Biomarkery v sepsi – možnosti a omezení

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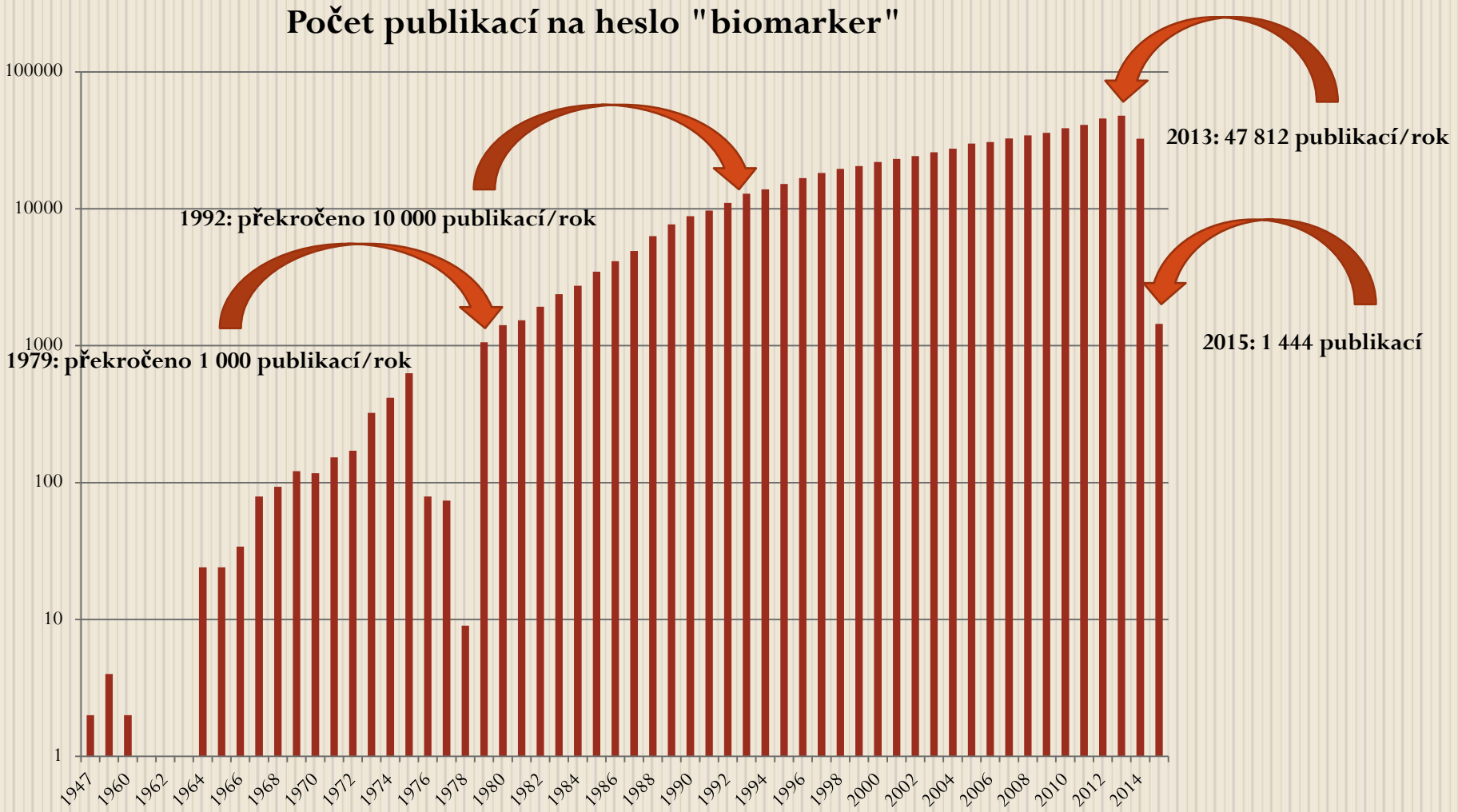
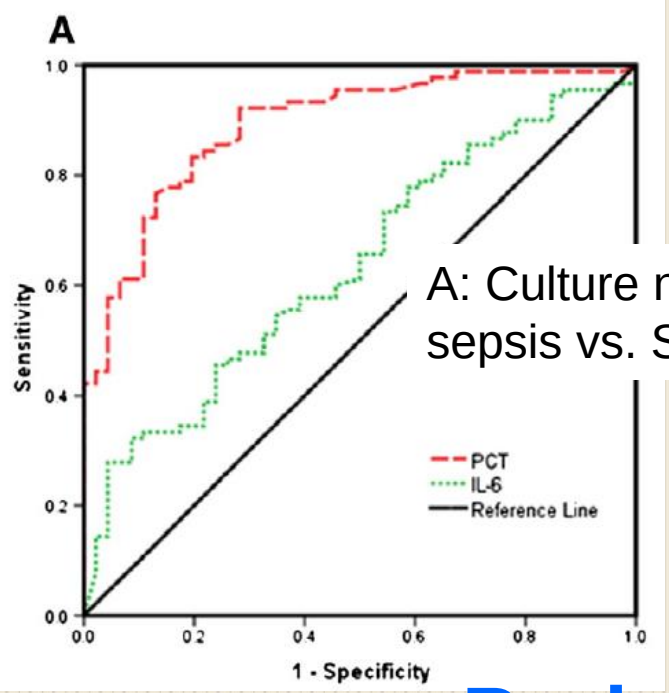


