Necrotizing Soft Tissue Infections: Regionalization and Delays in Transfer

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Courtesy of American College of Surgeons Division of Education Clinical Congress 2015

SPECIAL ARTICLE

A National Evaluation of the Effect of Trauma-Center Care on Mortality

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Trauma Centers In The United States, 2012.

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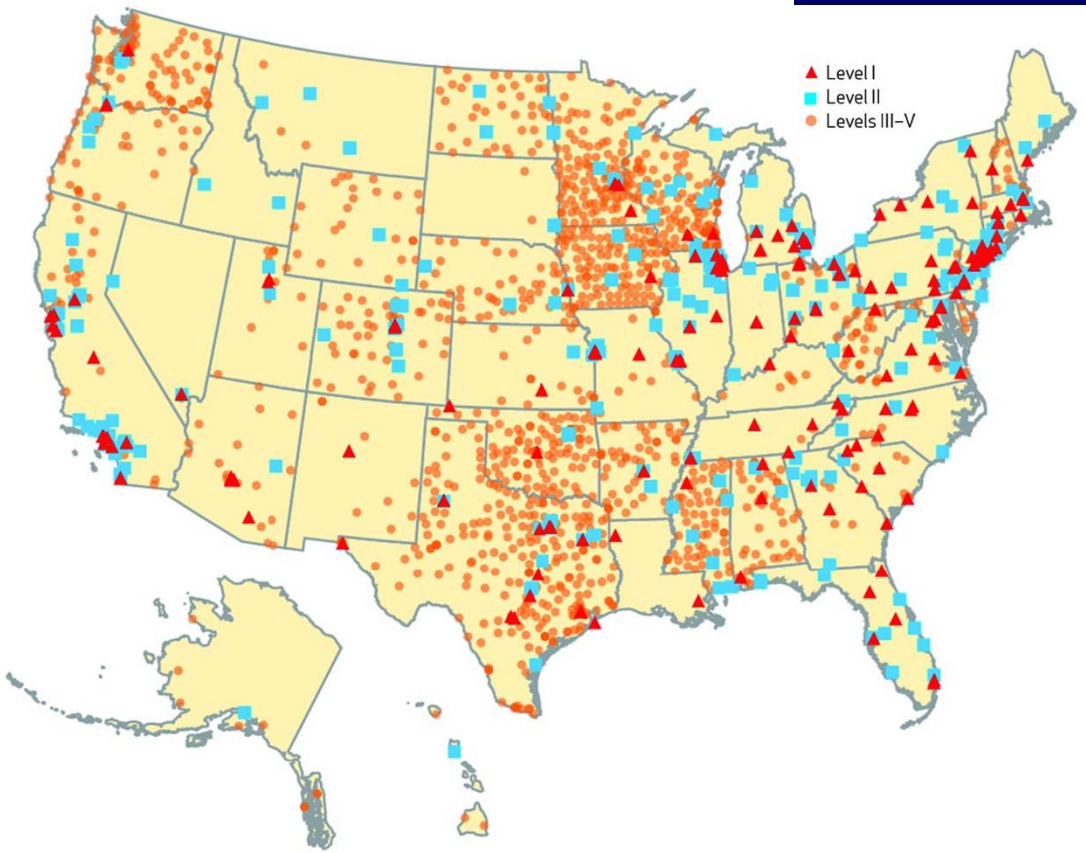

A. Brent Eastman et al. Health Aff 2013;32:2091-2098

HealthAffairs

Delays

- Diagnosis
- Treatment

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Delays in Diagnosis

- Rare diagnosis- lack of familiarity
- Perceived lack of access to means of diagnosis
  - Reluctance to perform cutdown

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Delays in Treatment

- When and where should the initial debridement take place?
- Is there a qualitative difference between a debridement at a primary receiving hospital vs a tertiary referral center?

Necrotizing Soft-Tissue Infections: Differences in Patients Treated at Burn Centers and Non-Burn Centers

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Endorf et al, J Burn Care Res 2008

- National Inpatient Sample
- All NSTI 2001-2004
- 10,940 patients
- 87% received definitive care at a non-burn center

Table 4. Outcomes of patients with necrotizing soft-tissue infections treated in burn and nonburn centers

	Burn Centers Mean (SD) or %	Nonburn Centers Mean (SD) or %	*P*
Length of stay (d)	22.1 (26.7)	16.0 (19.0)	<.0001
# Surgical procedures	4.6 (3.1)	4.3 (3.3)	<.0001
Hospital charges ($)	101,800 (122,000)	68,500 (91,300)	<.0001
Adjusted hospital charges ($)*	82,900	71,200	<.0001
Disposition			
Home	36.3	29.3	<.0001
Subacute care	25.5	28.0	.04
Mortality	13.8	10.5	.0005

* Adjusted for length of stay and number of surgical procedures.

