



CHOBOTNICE V INTENZIVNÍ PÉČI

Thomas Karvunidis

JIP, I. interní klinika, LF, FN a Biomedicínské centrum v Plzni, Univerzita Karlova





Normal Heart

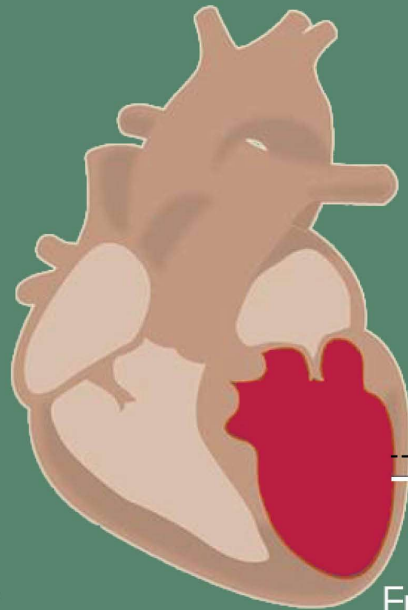
The normal shape of the left ventricle after it contracts



Left Ventricular

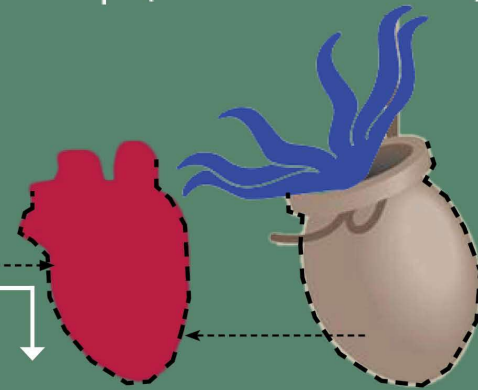
Takotsubo Cardiomyopathy

The shape of the left ventricle becomes similar to the octopus trap



Enlarged Ventricular

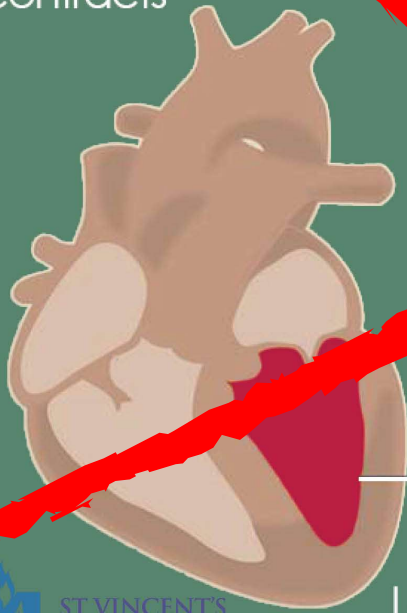
Japanese Octopus Trap (called Tako-Tsubo)





Normal Heart

The normal shape of the left ventricle after it contracts



Left Ventricular

Takotsubo Cardiomyopathy

The shape of the left ventricle becomes similar to the octopus trap



Enlarged Ventricular

Japanese Octopus Trap (called Tako-Tsubo)



