ,Tehran, Iran

5. General MD

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ABSTRACT

Since severe sespsis result to mass casualties during its course, understanding the factors involved in sepsis prognosis can decrease its morbidities and mortalities .So we conduct this study to evaluate lipid profile and CRP of plasma and patient prognosis.
Methods: This observational cohort study was carried out with 60 patient suffering from severe sepsis and hospitalized to Imam Reza ICU ward. Serum lipid profil and CRP were measured on first, third and seventh days and compared with patient's SAPS. Data were analyzed on the basis of student's t – test and $\chi 2$ test ANOVA test and within subject ANOVA with repeated measures tests and using SPSS- 18 software.
Results: The results are expressed as mean ± SE and $P < 0.05$ is considered statistically significant. According to our findings CRP level was high on the first, third and seven days in dead patients (p=0.042 p=0.018, p=0.024 respectively).Also triglycerids, LDL and HDL were low on the seventh day(p=0.019,p=0.026, p=0.006 respectively) and had not different on the first and third days(p>0.05).
Conclusion: Severe sepsis prognosis have relationship with serum lipidprofile and CRP.
As with high CRP level and low triglyceride and cholestroles level the patient will have poor prognosis.

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Introduction

The patients will have hospitalized in ICU ward, are special patients and have critical condition that susceptible to killer disease such as sepsis(1).

Hospital disease specialy sepsis can cause ICU prolongation and increase treatment cost thus efforts to reduce the length of ICU stay cause less the hospital cost (2).

Sepsis prevention and improvement of patient condition have important role to reduce complication, for this reason understanding the factors that influence the course and prognosis of the sepsis is important(3).

The definition of sepsis was based on the presence of at least 2 of the following criteria(4): fever or hypothermia (temperature ≥38°C or ≤36°C), tachycardia (heart rate ≥90 beats per minute), tachypnea (respiratory rate ≥20 breaths per minute), and leukocytosis or leukopenia (leukocyte count ≥12000/μL or ≤4000/μL or N10% immature forms), concurrently with the presence of confirmed infection. Additional requirements for severe sepsis were at least 1 of the following(5) : 1- hypotension (systolic blood pressure ≤90 mm Hg, sustained drop in systolic blood pressure ≤40 mm Hg, or mean arterial

Corresponding Author: Mohamadreza Rafiei , General MD. Email: m.rafiei@ajaums.ac.ir

pressure≤65mmHgcorrectedwithin 1 hour by fluid resuscitation), 2- arterial hypoxemia (PaO2≤75mmHgwithout evidence of primary lung disease), 3- metabolic acidosis (pH ≤7.3 or base deficit ≥5 mEq/L),4- oliguria (urine output ≤30 mL/h for at least 2 hours despite adequate fluid replacement), 5- acute alteration ofmental status, 6- oagulation abnormalities of recent onset (prothrombin time or activated partial thromboplastin time ≥1.2 times the upper normal limit plus D-dimers ≥500 or platelets ≤100000/μL). Lipoprotaine ability in binding to bacterial toxic substance and neutralize them more consider every day(6). Lipoprotein have been showed to reduce cytokine response and mortality rate in vivo and vitro against sepsis(7,8). HDL infusion into rabbit reduced cytokine production in response to bacterial lipopolysaccharide(9). In severly ill patients was observed that they had low serum lipid concentration(10,11). Serum levels of C-reactive protein (CRP), an acute-phase protein synthesized by the liver after stimulus by various cytokines including tumor necrosis factor and interleukin (IL)-6, markedly increase within hours of infection or inflammation(12). Numerous studies have shown increased CRP levels in patients with sepsis(13-15), but their relation to multiple-organ dysfunction and failure, to date, has not been well evaluated. Severity scoring systems are designed to provide an estimate of the probability of hospital mortality

for critically ill patient one of this systems is the Simplified Acute Physiology Score (SAPS) that ability of any such systems to accurately predict mortality rate is determined by its discrimination and calibrations (16).In this study we evaluate parameters such as CRP and lipoproteins with SAPS to determine prognostic factors in severe sepsis patients.

Material And Method:

In this cohort study 60 severe sepsis patient were studied. Our inclusion criteria were being 20-75 years old age persons with severe sepsis disease that admitted to Imam Reza hospital ICU. Exclusion criteria were and DIC and renal insufficiency, died within four hours of admission to ICU or who stayed in the ICU less than 24 hours and if patients had been admitted more than once to the ICU during the study period, only the first admission was included. Approval for the project was obtained from the faculty Ethics Committee.

Serum lipid profile was determined in all participants, after an overnight fast of 12 hours, on admission (day1) and on days 3 and 7 also CRP was determined on that days. SAPS of patients were calculated on that days.

Data were analyzed on the basis of student's t – test and $\chi 2$ test ANOVA test and within subject ANOVA with repeated measures tests and using SPSS- 18 software The results are expressed as mean ± SE and $P < 0.05$ is considered statistically significant.

Results:

In this cohort observational study 60 severe sepsis patient were enrolled and their lipidprofile and CRP and SAPS compared on first and third and seventh days in order to determine prognostic condition of patients. Comparison of the demographic parameters between patients showed uniform distribution (Table 1).

In this study HDL and LDL and TG values from the first day until the seventh gradually will reduce and CRP value from the first to seventh day will increase (Table 2|).

Also in this study mean values of HDL and LDL and Triclycerides decreased in patient with high level of SAPS score and CRP value increased in patient with high level of SAPS score(Table 3).

