

**Diagnostic value of C-reactive protein, procalcitonin, IL6 and IL8 during critical condition.****N.Barnabishvili, Z.Kheladze, Zv.Kheladze, E.Ivanidze (Tbilisi, Georgia)**

The diagnostic value of C-reactive protein, procalcitonin, IL-6 and IL-8 are studied during the critical situations. It is indicated that procalcitonin and IL-8 are the most optimal markers for the detection of septic complications.

**Key words: protein, procalcitonin, critical condition**

**Actuality:**

The important problems for the modern medicine are sepsis and grave infections. Together with development of medicine these problems are not diminished. Annually there are up to 18 million sepsis cases all over the world. 30% of them have fatal outcome and this statistic has an increasing trend. The reasons are: first- population aging (in developed countries) and the second a) suppressive situations and b) development of invasive technologies (1.2.310.12).

**Introduction:**

The 50% of fatality in intensive care come on sepsis all over the world. Money spent on sepsis treatment amounts to hundred million dollars. Sepsis progress is especially grave in patients having multiple organ failure. Grave infections and sepsis are followed by clinical picture characteristic to local inflammatory reaction (LIR) and by laboratory changes, recommended as the criteria for diagnosis. But fever, tachycardia, tachypnea and leukocytosis are also the signs of non-infectious LIR. The same symptoms are often detected in cases of sterile forms of pancreato necrosis, severe injury, burn, drug allergy response, big surgical operations and in cases of acute cardiac insufficiency (14, 15). Classical laboratory markers of inflammatory process such as quantity and formula of leukocytes, the leukocytes index of intoxication, ESR and C-reactive protein are less specific and non-reliable for early detection of sepsis.

Modern microbiological methods are characterized by high specifications, but their total sensitivity does not exceed 45%. It's obvious that early recognition of sepsis gives an opportunity to begin antibacterial chemotherapy in time and consequently, to prevent timely the disease progression and multi organ dysfunctions related to it that is often the reason for fatal outcomes (8.11.13). The cases of sepsis fatality are mainly caused by late recognition and ineffective monitoring of the therapy. That's why the special interest is paid to the research of efficient and reliable markers of LIR. In last year's the determination of procalcitonin concentration in the serum or in plasma of blood is widely used for recognition of septic LIR. Procalcitonin (PCT) is polypeptide representing the indolent precursor of calcitonin. In normal situation it is secreted by C-

cells of thyroid glands, it is thoroughly transformed into calcitonin and is not practically detected in blood flow. In grave bacterial infections and in sepsis the PCT synthesis progress is carried out extrathyroidally – in neurothyroid cells of leukocytes, lungs, liver and intestines. The main indicators of PCT synthesis are bacterial endotoxins and inflammation cytokines IL-6 and IL-8(17, 18). At the same time the increase of PCT is detected only in systemic response, in case of local inflammation such increase is not determined, in other words, PCT increase is not a marker of infection, but is the indicator of process generalization level (8,9,10,11,12.). PCT detection is due in patients under the risk of sepsis in cases of organs dysfunction and in shocks of unidentified genesis. This happens always in critical patient.

The goal of the research was to identify the information level of detection of procalcitonin, CRP, some cytokines (IL6, IL-8) in critical patients. It should be mentioned that sepsis leading to critical situation is less grave than sepsis emerging in critical patients.

#### **Methods and results:**

30 patients were surveyed age range from 30 up to 85, with systemic infectious response syndrome, including: 8- Hemorrhagic stroke -12-Ischemic stroke, -6- Acute respiratory failure, -4-Pneumonia. Additional diseases were cardiac failure of different level, diabetes, atherosclerotic cardio sclerosis and ischemic heart diseases. Blood was taken as soon as the patient was hospitalized before the therapy. Procalcitonin determination was performed by immune enzyme test-system produced by WKEA (China). CRP was determined by turbidimeter method, by use of Spinreactiv set (produced in Spain). Determination of Cytokines –interleukin-6 and interleukin-8 was made by the immune enzyme test system of Vector-best (produced in Russia). The results of immune enzyme analysis were calculated on RAITO reader, as for results of turbidimetry they were calculated by use of CLINDIAG biochemical analyzer. In 8 cases, where patients had pneumonia or obvious clinical symptoms of sepsis, the sputum and blood bacteriological research were made as well. The blood was seeded on Columbian and chocolate soil, and the sputum was seeded on bloody, chocolate Columbian and McConkey soil.

The results of the research is given in the table (Table N1)