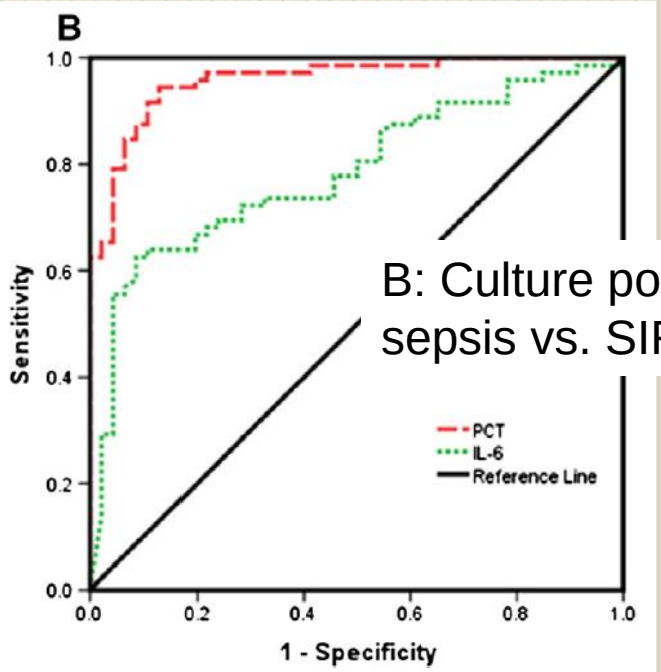
http://www.ncbi.nlm.nih.gov/pubmed/?term=biomarker k datu 27.1.2015

"biomarker" and "sepsis“: 619 výsledků k datu 27.1.2015

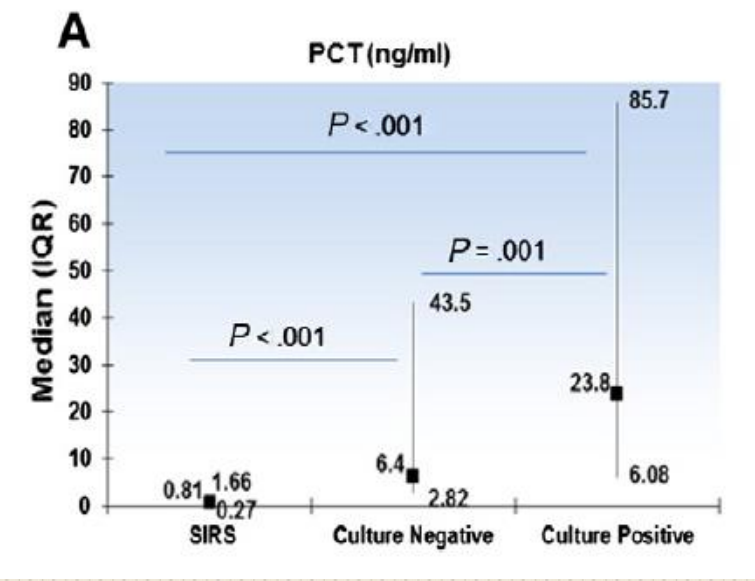
Prokalcitonin vs. IL6

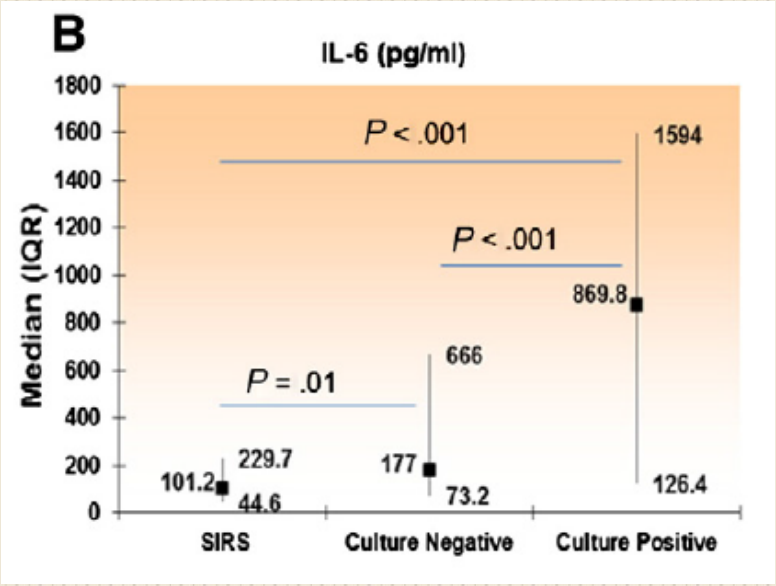


A: Culture negative sepsis vs. SIRS



B: Culture positive sepsis vs. SIRS





Diagnostic Microbiology and Infectious Disease 73 (2012) 221–227

Contents lists available at SciVerse ScienceDirect

Diagnostic Microbiology and Infectious Disease

journal homepage: www.elsevier.com/locate/diagmicrobio

Procalcitonin and the role of biomarkers in the diagnosis and management of sepsis

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Table 2
Expression of CT- and other cytokine mRNA in septic and healthy control animals.[a]

Tissue	Calcitonin		IL-6		TNF-α	
	Healthy control	Sepsis	Healthy control	Sepsis	Healthy control	Sepsis
Thyroid	↑↑↑↑↑[b]	↑↑↑↑↑		↑↑↑↑		↑↑↑
White blood cells		↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑↑↑
Peritoneal macrophage		↑↑	↑↑↑	↑↑↑↑	↑↑↑	↑↑↑↑
Spleen		↑↑↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑↑
Lung	↑↑	↑↑↑↑		↑↑↑	↑↑	↑↑↑↑
Liver		↑↑↑↑		↑↑↑		↑↑↑
Kidney		↑↑↑		↑↑↑	↑	↑↑↑↑
Adrenal		↑↑↑↑		↑↑↑	↑	↑↑
Brain		↑↑↑		↑↑↑↑		
Spine		↑↑↑		↑↑	↑	↑↑
Pancreas		↑↑↑↑				↑↑
Stomach		↑↑				↑↑
Small intestine		↑		↑↑	↑↑	↑↑↑↑
Colon		↑↑↑	↑↑↑	↑↑↑↑	↑↑↑	↑↑↑↑
Heart		(↑)	(↑)	↑↑↑↑	(↑)	↑↑↑↑
Muscle		↑	↑↑↑	↑↑↑↑	↑↑	↑↑↑↑
Skin		↑↑		↑↑↑↑	(↑)	↑↑↑↑
Visceral fat		↑↑↑	↑↑↑	↑↑↑	↑↑↑↑	↑↑↑↑
Testes		↑↑↑		↑↑		↑↑↑↑