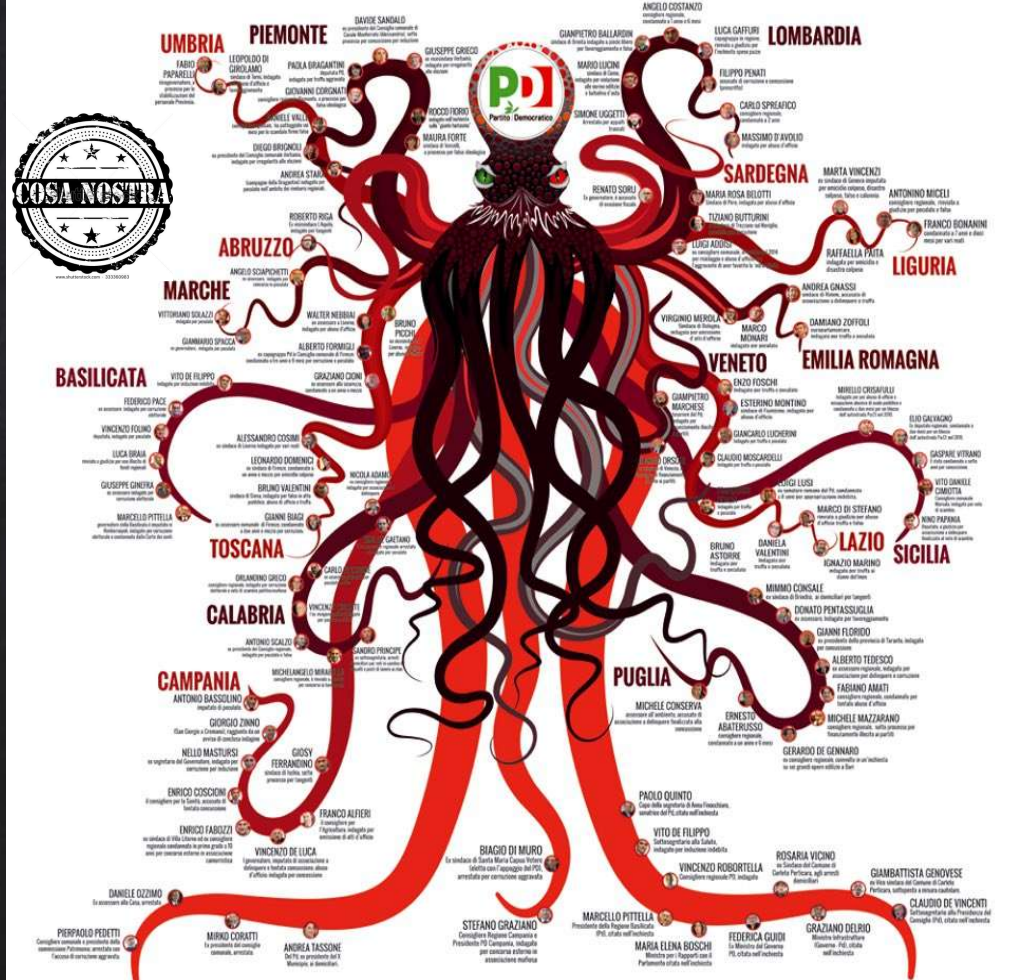




THE COMMISSION - 1931

WISE GUYS

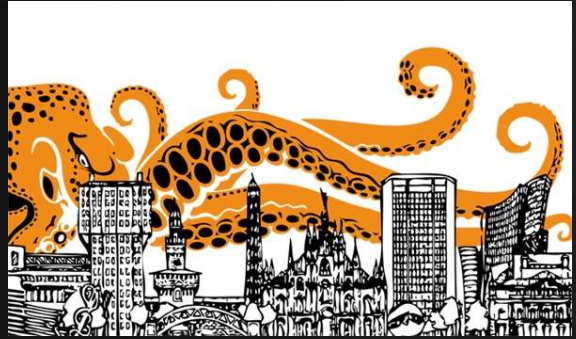
Paul Castellano / Vincent Mangano / Joe Masseria / Frank Nitti / Salvatore Maranzano / Joe Profaci / Vincent Gigante / Albert Anastasia / Al Capone / Lucky Luciano / Meyer Lansky / John Gotti / Tony Accardo / Mickey Cohen / Angelo Rizzuto / Angelo Bruno / Vito Genovese / Chris Gambino / Sam Giancana / Tommy Lucchese / Joe Bonanno / Stefano Magaddino / Carlos Marcello / Frank Costello / Dutch Schultz / Carmine Galante / Bugs Moran / Bugs Siegel

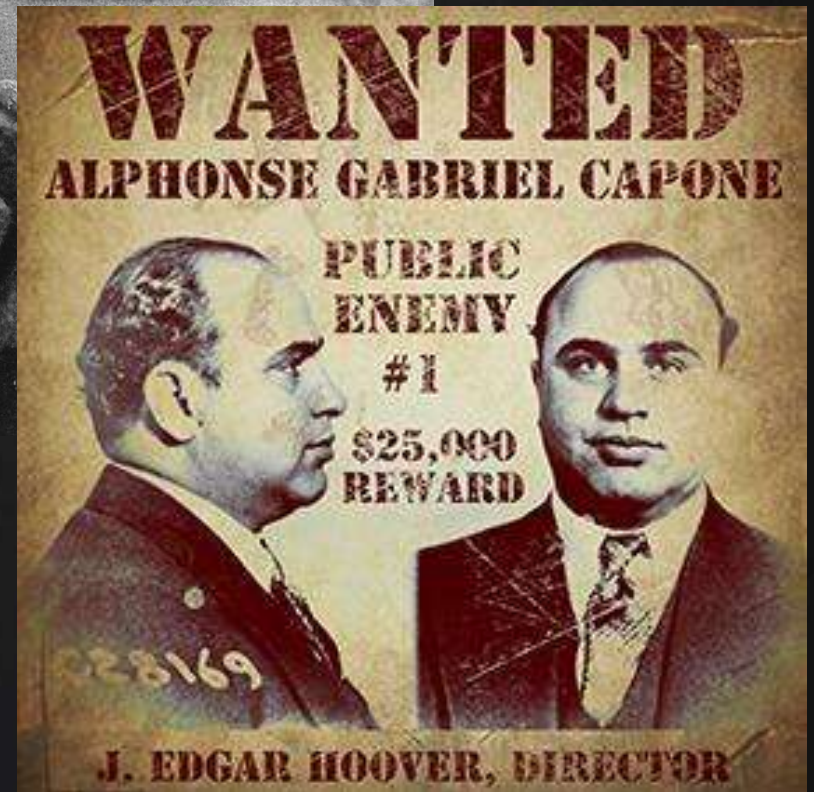
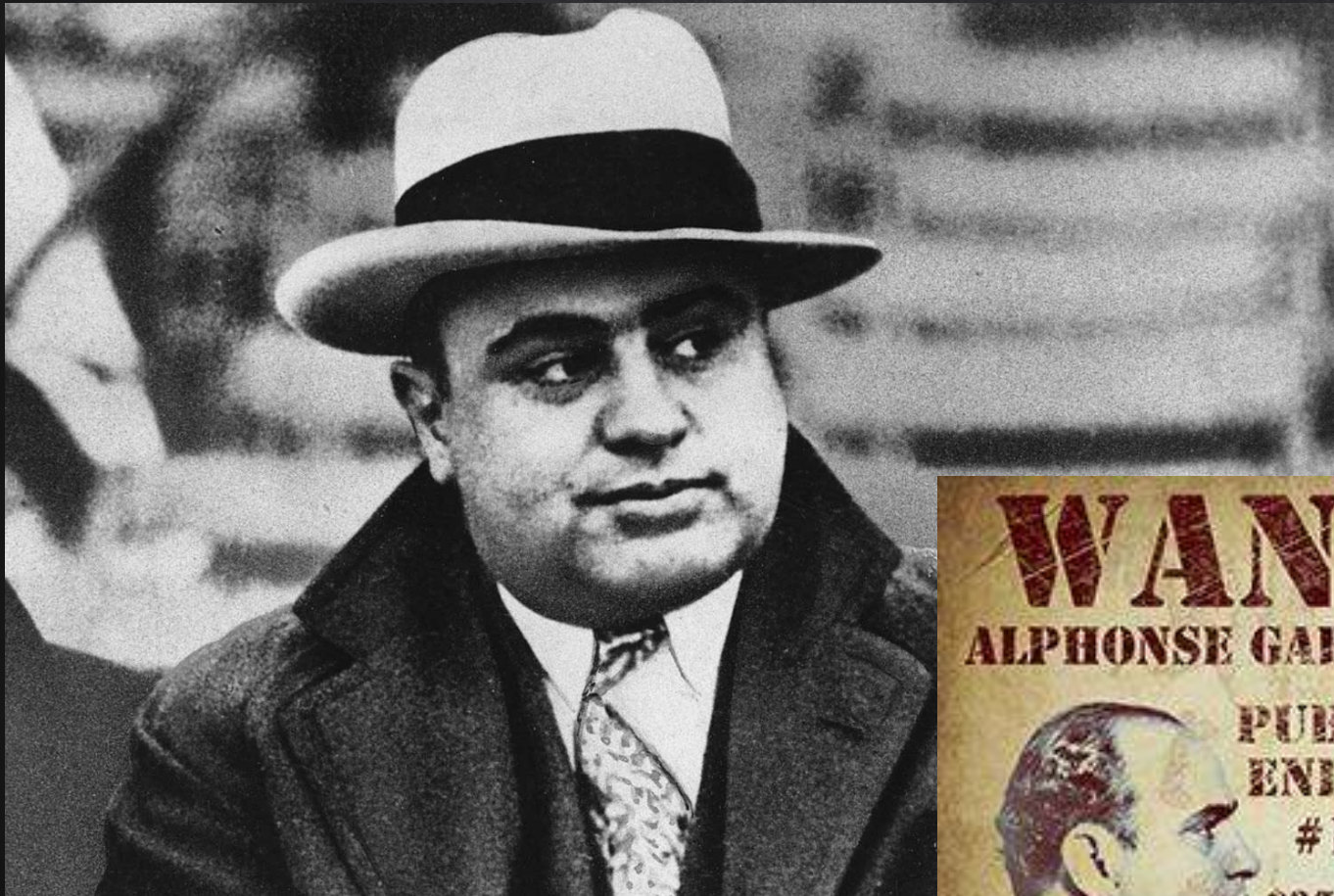


