



Presepsin as a tool to predict sepsis mortality in ICU.

An ongoing prospective study in Cagliari (I)



Anesthesia and Intensive Care Unit

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Dr. Paolo Mura

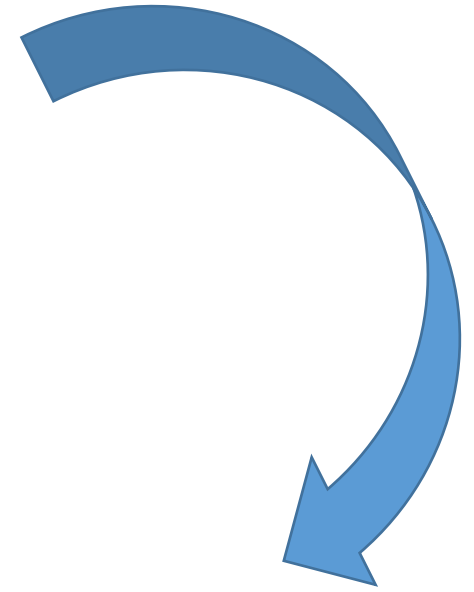
New biomarkers for diagnosis and prognosis



REVIEW ARTICLE

Soluble CD14 subtype presepsin (sCD14-ST) and lipopolysaccharide binding protein (LBP) in neonatal sepsis: new clinical and analytical perspectives for two old biomarkers

Michele Mussap¹, Antonio Noto², Marco Fravega¹ & Vassilios Fanos²



The Journal of Maternal-Fetal and Neonatal Medicine, 2011; 24(S(2)): 12-14

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healthcare

New biomarkers for diagnosis and prognosis



P35

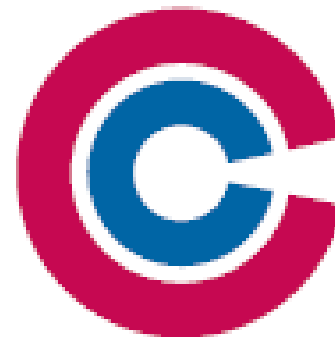
Compared values of presepsin (sCD14-ST) and procalcitonin as early markers of outcome in severe sepsis and septic shock: a preliminary report from the Albumin Italian Outcome Sepsis (ALBIOS) study

P Caironi¹, S Masson², E Spanuth³, R Thomae⁴, R Fumagalli⁵, A Pesenti⁵, M Romero⁶, G Tognoni⁶, R Latini², L Gattinoni¹

Critical Care 2013, 17(Suppl 2):P35 (doi: 10.1186/cc11973)

Presepsin (soluble CD14 subtype) and procalcitonin levels for mortality prediction in sepsis: data from the Albumin Italian Outcome Sepsis trial

Serge Masson^{1*†}, Pietro Caironi^{2,3†}, Eberhard Spanuth⁴, Ralf Thomae⁵, Mauro Panigada³, Gabriela Sangiorgi⁶, Roberto Fumagalli⁷, Tommaso Mauri⁸, Stefano Isgrò⁷, Caterina Fanizza⁹, Marilena Romero⁹, Gianni Tognoni⁹, Roberto Latini¹, and Luciano Gattinoni^{2,3}, on behalf of the ALBIOS Study Investigators[†]



CRITICAL CARE

Masson *et al.* *Critical Care* 2014, **18**:R6

New biomarkers for diagnosis and prognosis



Presepsin as a powerful monitoring tool for the prognosis and treatment of sepsis: A multicenter prospective study

Shigeatsu Endo. MD^a. Yasushi Suzuki. MD^a. Gaku Takahashi. MD^a.