Table 4
Procalcitonin: evidence-based utility for various infectious disease conditions.[a]

Evidence-based criterion	Observational studies	Randomized-controlled interventional studies
Strong evidence in favor of PCT		Upper respiratory tract infection COPD exacerbation Pneumonia Severe sepsis/septic shock
Good evidence in favor of PCT	Bloodstream infections/ bacteremia Pyelonephritis/urinary tract infections	Ventilator-associated pneumonia Postoperative infections
Moderate evidence in favor of PCT	Postoperative fever Arthritis Neutropenia Endocarditis	Meningitis
Use of PCT still undefined; weak/questionable evidence for/or against PCT	Abdominal infections Pancreatitis	

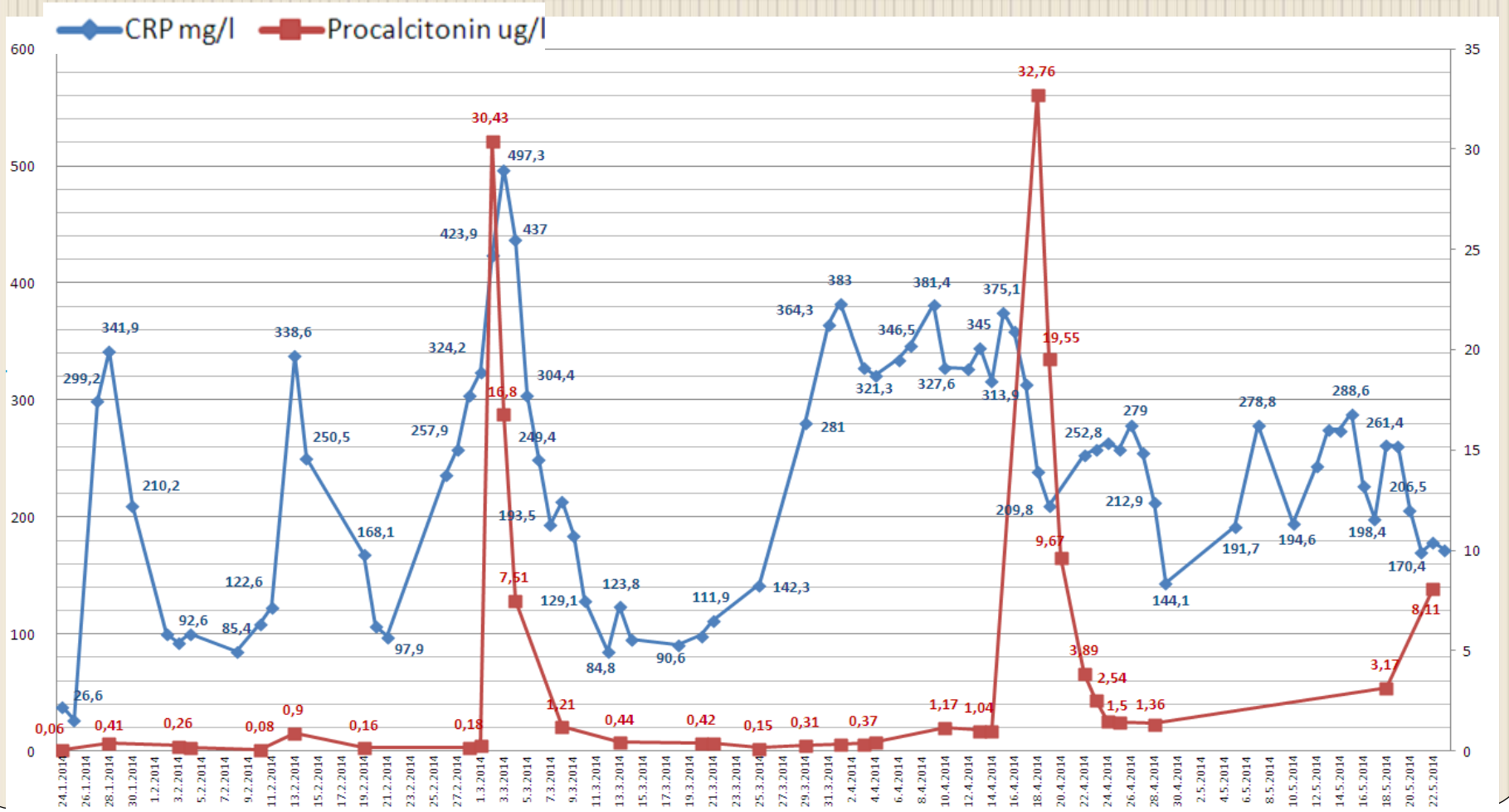
PCT = Procalcitonin; COPD = chronic obstructive pulmonary disease

Různá výpovědní hodnota prokalcitoninu v různých klinických situacích

Randomizované / observační studie vs. jednotlivá pozorování

Obezní pacientka, 56 let
Art. hypertenze, Angina pectoris CCS I, Ej.F. 55%
Syndrom HDŽ při tumoru pravé síně + opakovaná embolizace do plic

Hospitalizace 24.1.2014 -23.5.2014
Nyní přijata pro KCH řešení nálezu (tumor P síně a aortokoronární bypass)



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Biomarkery v sepsi: metaanalýzy