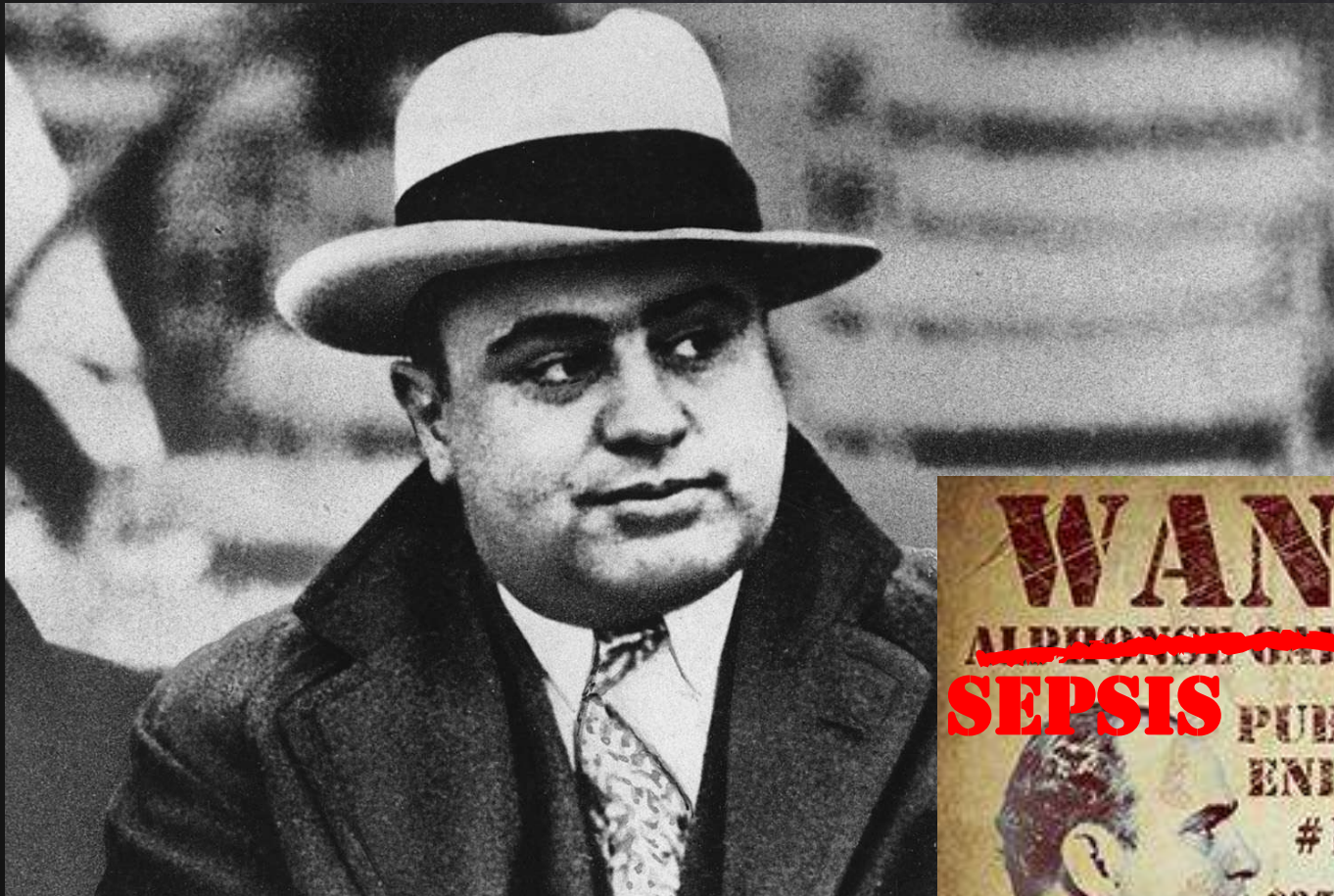
#MAFIACAPITALE

#GOMORRAPD

#TRIVELLOPOLI









Clinical Review & Education

Special Communication | CARING FOR THE CRITICALLY ILL PATIENT

JAMA February 23, 2016 Volume 315, Number 8

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Mervyn Singer, MD, FRCP; Clifford S. Deutschman, MD, MS; Christopher Warren Seymour, MD, MSc; Manu Shankar-Hari, MSc, MD, FFICM; Djillali Annane, MD, PhD; Michael Bauer, MD; Rinaldo Bellomo, MD; Gordon R. Bernard, MD; Jean-Daniel Chiche, MD, PhD; Craig M. Coopersmith, MD; Richard S. Hotchkiss, MD; Mitchell M. Levy, MD; John C. Marshall, MD; Greg S. Martin, MD, MSc; Steven M. Opal, MD; Gordon D. Rubenfeld, MD, MS; Tom van der Poll, MD, PhD; Jean-Louis Vincent, MD, PhD; Derek C. Angus, MD, MPH

The Third I for Sepsis a

Mervyn Singer, MD, FRCP; Cl
Djillali Annane, MD, PhD; Mic
Craig M. Coopersmith, MD; R
Steven M. Opal, MD; Gordon

Box 2. Key Concepts of Sepsis

- Sepsis is the primary cause of death from infection, especially if not recognized and treated promptly. Its recognition mandates urgent attention.
- Sepsis is a syndrome shaped by pathogen factors and host factors (eg, sex, race and other genetic determinants, age, comorbidities, environment) with characteristics that evolve over time. What differentiates sepsis from infection is an aberrant or dysregulated host response and the presence of organ dysfunction.
- Sepsis-induced organ dysfunction may be occult; therefore, its presence should be considered in any patient presenting with infection. Conversely, unrecognized infection may be the cause of new-onset organ dysfunction. Any unexplained organ dysfunction should thus raise the possibility of underlying infection.
- The clinical and biological phenotype of sepsis can be modified by preexisting acute illness, long-standing comorbidities, medication, and interventions.
- Specific infections may result in local organ dysfunction without generating a dysregulated systemic host response.

The Third I for Sepsis a

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- The clinical and biological phenotype of sepsis can be modified by preexisting acute illness, long-standing comorbidities, medication, and interventions.
- Specific infections may result in local organ dysfunction without generating a dysregulated systemic host response.

sepsis ≈ prokázaná či suspektní infekce + orgánová dysfunkce

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Table 1. Sequential [Sepsis-Related] Organ Failure Assessment Score^a

System	Score				
	0	1	2	3	4
Respiration					
PaO ₂ /FIO ₂ , mm Hg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation					
Platelets, ×10 ³ /μL	≥150	<150	<100	<50	<20
Liver					
Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular					
	MAP ≥70 mm Hg	MAP <70 mm Hg	Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b
Central nervous system					
Glasgow Coma Scale score ^c	15	13-14	10-12	6-9	<6
Renal					
Creatinine, mg/dL (μmol/L)	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d				<500	<200

Abbreviations: FIO₂, fraction of inspired oxygen; MAP, mean arterial pressure; PaO₂, partial pressure of oxygen.

^a Adapted from Vincent et al.²⁷

^b Catecholamine doses are given as μg/kg/min for at least 1 hour.

^c Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

Datum odběru **4.11.2016** 4.11.2016 9.11.2016 21.11.2016
od - do **05:30** 12:19-12:20 12:07-12:19 04:56

Poznámka k odběru viz. str. 1

Krevní obraz

B--Le	2,60	1,00
B--Ery	3,54	3,01
B--Hb	109	88
B--HTK	0,314	0,259
B--Obj ery.	89	86
B--Hb ery	30,9	29,1
B--Hb konc	349	338
B--Erytr.křivka	14,3	16,3
B--Trombo	80	65
B--shluky trombo	nejsou	
B--Nbl abs	0,00	0,00
B--Nbl rel	0,001	0,003

Dif mikr.

B--Seg	0,76	0,81
B--Tyc	0,10	0,02
B--Ly	0,13 *)	0,17
B--Ly akt.	0,01	

Biochemie

P/S--Bilirubin	12	8
P/S--AST	2,59	3,19
P/S--ALT	2,68	6,28
P/S--GGT	1,71	7,71
P/S--ALP	6,70	2,97
P/S--AMS	0,57	2,28
P/S--CHS	49	
P/S--Glukóza	8,7	
P/S--Močovina	3,9	7,7
P/S--Kreatinin	47	33
P/S--Kys. močov.	183	
P/S--Sodík	138	
P/S--Draslík	3,8	
P/S--Chloridy	102	
qS--Cl korig.	103	
P/S--Vápník	1,71	1,92
P/S--Fosfor	1,32	1,05
qS--Ca x P	2,3	2,0
P/S--Hořčík	0,89	0,99
qS--Osmol. výpoč	289	
qS--Osm. efekt.-v	285	
P/S--Celk. bílkovir	47,6	
P/S--Albumin	25,2	24,4
P/S--CRP	12	6
P/S--Prokalcitonin	0,24	
P/S--CK	2,52	
P/S--Myoglobin	64,8	



P--Troponin T hs	<3,0	
Hemokoagulace		
P--APTT	36,6	42,1
P--APTT - R	1,13	1,30
P--Protrombin. te	15,3	14,5
P--PT - R	1,14	1,08
P--INR	1,2	1,1

ABR

B--Typ krve	venózní	
B--Hemoglobin	tech.dův	

Spec. bioch. vyšetření

P/S--Feritin	453	1 199
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Lipidogram