J Infect Chemother 20 (2014) 30–34

New biomarkers for diagnosis and prognosis

Original article

Presepsin as a powerful monitoring tool for the prognosis and treatment of sepsis: A multicenter prospective study

Shigeatsu Endo, MD^a, Yasushi Suzuki, MD^a, Gaku Takahashi, MD^a,
Tatsuyori Shozushima, MD^a, Hiroyasu Ishikura, MD^b, Akira Murai, MD^b,
Takeshi Nishida, MD^b, Yuhei Irie, MD^b, Masanao Miura, MD^c,
Hironobu Iguchi, MD^c, Yasuo Fukui, MD^d, Kimiaki Tanaka, MD^d,
Tsuyoshi Nojima, MD^d, Yoshikazu Okamura^{e,*}

J Infect Chemother 20 (2014) 30–34

Intensive Care Unit

Policlinico «*Duilio Casula*» Monserrato (CA), I



The role of Presepsin (sCD14) and Procalcitonin (PCT) in early diagnosis and prognosis of sepsis. Observational Prospective Trial

- Started on May the 15th 2013
- On course
- Data from patients recruited till February 2014





Patients

Included

- 18 or older consenting patients admitted in ICU
- Expected length of stay > 48 hr
- No contraindications to phlebotomy (e.g. severe anemia, Jehovah witness)

Excluded

- Pregnant patients
- Not meeting inclusion criteria



Methods: blood exams



Admission

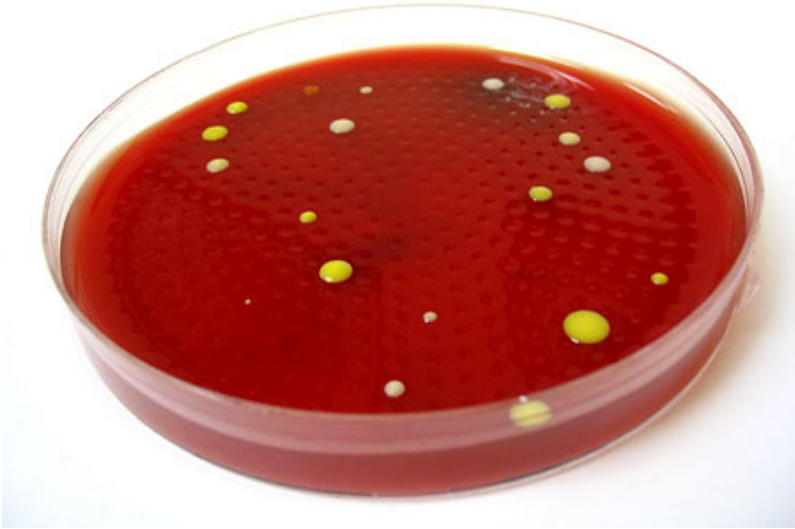
- Presepsin
- Procalcitonin
- Blood Cell Count
- Creatinine/BUN
- APACHE II/SOFA

Every morning till dimission or 10th day of stay

- PCT/sCD14-ST/BCC
- SOFA



Methods: Microbiological



- Urine and bronchial secretion on admission
- U/BS twice a week
- Other as needed (hemocultures, removed devices, peritoneal/pleuric fluid)

Infection = microbial phenomenon characterized by an inflammatory response to the presence of microorganisms or the invasion of normally sterile host tissue by those organisms.

Bacteremia = the presence of viable bacteria in the blood.

Systemic inflammatory response syndrome (SIRS) = the systemic inflammatory response to a variety of severe clinical insults. The response is manifested by two or more of the following conditions: (1) temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$; (2) heart rate >90 beats per minute; (3) respiratory rate >20 breaths per minute or $\text{PaCO}_2 <32$ mm Hg; and (4) white blood cell count $>12,000/\text{cu mm}$, $<4,000/\text{cu mm}$, or $>10\%$ immature (band) forms

Sepsis = the systemic response to infection, manifested by two or more of the following conditions as a result of infection: (1) temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$; (2) heart rate >90 beats per minute; (3) respiratory rate >20 breaths per minute or $\text{PaCO}_2 <32$ mm Hg; and white blood cell count $>12,000/\text{cu mm}$, $<4,000/\text{cu mm}$, or $>10\%$ immature (band) forms.