Parametr	CRP	PCT	IL6	TnT / TnI	BNP / NT-proBNP	NGAL
Počet pacientů	1386	3244	327	1227	1865	1783 (319 AKI)
AUC	-	0,85	0,86	0,68	0,63 – 0,99	0,84
Senzitivita (%)	75	77	75	77	79	78
Specifita (%)	67	79	86	47	60	84
+LR	2,43	? 3,67	-	1,5	2,3	-
-LR	0,42	? 0,29	-	0,5	0,3	-
Outcome	Dg. sepse	Dg. sepse	Dg. sepse	Mortalita v sepsi	Mortalita v sepsi	Predikce AKI

Procalcitonin as a diagnostic marker for sepsis: a systematic review and meta-analysis

Christina Wacker, Anna Prkno, Frank M Brunkhorst*, Peter Schlattmann*

Lancet Infect Dis 2013; 13: 426–35

Summary

Background Procalcitonin is a promising marker for identification of bacterial infections. We assessed the accuracy and clinical value of procalcitonin for diagnosis of sepsis in critically ill patients.

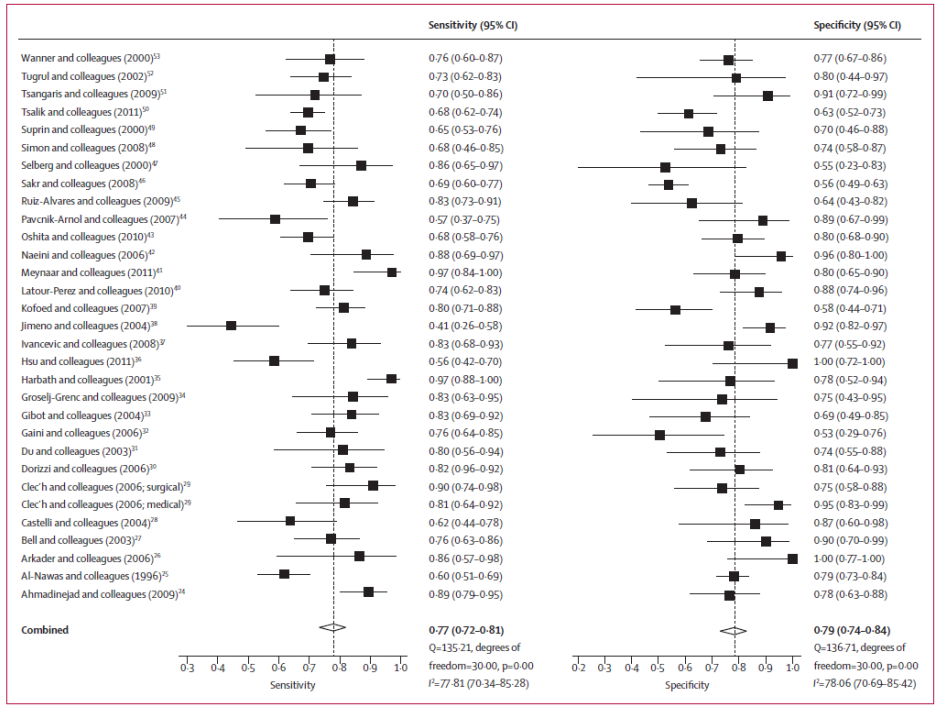

Figure 2: Sensitivity and specificity of procalcitonin assay for diagnosis of sepsis