Table 7. Adjusted risk of mortality in patients with necrotizing soft-tissue infections treated in burn and nonburn centers

Variable	Odds Ratio	Confidence Interval	*P*
Treatment location*	1.68	1.32–2.02	<.0001
Age	1.03	1.03–1.04	<.0001
Female gender	1.45	1.27–1.66	<.0001
Transfer status	1.28	1.07–1.54	.0067
Organ failure	6.65	5.78–7.66	<.0001
Payer status			
Medicare†	1.10	0.878–1.38	.155
Medicaid	1.25	1.03–1.51	
Self-pay/other	1.11	0.854–1.44	

* Reference = nonburn center.

† Reference = commercial status.

Outcomes from treatment of necrotizing soft-tissue infections: results from the National Surgical Quality Improvement Program database

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Mills et al, Am J Surg 2010

- NSQIP Registry
- NSTI 2005-2008
- 688 patients
- Overall mortality 12%, mean LOS 18 d

Table 5 Logistic regression for individual variables affecting mortality in NSTI patients

Variable	Odds ratio	95% CI	*P* value
Age (in 5-year increments starting at age 18)	1.26	1.1–1.4	<0.001
Direct admission	0.51	0.3–0.8	0.005
Cancer	5.0	2.2–11.3	<0.001
Renal disease	3.1	1.9–5.1	<0.001
Neurologic disease	3.3	2.0–5.2	<0.001
Any sepsis	2.4	1.1–5.3	0.033
Liver disease	3.6	1.6–7.8	0.001
Respiratory disease	3.3	2.1–5.3	<0.001
Dyspnea	2.5	1.5–4.0	<0.001
Emergency surgery	1.6	1.0–2.7	0.048

Society of University Surgeons

Transfer status: A risk factor for mortality in patients with necrotizing fasciitis

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Holena et al, Surgery 2011

- Retrospective analysis National Inpatient Sample
- NSTI 2000-2006
- 9,958 patients
- Compared outcomes after debridement at presenting facility vs after transfer

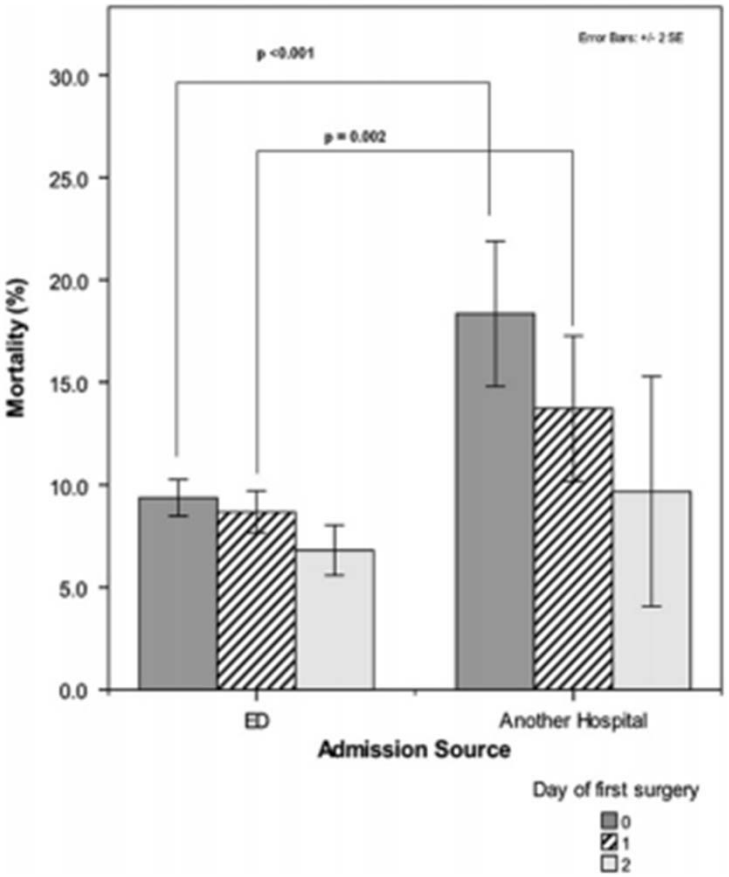

Fig 1. Mortality rates by day of operation and admission source (*0*, Operated on within 24 h of admission; *1*, operated on 24–48 h after admission; *2*, operated on 48–72 h after admission).

In and Post-Hospital Resource Utilization

- According to NIS ~20% of patients will undergo operative closure
  - Amputations are rare (<5%)
- Mills et al – 80% SIRS spectrum, 26% septic shock
- Harborview – NSTI survivors have significantly decreased HRQOL as measured by SF-36

Courtesy of American College of Surgeons Division of Education
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Conclusion

- Transfer should take place after initial debridement
- Optimal criteria for transfer of NSTI have not been established
- Patients treated at burn centers are more likely to be transfers, have longer lengths of stay, and have more operations
- Many patients will require critical care early in the disease process, and the coordination of surgical, nursing, and rehabilitative therapy services during the recovery process
- While resource considerations would seem to drive referral of these patients, the vast majority are cared for in non burn centers

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