Sepsis course – VI: Surviving Sepsis Campaign

Zsolt Molnár

University of Szeged

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Question of the ‘90s

Friedman G, Silva E, Vincent JL:

Has the mortality of septic shock changed with time?

Crit Care Med 1998; 26: 2078-86

Surviving Sepsis Campaign – 2008

Dellinger RP et al. *Intensive Care Med* 2008; 34: 17-60

Grades of Recommendation, Assessment, Development and Evaluation (GRADE)

Dellinger RP et al. *Intensive Care Med* 2008; 34: 17-60

- Quality of evidence:
  - A: high (RCT)
  - B: moderate (small RCT, excellent observational study)
  - C: low (observational study)
  - D: very low (case series or expert opinion)
- Strength of recommendation:
  - 1: strong „recommend”
  - 2: weak „suggest”

Resuscitation and infection

- EGDT
  - CVP:8-12, MAP>65, UO>0.5ml/kg/h, $ScvO_2$>70% (1C)
  - Christalloid or colloid (1B)
- Diagnosis
  - 2 or more blood cultures (1C)
  - Immediate radiology (1C)
- Antibiotic treatment
  - <1 h in severe sepsis (1D), septic shock (1B)
  - Broad spectrum AB (1B)
  - De-escalation (2D)
  - Stop AB immediately if there is no infection (1D)

Hemodynamics

- Vasopressors, inotropes
  - First choice: noradrenalin v. dopamin (1C)
  - Adrenalin, phenylephrin, vazopresszin: not recommended (2C)
  - „Renal dose dopamine”: No (1A)
  - IABP (1D)
  - First choice inotrope: dobutamine (1C)
- Blood products
  - Don’t give: erythropoietin (1B), FFP if there’s no bleeding (2D), antithrombin (1B)
  - Give platelets: <5000/mm^3, 5000-30000 vérzési rizikó esetén, <50000 műtétekhez (2D)

Adjuvant and supportive care

- Activated protein C (rhAPC)
  - PROWESS (n=1690)
    - 6.1 % reduction in mortality
    - 19.4 % relative risk reduction
    - NNT = 16
  - ADDRESS (n=2613)
    - 1.5 % higher mortality in the APC group
    - Postop + 1 organ failure: 6.6 % higher mortality
  - ENHANCE (n=2378)
    - Give early
  - Recommendation:
    - Sepsis + high risk (APACHE II>25, MOF): „suggest" (2B, 2C postop)
    - Severe sepsis + small risk (APACHE II<20, 1 organ failure): not recommended (1A)

Adjuvant and supportive care

- Glucose control
  - i.v. inzulin (1B)
  - „Sliding scale” target: 8.3 mmol/l (2C)
  - *Brunkhorst FM, et al: NEJM 2008; 358:125-139*
  - *Finfer S, et al: NICE-Sugar Study NEJM 2009; 360: 1283-97*

- Steroids
  - Therapy resistant hypotension (2C)
  - *Sprung CL, et al: NEJM 2008; 358: 111-124*

- And many more… (85 all together)

Evidence and outcome

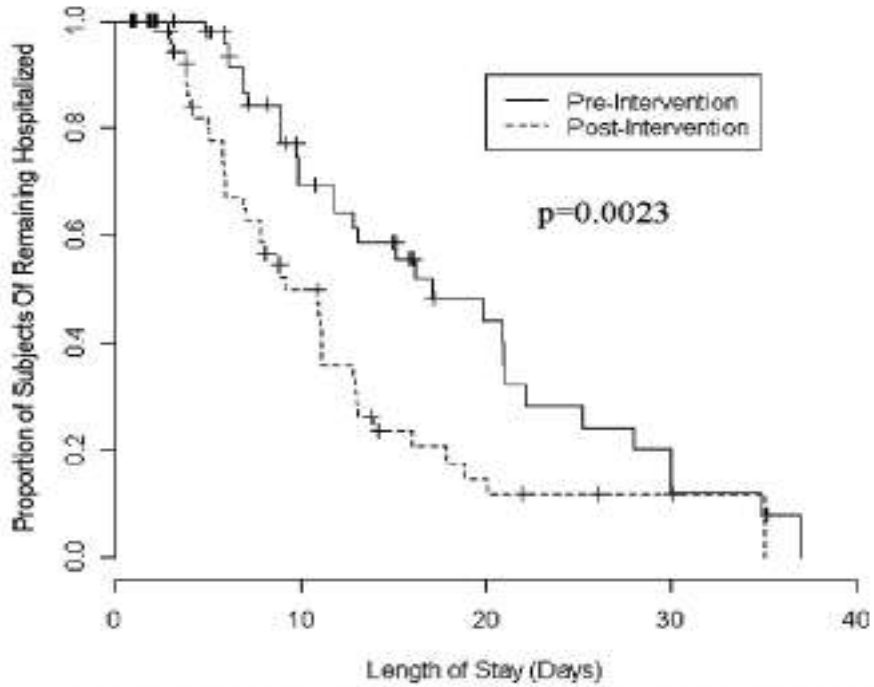
Economic implications of an evidence-based sepsis protocol: Can we improve outcome and lower cost?