Celková senzitivita **0,77**

Celková specifičnost **0,79**

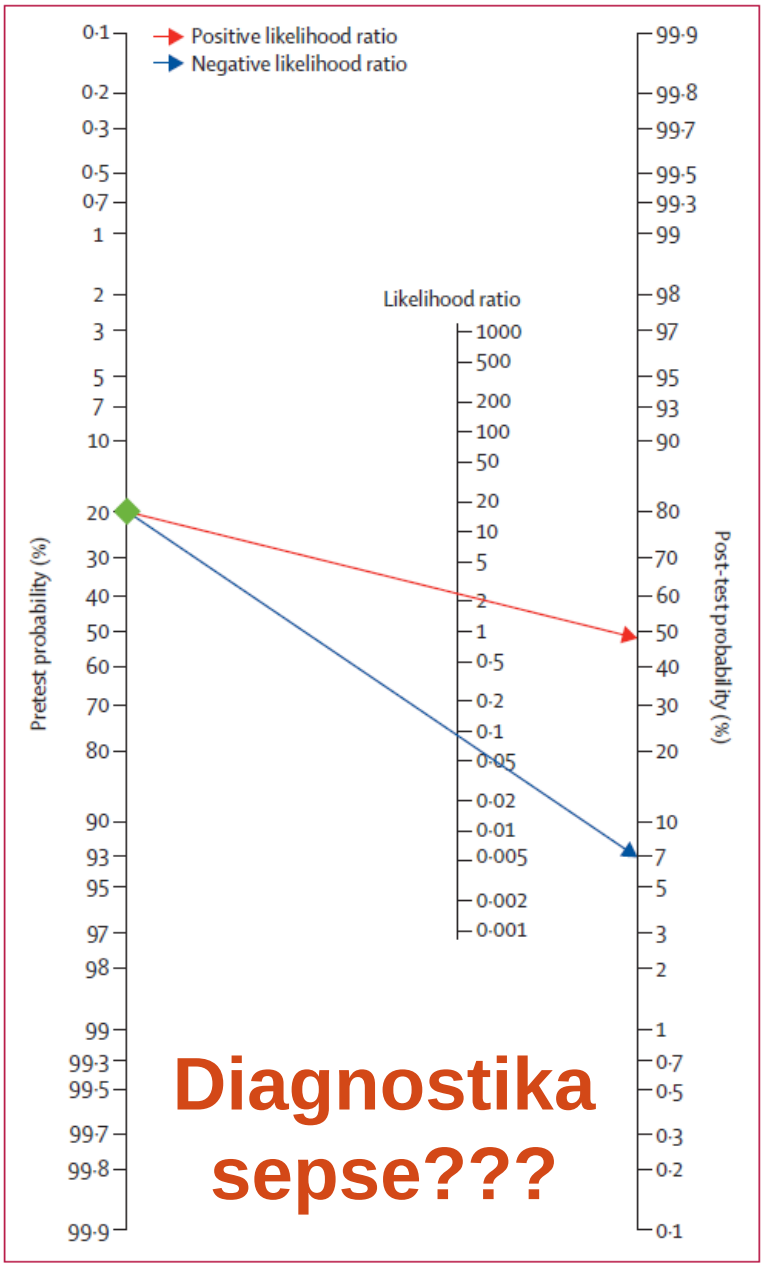

Figure 4: Fagan nomogram of the procalcitonin test for diagnosis of sepsis

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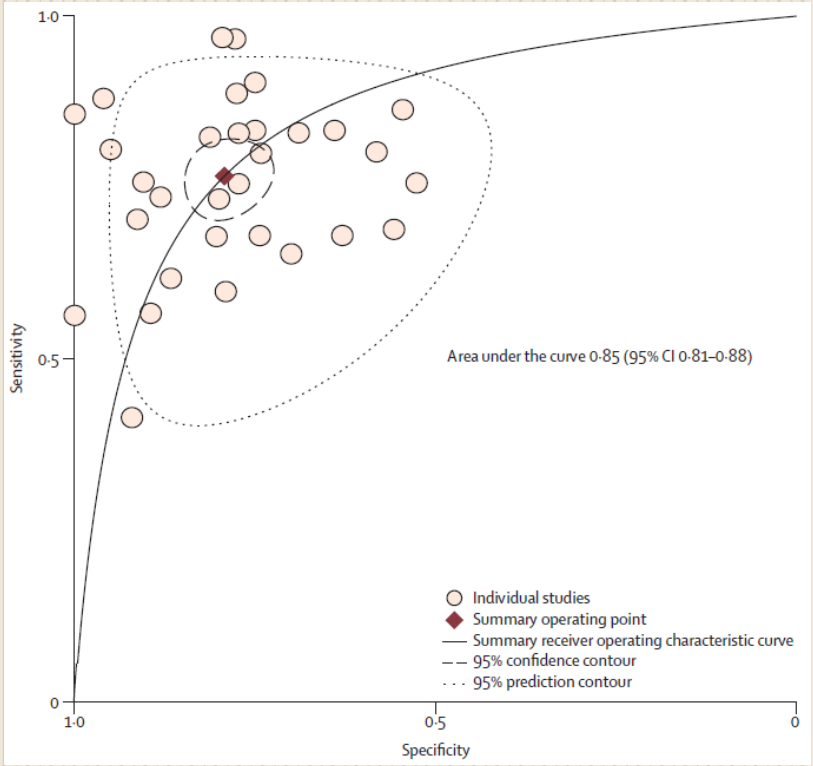

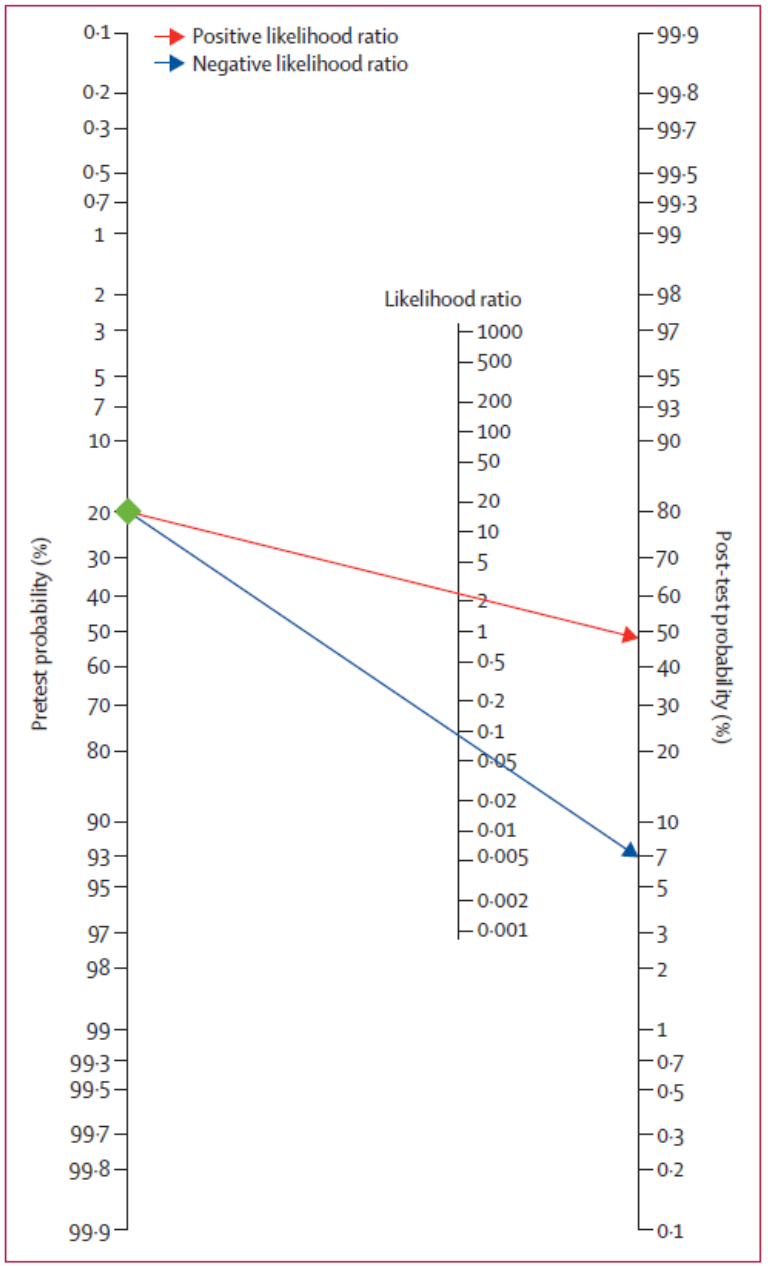

Figure 4: Fagan nomogram of the procalcitonin test for diagnosis of sepsis

Prokalcitonin: modelové doporučení

Take-Home Message

Procalcitonin must be used cautiously, in conjunction with the clinical picture, when differentiating sepsis from noninfectious systemic inflammatory response syndrome.