Discussion:

Profound changes in the concentration and composition of plasma lipids and lipoproteins have been described in critical illness(17), in intensive care patients with sepsis and in cirrhotic patients with severe sepsis, previous few studies demonstrated that a marked decline in serum HDL levels has been documented (18,19). Lower serum cholesterol mechanisms remain unclear(20). One possibility is that cholesterol is consumed significantly by binding bacterial substances(21-23). Therefore, a high production of endotoxin consumes more cholesterol and causes a rapid decline of the latter. Another

possibility is that high concentrations of proinflammatory cytokines during sepsis suppress lipoprotein production and facilitate lipoprotein degradation(24,25). The deficiency in cholesterol renders the host tissue more susceptible to bacterial substance-mediated injury, resulting in cytokine overproduction and a further depletion of cholesterol(20).

C-reactive protein is a marker of inflammation that has been used to monitor the course of infection and inflammatory diseases(26).

C-reactive protein is predominantly produced and secreted by hepatocytes, although other cells including alveolar macrophages may also synthesize CRP. C- reactive protein is thought to represent a measure of cytokine-induced protein synthesis. The relatively short half-life of approximately 19 hours makes it a useful monitor for follow-up of inflammatory response, infection, and antibiotic treatment. In addition, laboratory tests for CRP are easily available and less costly than cytokine tests(27).

Despite its limitations, outcome predictors such as the extensively evaluated SAPS scores are helpful in identifying those septic patients who are at high risk for death and who are more likely to benefit from intervention. Morbidity and mortality in elderly patients admitted to the ICU are higher than in younger patients. The most important factors independently

associated with the highest risk of death are severity of illness, 190 D. MemisS et al. impaired level of consciousness, and infection(28).

Hazrati et al (2015) showed Compared to the other centers Mean days of hospital stay was significantly shorter ($p < 0.01$, (15.1 ±14.9 days) Vs. (23.8±.3 days)) and a significant higher percent of patients have history of carbapenem use. (68.8% vs 49.4% , $p = 0.00$). carbapenem resistant infections in shorter hospital stay and a significantly higher percents of them have history of carbapenem administration (29).

In the present study, the prognostic value of cholesterol and CRP levels was comparable to that of the SAPS score. Our belief is that simultaneous use of cholesterol together with other variables may be needed to increase its prognostic value; these may include, for instance, severity of illness, age, infection, variables considered in currently available scoring systems. We conclude that hypocholesterol and increased CRP concentrations may be a valuable addition to SAPS scores in predicting risk of death, as are the SAPS scores. Serial measurements of cholesterol and CRP concentrations in critically ill patients may help to identify patients who may require more aggressive diagnostic and

therapeutic interventions to avoid complications. Cholesterol and CRP concentrations also may be helpful in clinical trials, to identify high-risk patients who would benefit from new therapeutic interventions.

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Table 1. Demographic characteristics

		Total (n=60)
Age (years)		62±9.2
SAPS	High	12 (20%)
	Moderate	18 (30%)
	Low	30 (50%)
Sex	man	25 (41.7%)
	Woman	35 (58.3%)
Survivors		36 (60%)
Non-survivors		24 (40%)

Table 2. frequency distribution of prognosis according to measured parameters

		Triglycerids			Cholesterole						CRP		
					HDL			LDL					
		First day	Third day	Seventh day	First day	Third day	Seventh day	First day	Third day	Seventh day	First day	Third day	Seventh day
prognosis	Survivors	153.1 ± 26.5	142.5 ±25.4	137.4± 26.1	37.2±3.9	34.4±3.8	35.7±5.1	105.25± 17.2	97.16.3	93.2±16.1	45.2± 40.4	49.2± 49.3	53.5± 51.1
	Nonsurvivors	145.7 ± 27.5	131.6 ±26.5	120.7± 26.4	35.6±5.1	32.7±5.6	32.3±3.9	98.6± 16.3	90.4± 15.5	84.3±12.3	67.6± 41.6	82.6± 55.8	85.2± 53.1
p-value		0.05 <	0.05<	0.019	0.05<	0.05<	0.006	0.05<	0.05<	0.026	0.042	0.018	0.024

Table 3. frequency distribution of SAPS score according to measured parameters

		Triglycerids			Cholesterole						CRP		
					HDL			LDL					
		First day	Third day	Seventh day	First day	Third day	Seventh day	First day	Third day	Seventh day	First day	Third day	Seventh day
SAPS Score	I	153.3± 28.5	142.8±27.7	135.5±29.3	37.2± 3.9	34.6±4	35.4±4.4	105.5± 17.7	96.6± 15.9	92±14.9	43.5± 39.4	38.4± 38.1	42.3± 39.6
	II	150.3± 25.1	135.2 ± 23.5	126.5± 24.3	36.7± 4.2	34.4±4.2	34.3±5.4	103.1± 15.6	95.9± 15.6	91.3±15.4	57.6± 40.5	75.4± 51.5	80.7± 53.6
	III	142.1± 26.1	131.1 ± 26.1	125.1± 26.1	33.4± 5.5	30.4±5.5	31.8±4.7	94.5± 16.1	86.5± 16.1	81.3±13.8	75.8± 44.9	103.9± 63.8	104± 59.1
p-value		0.05 <	0.05<	0.05<	0.039	0.020	0.05<	0.05<	0.05<	0.05<	0.05<	0.0001	0.001

I= low II=moderate III=high