P/S--Cholesterol	3,78	
P/S--TG	2,91	4,76

Vyšetření moče

U--pH	nedodáno	8,0
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Odhad glom.filtrace

qS--GF-MDRD	>1,50	>1,50
qS--GF-kreatinin(2,25	2,53

Hormony

P/S--hCG celkovy	<1	
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Systémové autoimunity

S--ANA	negat.	
S--Anti-dsDNA	31,00	
S--ENA	0,2	
S--p-ANCA IF	negat.	
S--c-ANCA IF	negat.	
S--ANCA-PR3 BI,0		
S--ANCA-MPO B 0		
S--RF latex	<11,4	
S--RF IgG	33,18	
S--RF IgA	24,30	
S--RF IgM	40,84	

Autoim. nem. ledvin

S--Anti-GBM	0	
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Datum odběru **4.11.2016**
od - do **12:36**

Poznámka k odběru

ABR

B--Typ krve	arter.
B'--pH	7,35
B'--pO2	7,7
B'--pCO2	7,7
B--BE	6,0
B--HCO3 aktualn	31,8
B--Hemoglobin	109
B--Oxyhemoglobi	0,88
B--Saturace Hb k	0,92
B--Sodík	133
B--Draslík	3,6
B--Chloridy	101
B--Ca ioniz.	1,01
B--Laktát	1,30
B'--Teplota aktuá	36,4
B--Konc.O2 vdec	0,55

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S--ENA	0,2	
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S--c-ANCA IF	negat.	
S--ANCA-PR3 BI,0		
S--ANCA-MPO B 0		
S--RF latex	<11,4	
S--RF IgG	33,18	
S--RF IgA	24,30	
S--RF IgM	40,84	

Autoim. nem. ledvin

S--Anti-GBM	0	
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B--Saturace Hb k	0,92
B--Sodík	133
B--Draslík	3,6
B--Chloridy	101
B--Ca ioniz.	1,01
B--Laktát	1,30
B'--Teplota aktuá	36,4
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Poznámka k odběru

P-TLAKOVÁ SIMV

AAC

ZÁKLADNÍ

VYSOKÝ ŠPIČKOVÝ TLAK

0.39
L
Vt

0.42
L
Vte

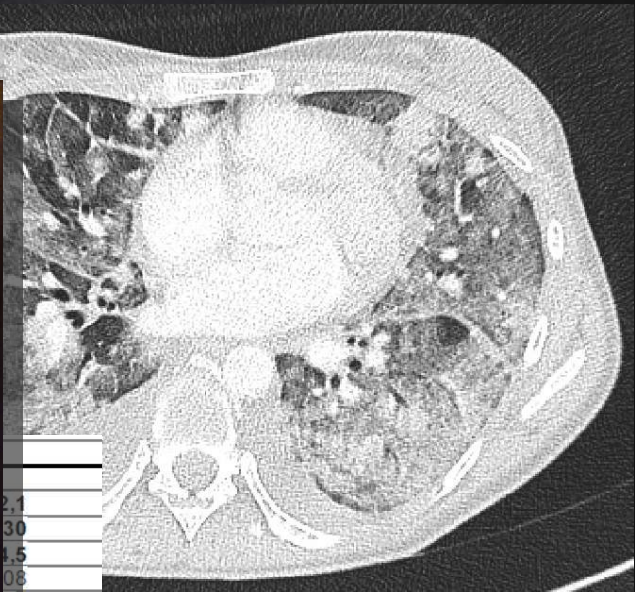
41
cmH2O
Ppeak

12
cmH2O
PEEP

0.27
mL/cmH2O/kg
Cdyn/kg



18 dých/min Frekvence
 19 cmH2O Insp Tlak
 1.40 sec. Insp Cas
 18 cmH2O PSV
 12 cmH2O PEEP
 0.8 L/min Průtok Trig
 55 % FIO2



P/S--Sodík	138	
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S--RF latex	<11,4	
S--RF IgG	33,18	
S--RF IgA	24,30	
S--RF IgM	40,84	
Autoim. nem. ledvin		
S--Anti-GBM	0	

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Poznání k odběru

P-TLAKOVÁ SIMV

AAC

ZÁKLADNÍ

VYSOKÝ ŠPIČKOVÝ TLAK

0.39

80 Paw (cmH2O)



Table 1. Sequential [Sepsis-Related] Organ Failure Assessment Score^a

System	Score	0	1	2	3	4
Respiration						
PaO ₂ /FIO ₂ , mm Hg (kPa)		≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation						
Platelets, ×10 ³ /μL		≥150	<150	<100	<50	<20
Liver						
Bilirubin, mg/dL (μmol/L)		<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular						
MAP ≥70 mm Hg		MAP <70 mm Hg		Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b
Central nervous system						
Glasgow Coma Scale score ^c		15	13-14	10-12	6-9	<6
Renal						
Creatinine, mg/dL (μmol/L)		<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d					<500	<200

Abbreviations: FIO₂, fraction of inspired oxygen; MAP, mean arterial pressure; PaO₂, partial pressure of oxygen.

^b Catecholamine doses are given as μg/kg/min for at least 1 hour.

^c Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

^a Adapted from Vincent et al.²⁷

P/S--CRP	12	6
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Autoim. nem. ledvin	
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System	Score	0	1	2	3	4
Respiration						
PaO ₂ /FIO ₂ , mm Hg (kPa)		≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation						
Platelets, ×10 ³ /μL		≥150	<150	<100	<50	<20
Liver						
Bilirubin, mg/dL (μmol/L)		<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular						
MAP ≥70 mm Hg		MAP <70 mm Hg		Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b
Central nervous system						
Glasgow Coma Scale score ^c		15	13-14	10-12	6-9	<6
Renal						
Creatinine, mg/dL (μmol/L)		<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d					<500	<200

SEPSE?