Cohn, B.: Can Procalcitonin Differentiate Sepsis From Systemic Inflammatory Response Syndrome Without Infection? Ann. Emerg. Med., 63, 2014, p. 631-632.

An ideal biomarker should distinguish between various stages of bacterial infection, inform further diagnostic tests, help to time treatment, and provide information about prognosis.

Procalcitonin is not a perfect biomarker but it is the best available means for making individualised treatment decisions to reduce duration of antibiotic treatment or withhold antibiotics for non-life-threatening respiratory tract infections

Afshari, A., Harbarth, S.: Procalcitonin as diagnostic biomarker of sepsis. Lancet Inf. Dis., 2013, vol. 13, p. 382-384.

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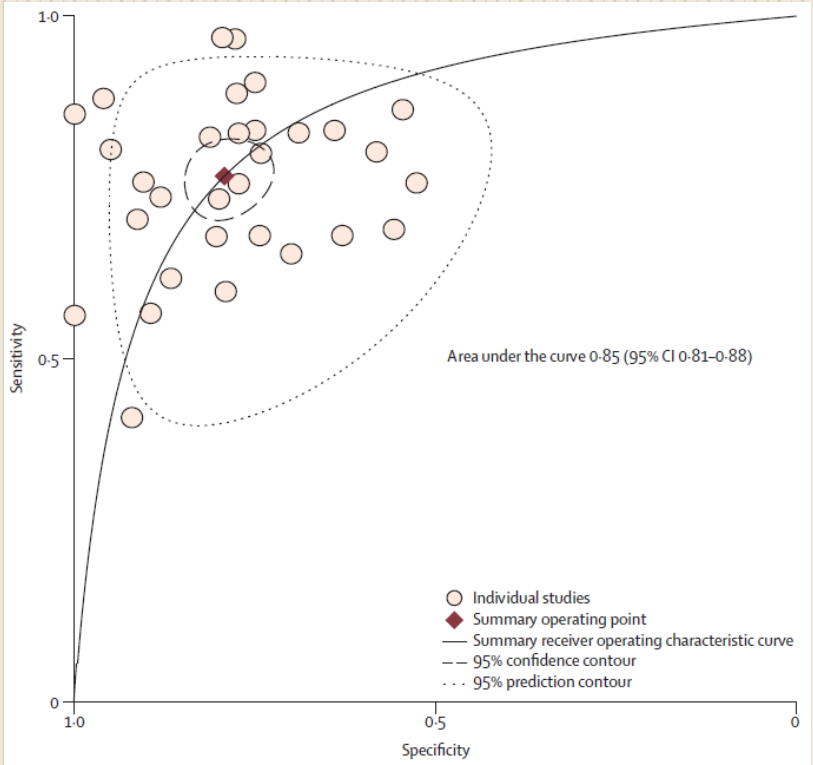
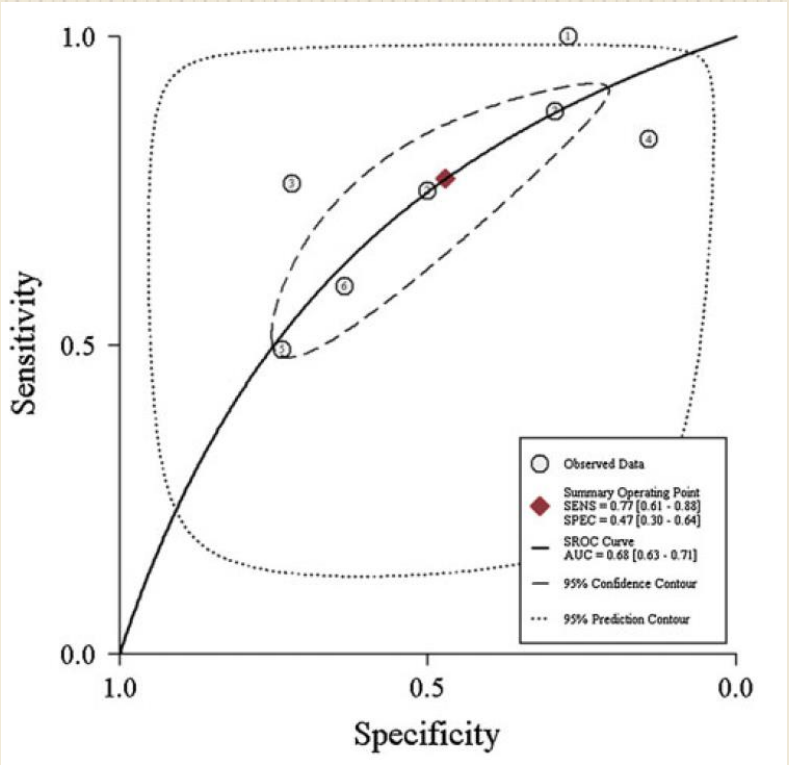


Intensive Care Med (2013) 39:1181–1189
DOI 10.1007/s00134-013-2902-3

SYSTEMATIC REVIEW

Francis Bessière
Safia Khenifer
Julie Dubourg
Isabelle Durieu
Jean-Christophe Lega