Shorr AF et al. *Crit Care Med* 2007; 35: 1257

- Methods
  - Retrospective *post-hoc* analysis
  - Pre-protocol: 2004-2005 (n=60)
  - Protocol: 2005-2006 (n=60)
    - Surviving Sepsis Campaign:
      - Early AB
      - EGDT
      - Vasopressor/inotrope
      - Transzfusion
      - rhAPC
      - Corticosteroids

Economic implications of an evidence-based sepsis protocol: Can we improve outcome and lower cost?

Shorr AF et al. *Crit Care Med* 2007; 35: 1257



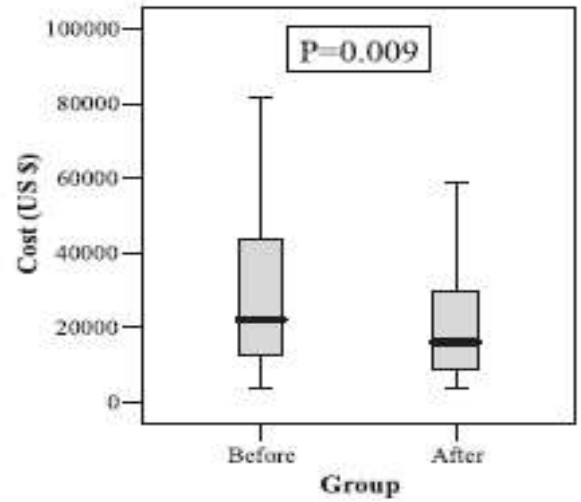


Figure 3. Kaplan-Meier plot showing proportion of patients hospitalized over time before and after implementation of the protocol.

Mortality: 48 vs. 30% (p=0.04)


ATI
SZTE
Department of Anaesthesiology and Intensive Therapy Szeged

Finance

Cost

USA

- 1995 (n=192 980)
  - Mortality: 28.6%
  - LOS: 19.6 nap
  - Cost (S): 22 100 $
  - Cost (NS): 25 900 $
- 2005 (n=60)
  - APACHE II: 22.5 ± 8.3
  - Mortality: 48.3%
  - Cost: 21.985 $

Angus DC et al. *Crit Care Med* 2001; 29: 1303-1310
Shorr AF et al. *Crit Care Med* 2007; 35: 1257

Hungary (Pécs)

- 2006 (n=44)
  - SAPS II: 46.4
  - Mortality: 34%
  - LOS: 15.8 nap
  - Income: 5 170 $
  - Expense: 16 230 $
- Summary
  - >5000 $
  - Reason: salary, numbers?

PTE, AITI: „Trauma”-ICU 2006.01-2006.10.
(Csontos Cs, Varga Sz)

Személyi feltételek és a túlélés

Influence of the number of nurses on survival in MSOF

Mikor A, et al. *Crit Care* 2008; 12: S166

Year	No of patients on ICU	No of patients with MSOF	Age	Sex (M/F)	SAPS II	ICU LOS	Mortality of all patients on ICU	Mortality of MSOF	No of nurses on the unit	Ratio of qualified nurses	Lowest nurse:patient ratio
2001	608	111	63 (21,87)	69/42	49 ± 24	6 (1,52)	22,5%	92,8%	14	57%	1:4
2002	557	69	59 (21,80)	44/25	45 ± 21	9 (1,58)	25,5%	89,9%	15	46%	1:4
2003	486	106	62 (18,85)	68/38	51 ± 22	5 (1,51)	30,6%	84%	16	56%	1:4
2004	489	85	59 (20,88)	63/22	48 ± 21	8 (1,48)	25,8%	75,3%*	31	55%	1:2
2005	536	78	60 (21,87)	37/41	51 ± 22	5 (1,61)	23,1%	65,4%*	30	59%	1:2
Total	2676	449	61 (18,88)	281/168	49 ± 22	7 (1,61)	25,3%	82,2%			

Data shown as median (min., max.) and mean ± standard deviation *: $p<0.05$ compared to 2001.

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	2001	2002	2003	2004	2005
Nővérlétszám	14	15	16	31	30
Nővér/beteg arány	1/4	1/4	1/3,5	1/2	½
Orvos (szakorvos)	1	1	2	2	2
Orvos (gyakornok)	1	1	1	2	2-3

Independent predictors of outcome

Prediktív változó	Beta	P
SAPS	-0,248	P< 0,001
Nővérszám	0,220	P< 0,001
Kor	-0,114	P= 0,021

Summary

- Severe sepsis – mortality can be reduced!
  - Think about it!
    - Adequate clinical and biochemical investgations
  - Prevention = early resuscitation
    - Oxygen + fluid + monitoring ($ScvO_2$)
  - Treatment:
    - ICU
- Sepsis
  - Less of a diagnosis…
  - …more of a concept

Motto

Diagnosis can wait, but cells can’t!

The question isn’t about
whether you’ve done the right thing,
but whether you’ve done everything to
do the right thing.