Abbreviations: FIO₂, fraction of inspired oxygen; MAP, mean arterial pressure;

PaO₂, partial pressure of oxygen.

^a Adapted from Vincent et al.²⁷

^b Catecholamine doses are given as μg/kg/min for at least 1 hour.

^c Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

P/S--CRP	12	6
P/S--Prokalcitonin	0,24	
P/S--CK	2,52	
P/S--Myoglobin	64,8	

S--RF IgG	33,18
S--RF IgA	24,30
S--RF IgM	40,84
Autoim. nem. ledvin	
S--Anti-GBM	0

B--Ca ioniz.	1,01
B--Laktát	1,30
B'--Teplota aktuá	36,4
B--Konc.O2 vdec	0,55

sepsy \approx prokázaná či suspektní infekce + orgánová dysfunkce

sepsis \approx prokázaná či suspektní infekce + orgánová dysfunkce



sepsis \approx suspektní infekce + orgánová dysfunkce

sepsis ≈ prokázaná či suspektní infekce + orgánová dysfunkce



? sepsis ≈ **suspektní infekce** + **orgánová dysfunkce** ?

HEMOFAGOCYTÁRNÍ LYMFHISTIOCYTÓZA (HLH)

postižení/infiltrace plic (biopsie)

postižení/infiltrace kostní dřeně (biopsie)

polyserozitida

FHL2: PRF1/perforin homozygot



DIABETICKÁ
KETOACIDÓZA

TYROIDNÍ
BOUŘE/MYXEDEMÓVÉ KOMA

ADRENÁLNÍ
INSUFICIENCE

HEAT
STROKE

PANKREATITIDA

ANAFYLAXE



INTESTINÁLNÍ
ISCHEMIE

PLICNÍ EMBOLIE



CAPILLARY LEAK
SYNDROME

KATASTROFICKÝ
ANTIFOSFOLIPIDOVÝ SYNDROM

STILLOVA CHOROBA
DOSPĚLÝCH

HLH/MAS



SLE

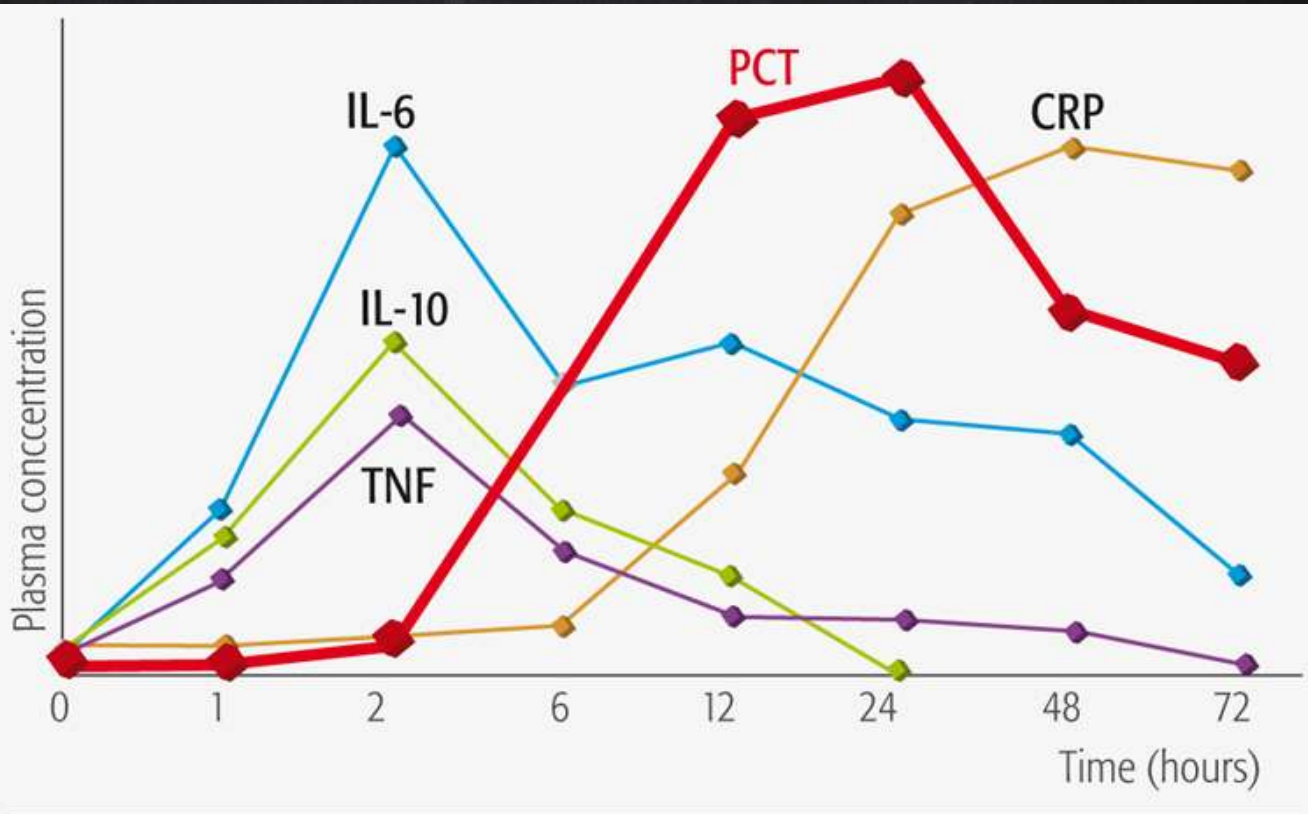
TTP/TMA

DIFERENCIAČNÍ (ATRA)
SYNDROM

ENGRAFTMENT
SYNDROME/PERDS



POMŮŽE NÁM PROKALCITONIN?