Prognostic value of troponins in sepsis: a meta-analysis



Nové biomarkery

Journal of Critical Care 30 (2015) 219.e1–219.e7

Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.jccjournal.org

Predictive value of plasma biomarkers for mortality and organ failure development in patients with acute respiratory distress syndrome ☆,☆☆

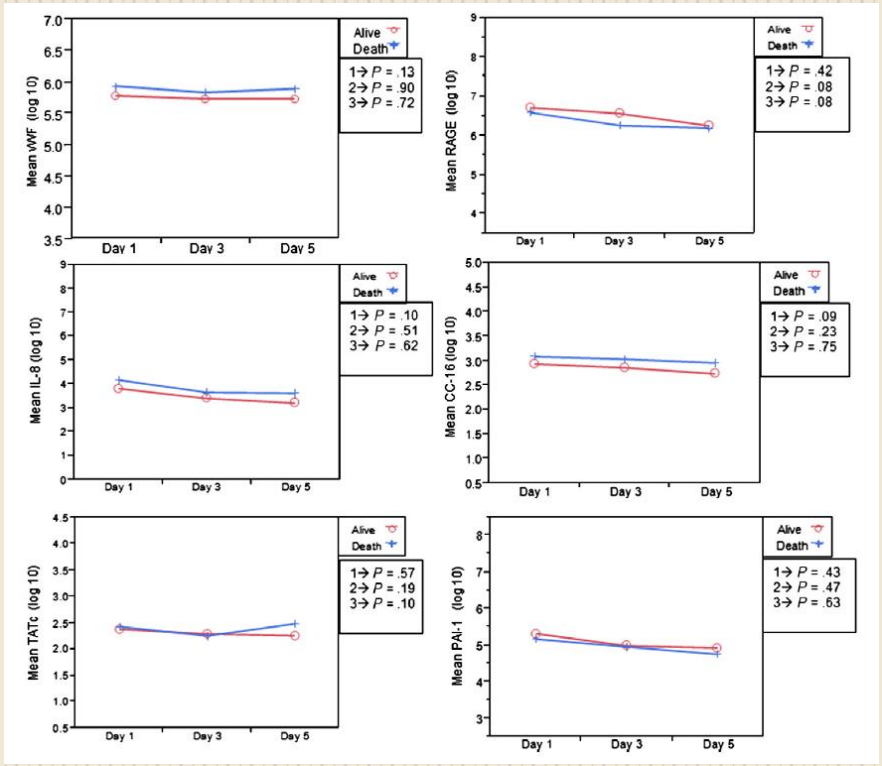
Rodrigo Cartin-Ceba, MD, MSc [a,*], Rolf D. Hubmayr, MD [a], Rui Qin, PhD [b], Steve Peters, MD [a], Rogier M. Determann, MD, PhD [c], Marcus J. Schultz, MD, PhD [c], Ognjen Gajic, MD, MSc [a]

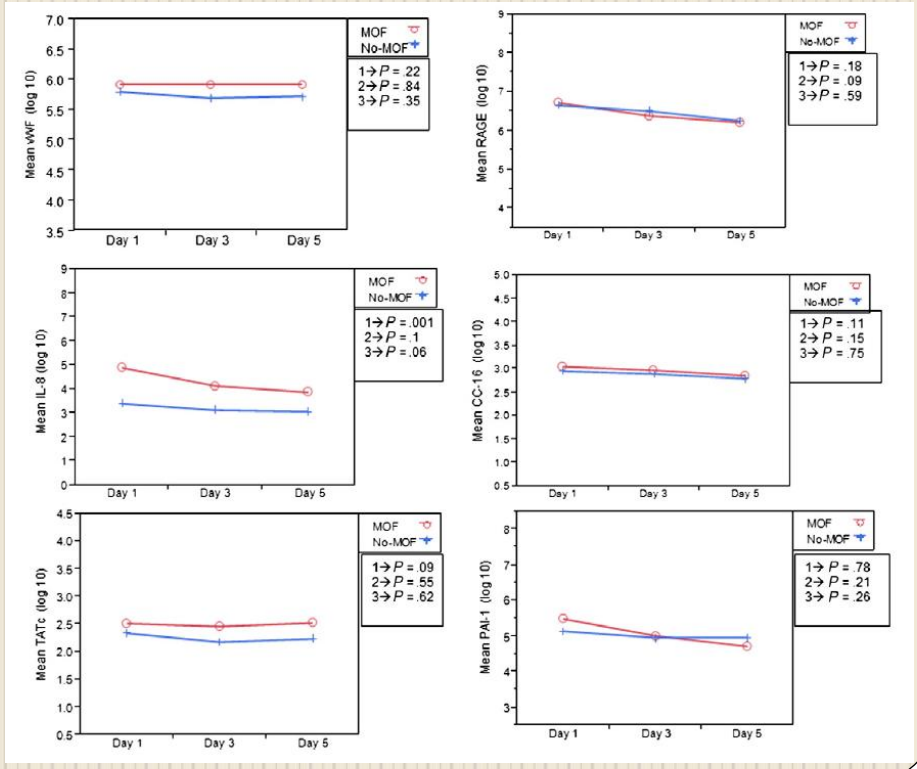
[a] Department of Medicine, Division of Pulmonary and Critical Care Medicine, Mayo Clinic, Rochester, MN
[b] Department of Biomedical Statistics and Informatics, Mayo Clinic, Rochester, MN
[c] Laboratory of Experimental Intensive Care and Anesthesiology and Department of Intensive Care, Academic Medical Center, University of Amsterdam, Amsterdam, the Netherlands.