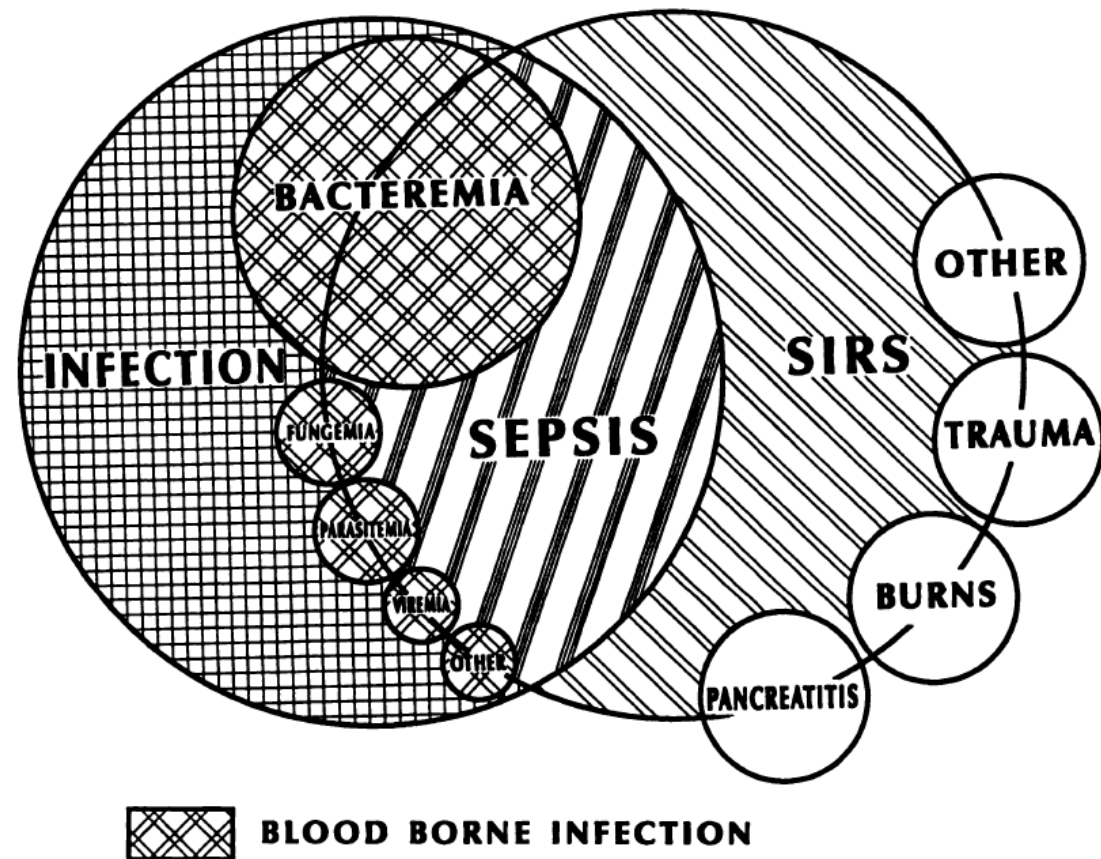
Severe sepsis = sepsis associated with organ dysfunction, hypoperfusion, or hypotension. Hypoperfusion and perfusion abnormalities may include, but are not limited to lactic acidosis, oliguria, or an acute alteration in mental status.

Septic shock = sepsis-induced with hypotension despite adequate fluid resuscitation along with the presence of perfusion abnormalities that may include, but are not limited to, lactic acidosis, oliguria, or an acute alteration in mental status. Patients who are receiving inotropic or vasopressor agents may not be hypotensive at the time that perfusion abnormalities are measured.

