Microbiology of Necrotizing Fasciitis and Implications on Antimicrobial Stewardship

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Background

- Necrotizing fasciitis (NF) is a relatively uncommon but deadly soft tissue infection
- Current recommendations are to initiate broad-spectrum antibiotics for empiric treatment against anaerobes, gram negative, and resistant gram-positive organisms[1]

Objectives

- To evaluate the microbiology and empiric therapy of NF in our institution
- To evaluate if broad spectrum antibiotics that cover *Pseudomonas aeruginosa* (PSA) or methicillin resistant *Staphylococcus aureus* (MRSA) are necessary for NF

Methods

- Retrospective chart review from January 2016 to May 2020
- All patients with suspected NF included in the study. Patients further divided into surgically confirmed cases of NF

Results

- Sixty-five suspected cases of NF with 25 cases of confirmed NF identified in 22 patients
- Of these cases, 60 (92.3%) received clindamycin, 59 (90.7%) received anti-PSA, and 59 (90.7%) received vancomycin empirically
- All cases of confirmed NF received both an anti-pseudomonal agent and clindamycin for empiric therapy. One patient (4.5%) did not receive empiric vancomycin.
- There were no cases with in-hospital mortality in the NF confirmed group

Results (continued)

Clinical Features	
Age, years (IQR)	54.5 (37-59.75)
Male gender, n (%)	15 (60%)
Laboratory Risk indicator for Necrotizing Fasciitis[2] (IQR)	15 (9-31.25)
C-reactive Protein, mg/L (IQR)	321.6 (258.9-37.63)
White Blood Cell, 10^9 cells/L (IQR)	17.5 (13.48-25.2)
Hemoglobin, g/dL (IQR)	10.8(9.2-13.0)
Sodium mEq/L (IQR)	129 (126.3-132.5)
Creatinine, mg/dL (IQR)	1.15(0.73-1.6)
Glucose, mg/dL (IQR)	306(136-409)
≥ 2/4 severe inflammatory response syndrome criteria, n (%)	15 (71.43%)
Maximum temperature in first 24 hours of admission (IQR)	37.4(36.9-38.5)
Heart Rate (IQR)	113(109-128.5)
Systolic Blood Pressure (IQR)	106(87.5-129.8)
Respiratory Rate (IQR)	22(20-25)
Length of stay, days (IQR)	14(9-31.3)
Planned duration of antibiotics, days (IQR)	21(16-41)
Number of surgeries (IQR)	1.5(1-2.75)
Location of NF	
Lower extremity, n (%)	13 (52%)
Upper extremities, n (%)	4 (16%)
Perineum, n (%)	7 (28%)
Abdomen, n (%)	2 (8%)
Amputation, n (%)	8 (32%)

Table 1. Clinical features and outcomes of patients with NF

Results (continued)

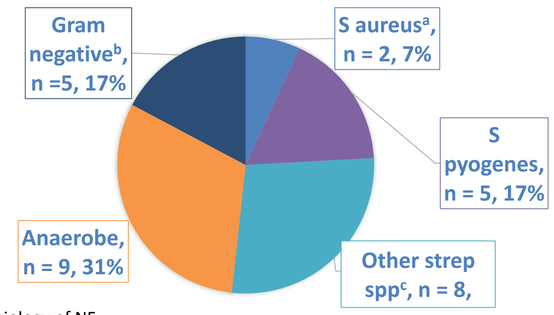

Figure 1. Microbiology of NF

[a] All isolates of S aureus were methicillin resistant

[b] Gram negatives isolated: 2 *K pneumoniae*, 2 *E aerogenes*, 1 *E coli.* No cases of extended spectrum beta lactmase gram negatives nor PSA were isolated

[c] Other strep spp: 6 *S agalactiae*, 3 viridans group streptococcus, 1 beta hemolytic group C strep

Conclusions

- Empiric anti-PSA therapy and coverage for resistant gram-negative bacteria may not be necessary for treatment of NF
- There appears to be very low need for empiric coverage of MRSA in NF. More monitoring for the role of MRSA in causing NF should be prospectively done
- NF is an attractive area for antimicrobial stewardship, to decrease anti-pseudomonal and anti-MRSA antibiotic utilization
- Human studies need to be done to evaluate the benefit of clindamycin, the evidence for benefit of which is unclear

References

1. Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. Clin Infect Dis. 2014;59(2):e10-52. Stevens DL, Bisno AL, Chambers HF, et al.
2. Wong CH, Khin LW, Heng KS, et al. The LRINEC (Laboratory Risk Indicator forNecrotizing Fasciitis) score: a tool for distinguishing necrotizing fasciitis fromother soft tissue infections. Crit Care Med. 2004;32:1535–41.