Sledování 6 biomarkerů:

- von Willebrand factor,
- thrombin–antithrombin III complex,
- plasminogen activator inhibitor 1,
- interleukin 8,
- receptor for advanced glycation end-products
- club cell secretory protein

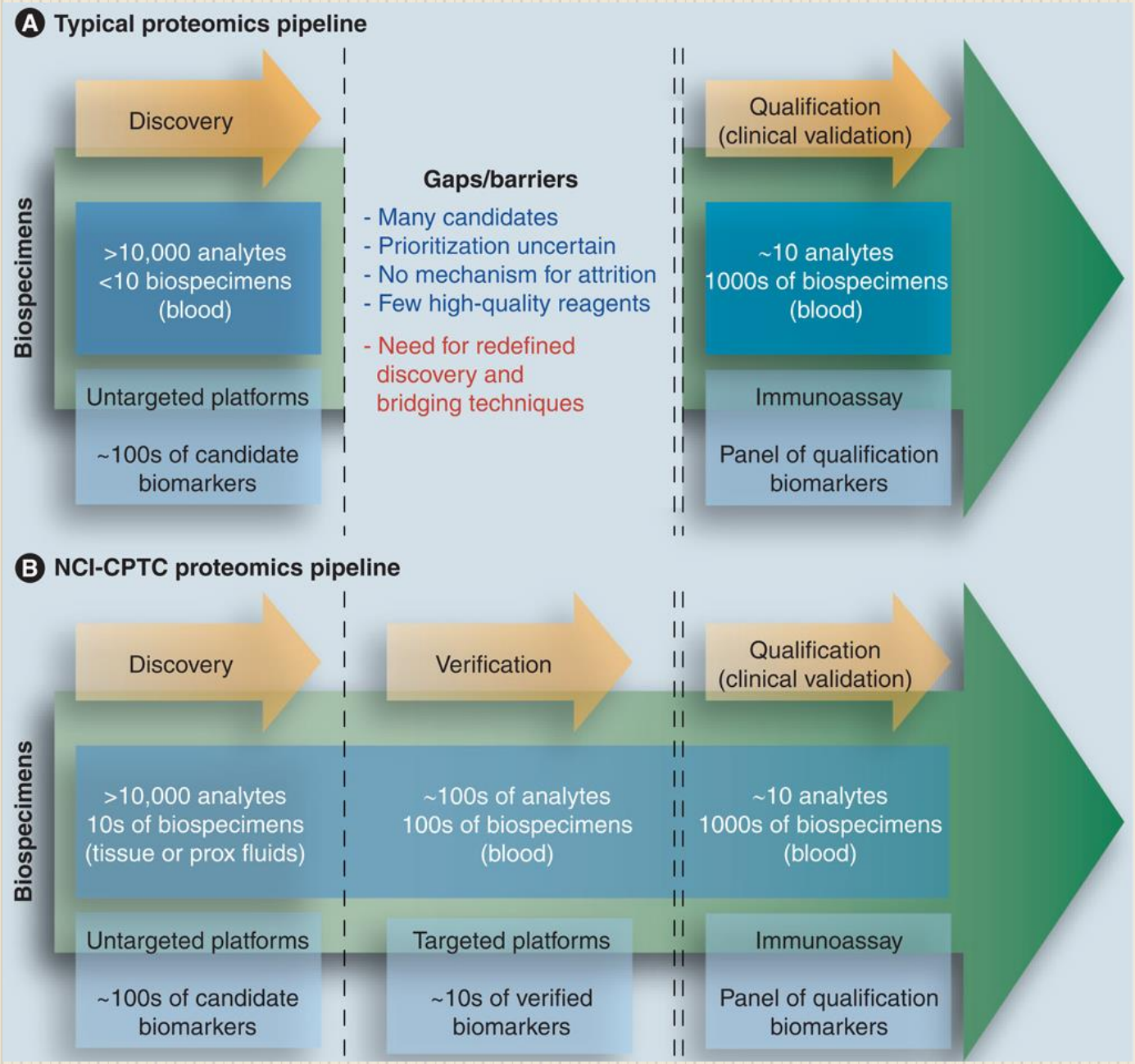
Bez schopnosti predikovat mortalitu.
IL8 měl vztah k rozvoji MOF v rámci vystupňované imunitní odpovědi.





Biomarkery: modelové doporučení

- Používat poučeně více biomarkerů
- Mohou zastupovat různé přístupy
  - diagnostika, monitorování, staging, prognóza,
- Je vhodné, pokud odrážejí různé patofyziologické procesy
- Sledování v čase je vhodnější než izolovaná vyšetření
- Specifické klinické situace vyžadují použití různých skupin biomarkerů
- Přednost mají zavedené biomarkery nebo biomarkery se známými charakteristikami
  - poločas, biologická variabilita, analytické znaky
- Ideální biomarkery neexistují stejně jako nejsou unifikovaní nemocní


A Typical proteomics pipeline
Biospecimens
Discovery
>10,000 analytes
<10 biospecimens
(blood)
Untargeted platforms
~100s of candidate
biomarkers
Gaps/barriers
- Many candidates
- Prioritization uncertain
- No mechanism for attrition
- Few high-quality reagents
- Need for redefined discovery and bridging techniques
Qualification
(clinical validation)
~10 analytes
1000s of biospecimens
(blood)
Immunoassay
Panel of qualification
biomarkers
B NCI-CPTC proteomics pipeline
Biospecimens
Discovery
>10,000 analytes
10s of biospecimens
(tissue or prox fluids)
Untargeted platforms
~100s of candidate
biomarkers
Verification
~100s of analytes
100s of biospecimens
(blood)
Targeted platforms
~10s of verified
biomarkers
Qualification
(clinical validation)
~10 analytes
1000s of biospecimens
(blood)
Immunoassay
Panel of qualification
biomarkers

Děkuji za pozornost