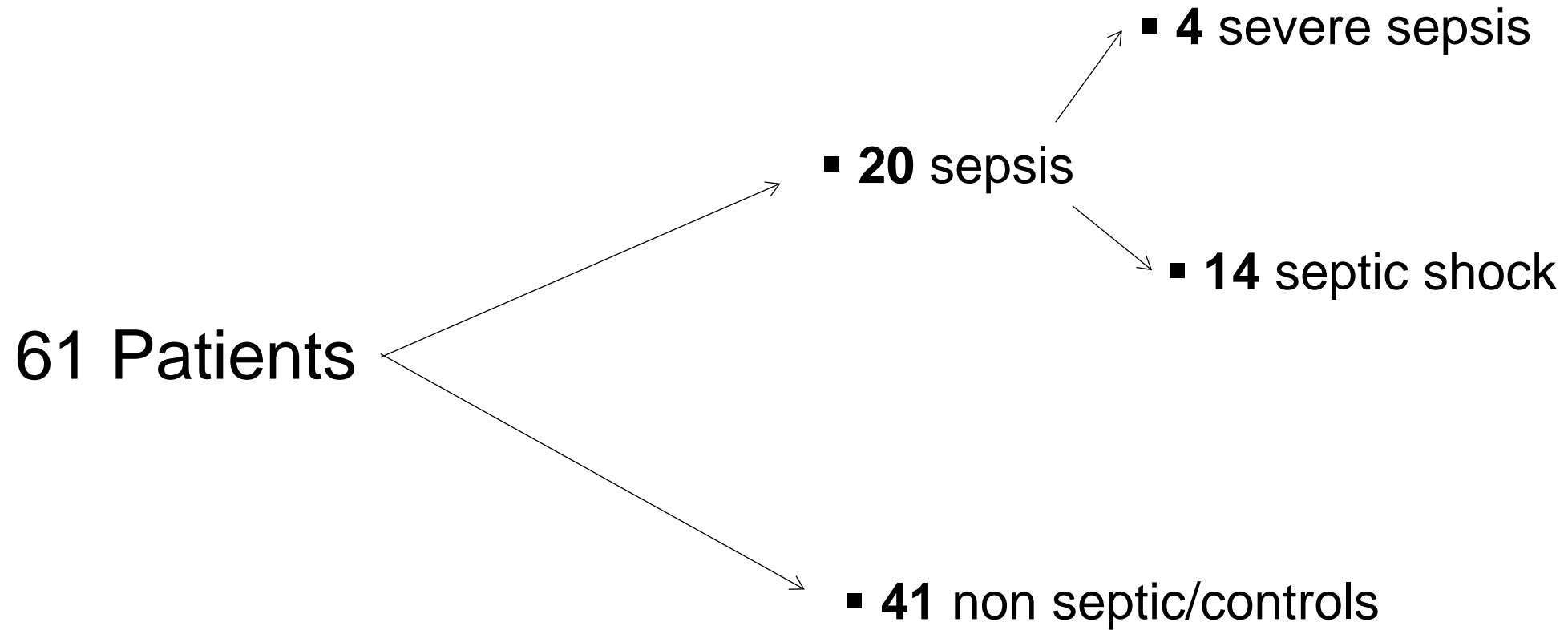
Sepsis-induced hypotension = a systolic blood pressure <90 mm Hg or a reduction of ≥ 40 mm Hg from baseline in the absence of other causes for hypotension.

Multiple organ dysfunction syndrome (MODS) = presence of altered organ function in an acutely ill patient such that homeostasis cannot be maintained without intervention.

Methods: diagnosis



Results: recruited





Results

		Sample	Sepsis	Control	p
		61	20	41	
Survival	n (%)	52 (85)	13 (65)	39 (95)	< 0.01
Age (Mean)	Yrs	72.12	74.9	70.73	NS
Genre (F)	n (%)	25 (41)	4 (20)	21(51)	0.03
APACHE II		25	33	24	< 0.01
SOFA Admission		8	10.50	7	< 0.01
SOFA		5	6	5	< 0.01
Presepsin Admission	pg/ml	837	1609	611	< 0.01
Presepsin	pg/ml	1050	1420	860	< 0.01
Procalcitonin Admission	ng/ml	0,51	1,93	0,19	< 0.01
Procalcitonin	ng/ml	0.55	1.2	0.44	< 0.01