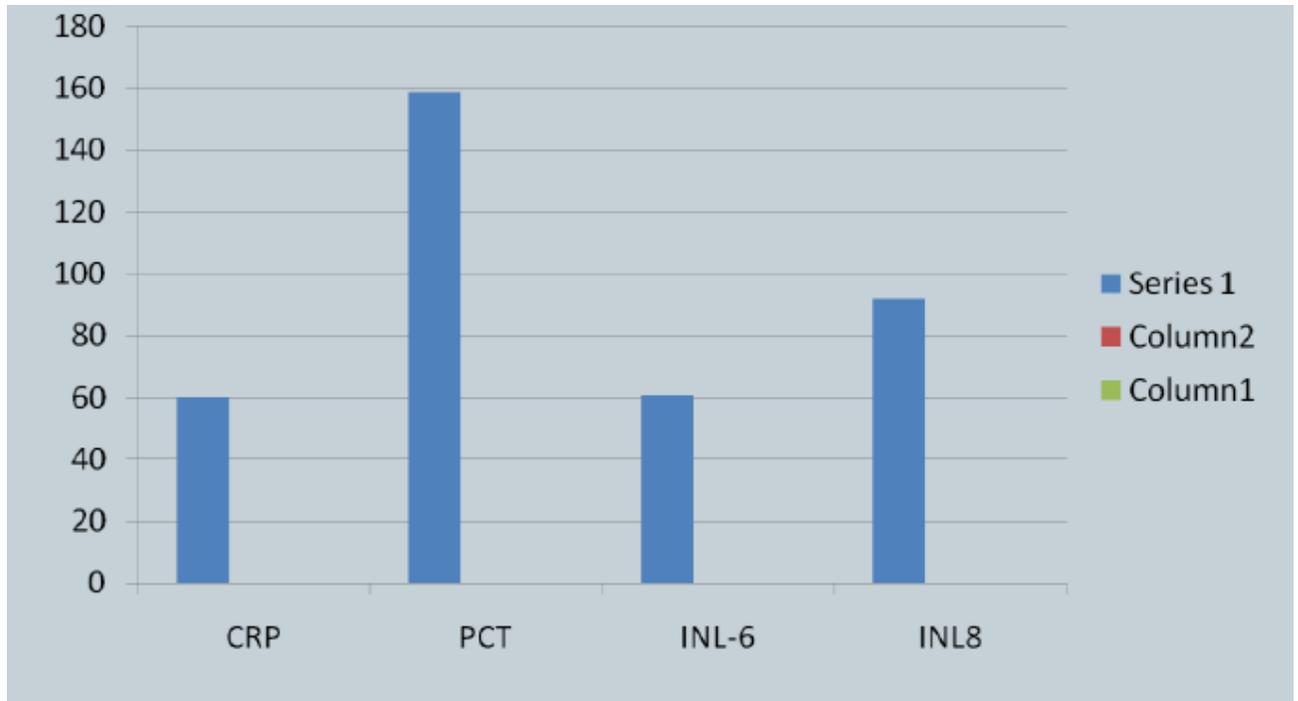
N	CRP	PCT	IL6	IL8	Notes
1	13,0	30	16	35	
2	19,3	38	3	65	
3	30,0	45	35	51	
4	31,0	40	15	120	
5	68,0	157	20	55	sepsis
6	13,0	15	22	61	
7	137,0	292	67	180,0	sepsis
8	74,0	50	89	49	pneumonia
9	38,0	60	13	49	
10	48,0	31	20	25	viral infection
11	181,0	102	19	67	sepsis
12	12,0	73	8	41	
13	33,0	42	8	18	
14	110,0	60	17	40	
15	35,0	60	12	22	
16	43,0	17	50	45	
17	57,0	41	42	63	
18	65,0	58	17	21	
19	386,0	62	120	110	pneumonia
20	102,0	14	61	15	pneumonia
21	52,0	27	43	53	
22	13,0	72	51	42	
23	62,0	69	18	21	
24	7,0	88	77	84	sepsis
25	23,3	50	60	35	
26	40,0	62	38	12	
27	46,0	37	17,3	34	
28	38,2	45,6	20,3	21	
29	15,9	7,3	14,9	17	
30	16	28,9	14,9	19	
	CRP 98,2+36,2	PCT 159,2+2,8	IL6 60,7+10,5	IL-8 82,0+22,6	

As it is seen from the table, CRP, IL6 and IL-8 were increased in all the cases. Although from other researches it is clear that proinflammatory cytokines profile is always changed in critical patients that partly match the literary data. But in cases of sepsis and pneumonia their high concentration was detected. Pneumonias were followed by CRP perceptible increase; in cases of sepsis CRP level was minimally increased (7 mg/l). As for procalcitonin it is detected in only 4 patients in recognition concentration, having grave sepsis clinical picture (fever, tachycardia, leukocytosis). Three of them had fatal outcome, one was discharged with improved clinical picture. Four patients with clinical signs of sepsis had normal procalcitonin level. In one of them grave viral infection was detected, in all other cases the pneumonia was determined. In all cases the blood bacteriological research has given a negative result; from the sputum were determined: 3 enterobacteria, 3 haemolytic streptococci, 1 proteus and 1 klebsiella.

In the chart there are the changes of C-reactive protein and interleukins in patients with aggravated sepsis. As it is seen from the chart in such cases procalcitonin is perceptibly increases. This research was the first attempt to study changes of acute phase proteins, cytokines and procalcitonins in critical patients and their correlation with different pathologies. The attempt to connect results of laboratory researches of critical patients to outcome prognosis.

**Summary:**

Thus, as it is given in literary information, (15) procalcitonin was only the indicator of generalized process in our case too. According to the prognosis the increase of all the four markers are indicators of sepsis and does not give hope for good outcome. Their existence is the signal for immediate intervention. It is desirable to examine also the patients who had already undergone an invasive intervention, especially in critical patients where the physical balance is always very friable. Control of timely detected changes might be very important in their treatment.

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C-რეაქტიული ცილის, პროკალციტონინის, IL6 და IL8-ს დიაგნოსტიკური ღირებულება კრიტიკულ მდგომარეობათა დროს.

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შესწავლილია C-რეაქტიული ცილის, პროკალციტონინის, IL-6 და IL-8-ს დიაგნოსტიკური ღირებულება კრიტიკულ მდგომარეობათა დროს. მითითებულია, რომ პროკალციტონინი და IL-8 ყველაზე ოპტიმალურ მარკერებს უნდა წარმოადგენდნენ სეპტიურ გართულებათა ამოცნობის საქმეში.

გასღები სიტყვები: ცილა, პროკალციტონინი, კრიტიკული მდგომარეობა.