Kinetic profiles of different biomarkers of bacterial infection.

Adapted from Meisner M.¹



POMŮŽE NÁM **PROKALCITONIN**?

Examples of possible causes of elevated serum procalcitonin

Severe localized or systemic bacterial infection

- Bacterial pneumonia
- Bacterial sepsis
- Bacterial meningitis
- Bacterial peritonitis

Other infections

- Malaria
- Certain fungal infections (candidiasis, aspergillosis)

Severe physiologic stress (even in the absence of sepsis)

- Major cardiothoracic or abdominal surgery
- Cardiogenic shock
- Bowel ischemia
- Mechanical trauma
- Severe burns
- Acute multiorgan failure
- Heat stroke
- Pancreatitis
- Untreated end-stage renal disease

Malignancy

- Medullary thyroid cancer
- Non-small cell lung cancer

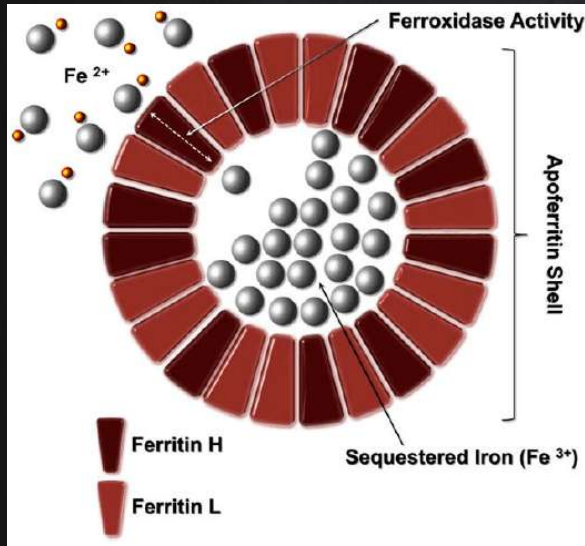
Immunoassay test interference

- Monoclonal and polyclonal antibody drugs

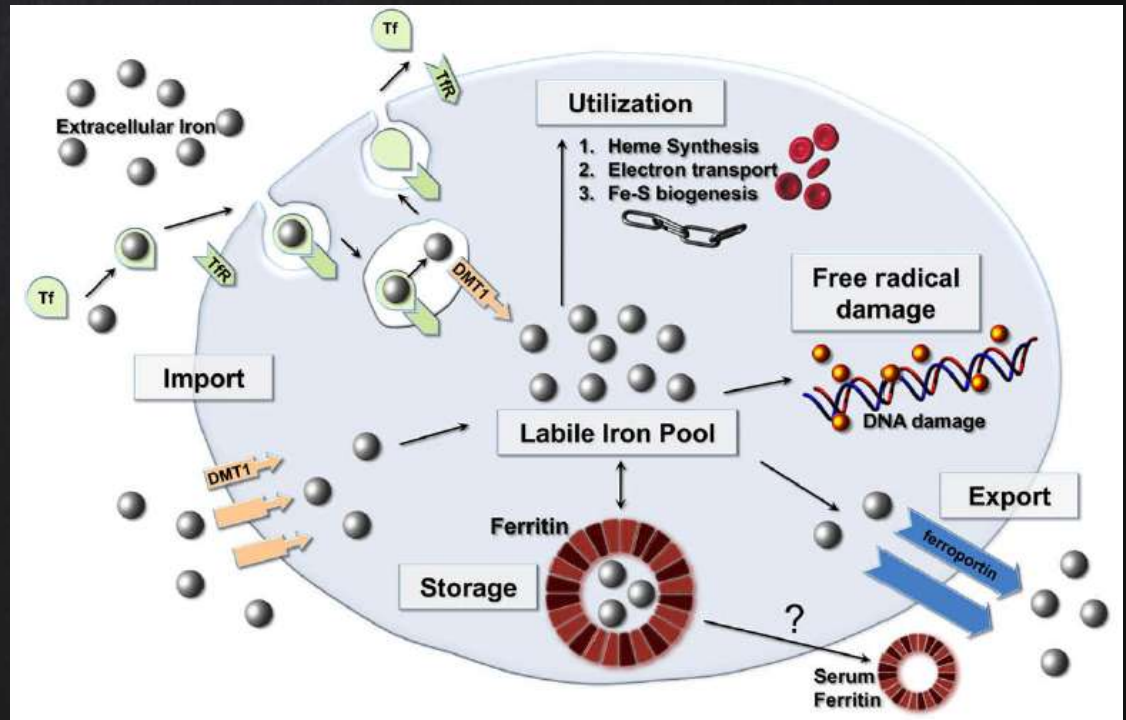


POMŮŽE NÁM FERITIN?

- 50 – 300µg/l
- + saturace transferinu



M.A. Knovich et al./Blood Reviews 23 (2009) 95–104





POMŮŽE NÁM FERITIN?

- HLH/MAS
- *Stillova choroba dospělých*
- SLE



POMŮŽE NÁM **FERITIN**?

- HLH/MAS
- Stillova choroba dospělých
- SLE



Diagnosis of hyperferritinemia in routine clinical practice

Presse Med. 2017; 46: e329-e338

Bernard Lorcerie, Sylvain Audia, Maxime Samson, Aurélie Millière, Nicolas Falvo, Vanessa Leguy-Seguin, Sabine Berthier, Bernard Bonnotte

Causes of hyperferritinemia

With iron overload	Without iron overload
Hemochromatosis (HFE-1 and the others)	Inflammatory syndrome
Mutation of the gene encoding ferroportin	Cytolysis (liver, muscle)
Aceruloplasminemia	Cancer and hemopathies
Compensated dyserythropoiesis	Chronic alcoholism
Repeated transfusion	Metabolic syndrome
Chronic liver diseases	Hyperthyroidism, diabetes
Porphyria cutanea tarda	Gaucher disease
Metabolic syndrome	Macrophage activation syndrome
Excess iron intake or infusions (patients with chronic dialysis and high-level athletes)	Still disease t-ferritin, with or without cataracts



POMŮŽE NÁM **FERITIN**?