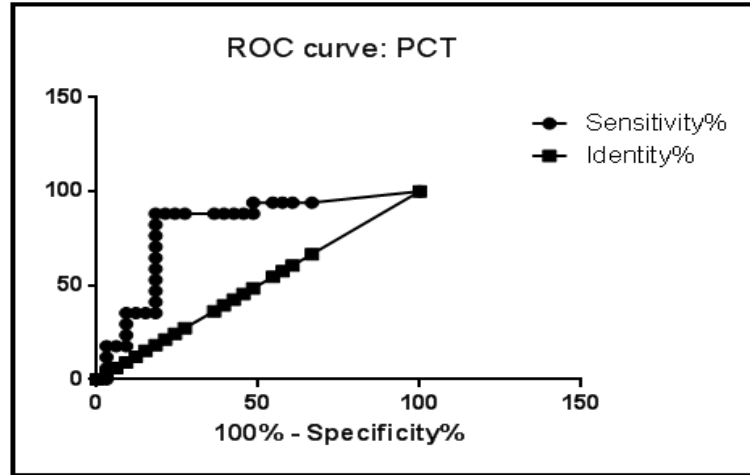


Results

		Sample	Survived	Deceased	p
		61	52	9	
Sepsis	n (%)	20 (33)	13 (25)	7 (78)	< 0.01
Age (Mean)	Yrs	72	70	76	NS
Genre (F)	n (%)	25 (41)	22 (42)	3 (33)	0.03
APACHE II		25	24	33	0.02
SOFA Admission		8	7	11	NS
SOFA		5	5	11	< 0.01
Presepsin Admission	pg/ml	994	853	2070	< 0.01
Presepsin	pg/ml	1050	1048	1606	NS
Procalcitonin Admission	ng/ml	0.51	0.47	1.72	0,09
Procalcitonin	ng/ml	0,55	0.53	0.87	< 0.01

Results:

ROC Curves

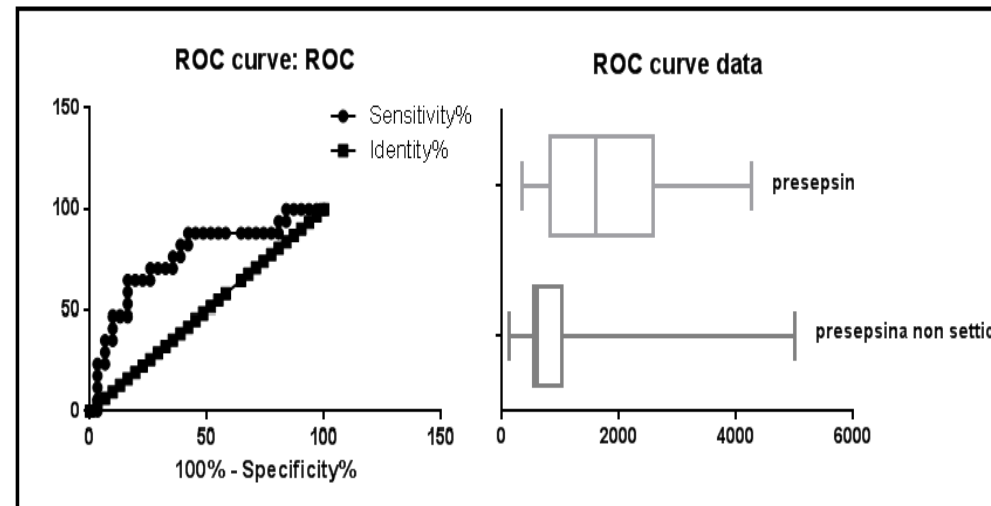
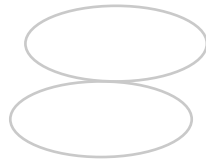


PCT admission:

- AUC 0,804
- Best Cut-off 0,75 ng/ml (severe sepsis)
- Sens 88,25%
- Spec 81,2%

sCD14 admission:

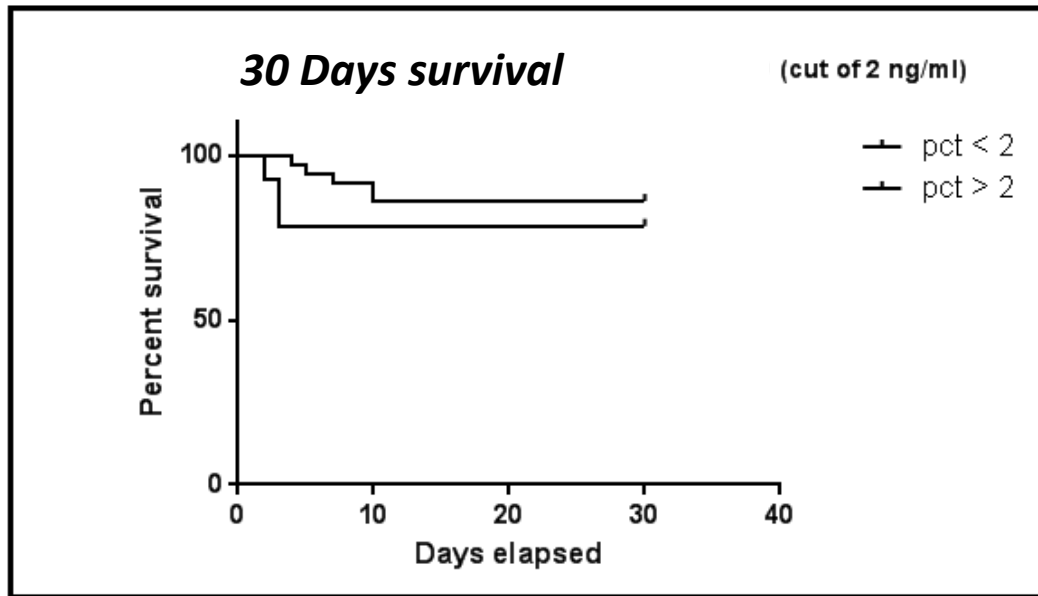
- AUC 0,7647
- Best Cut-off 1100 pg/ml (severe sepsis)
- Sens 80,71%
- Spec 83,72%





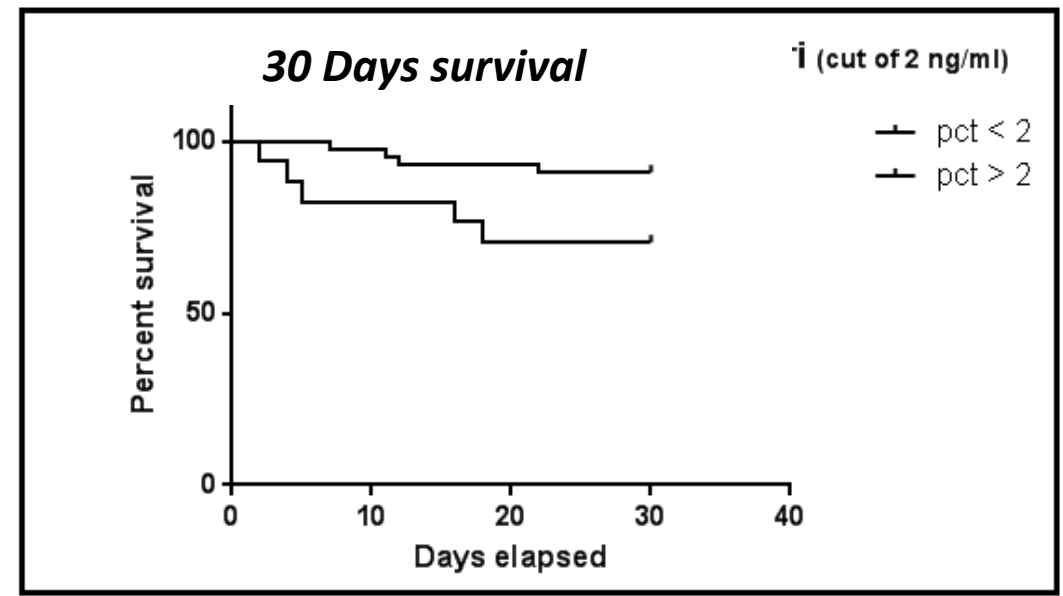
SURVIVAL CURVES (Kaplan-Meyer)

PCT on Admission



There is not statistical significant difference between the two groups (Mantel-Cox $p=0,41$)