- HLH/MAS
- Stillova choroba dospělých
- SLE

+ sepse/septický šok



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Without iron overload

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Gaucher disease

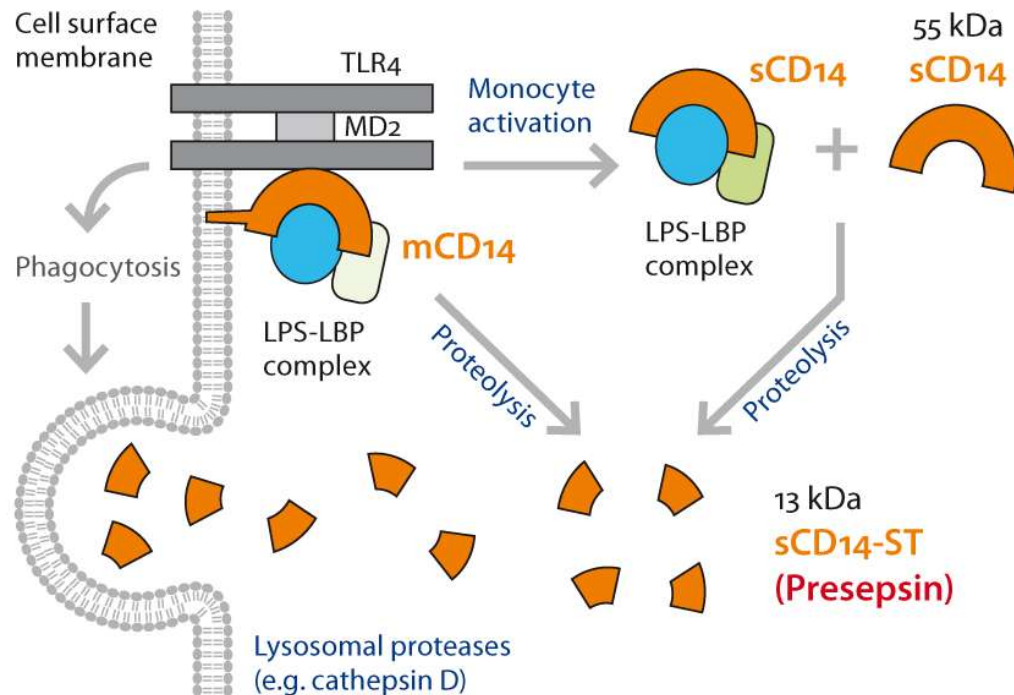
Macrophage activation
syndrome

Still disease
L-ferritin, with or
without cataracts



POMŮŽE NÁM PRESEPSIN?

Hypothetical mechanism of Presepsin secretion



mCD14: membrane CD14; sCD14: soluble CD14; sCD14-ST: soluble CD14 subtype (=Presepsin); LPS: lipopolysaccharide; PG: polyglycan, LBP: lipopolysaccharide binding protein, TLR4: toll-like receptor 4; MD2: Co-Protein of TLR4.



POMŮŽE NÁM PRESEPSIN?

Hypothetical mechanism of Presepsin secretion

Original Article

Clinical significance of plasma presepsin levels in patients with systemic lupus erythematosus

Shun Tanimura, Yuichiro Fujieda, Michihiro Kono, Yuhei Shibata, Ryo Hisada, Eri Sugawara, ...show all
Pages 1-7 | Received 04 Aug 2017, Accepted 17 Nov 2017, Published online: 14 Dec 2017



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Modern Rheumatology

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Phagocytosis

LPS-LBP

mCD14

complex

Diagnostic and prognostic value of presepsin vs. established biomarkers in critically ill patients with sepsis or systemic inflammatory response syndrome

Helena Brodska / Jiri Valenta / Kveta Pelinkova / Zdenek Stach / Robert Sachl / Martin Balik / Tomas Zima / Tomas Drabek

Published Online: 2017-11-25 | DOI: <https://doi.org/10.1515/cclm-2017-0839>



Clinical Chemistry and Laboratory Medicine (CCLM)

Published in Association with the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM)

Lysosomal proteases (e.g. cathepsin D)

mCD14: membrane CD14; sCD14: soluble CD14; sCD14-ST: soluble CD14 subtype (=Presepsin); LPS: lipopolysaccharide; PG: polyglycan, LBP: lipopolysaccharide binding protein, TLR4: toll-like receptor 4; MD2: Co-Protein of TLR4.





FOLLOW
YOUR
INSTINCTS



- sepsis...je „medical emergency“...
- ...stejně jako jiné nozologické jednotky, které ji svým „fenotypem“ připomínají...





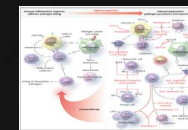
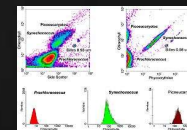
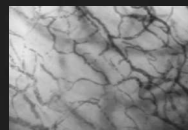
- ...na „chobotnice“ můžeme myslet vždy...
- ...zejména za specifických okolností a při atypickém průběhu...
- důvodné klinické podezření na rozvoj sepse opravňuje k aktivním krokům vedoucím ke kauzální a podpůrné léčbě bez ohledu na naplnění jejich kritérií a definic (Matějovič 2017)







...děkuji za pozornost



Program rozvoje vědních oborů Univerzity Karlovy PROGRES – projekt Q39
Projekt institucionálního výzkumu MZČR – FNPL 00669806