Mean PCT during ICU stay

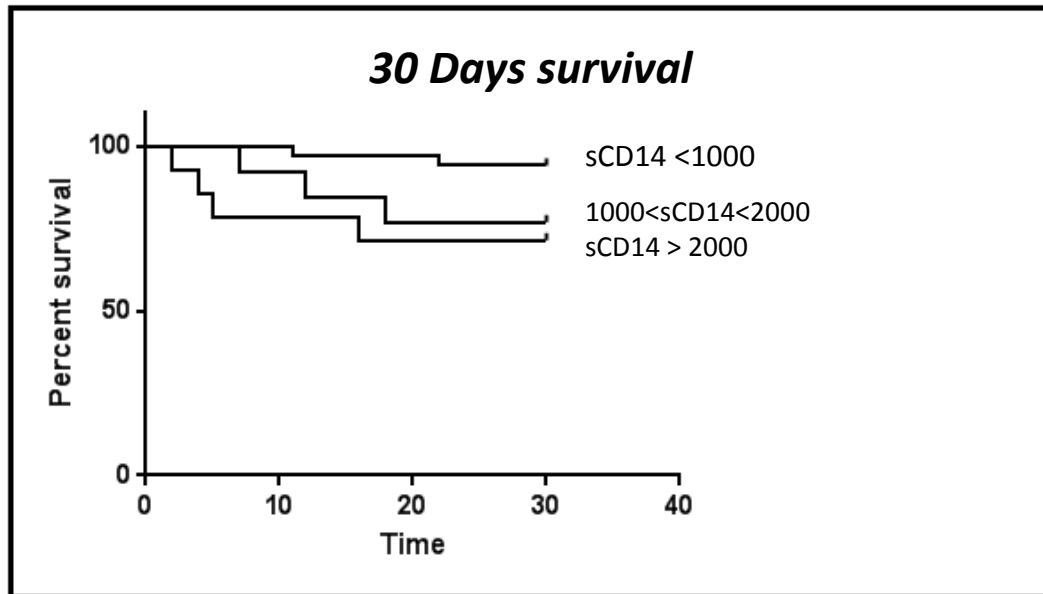


(Mantel-Cox $p=0,035$)



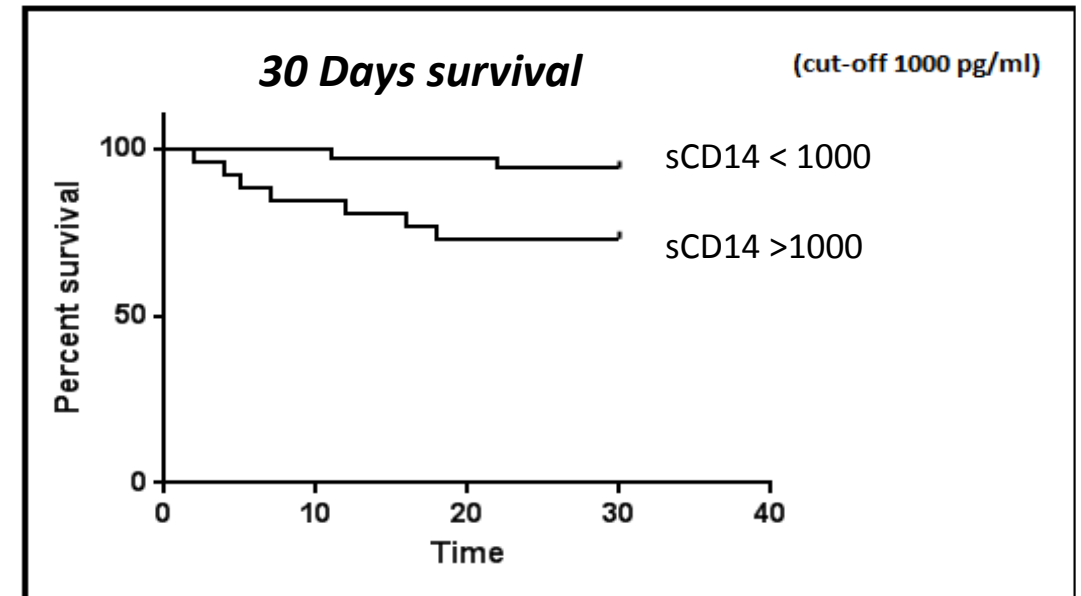
SURVIVAL CURVES (Kaplan-Meyer)

sCD14 on Admission



Difference between the first and second and third group (Log Rank Mantel-Cox $p=0,02$)

Mean sCD14 during ICU stay

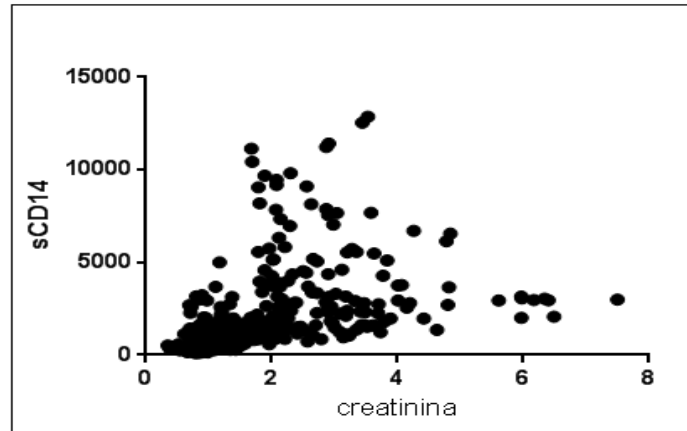


(Log Rank Mantel-Cox $p=0,02$)

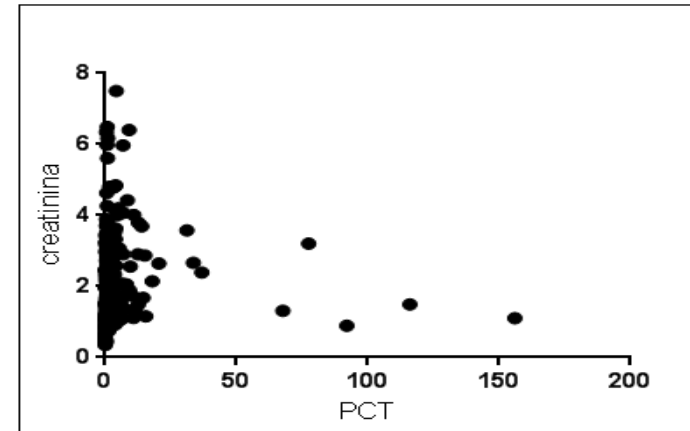
Results: Correlations

Septic:

sCD14 – creatinin r 0,7040

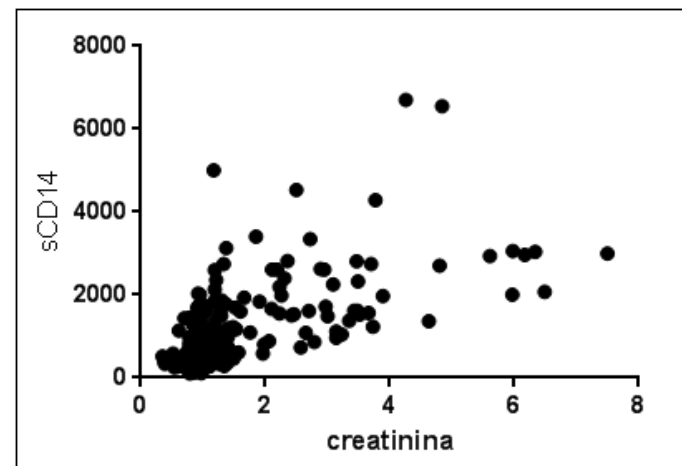


PCT – creatinin r 0,5889



Non septic:

sCD14 – creatinin
 r 0,6099



Spearman rank correlation test. $P < 0,01$



CONCLUSIONS



- PCT and sCD14 values are significantly higher in sepsis



Both confirm as valid sepsis' markers

- sCD14 > 1000 pg/ml on admission associates with higher mortality in KM survival curves (p=0.019)
- Not found with PCT



sCD14 confirms as negative prognostic index

Results according with most recent literature

Possible future developments

- Correlation between sCD14-ST and creatinine (Spearman-r 0,704) and between PCT and creatinine (Spearman-r 0,652) in **sepsis**

Less accurate in AKI (as for PCT)



- sCD14 and creatinine (con r = 0,6099) correlates in non septic **patients**



Future studies on relation between AKI and sCD14-ST

