Necrotizing Soft Tissue Infections

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Who is at Risk

- This can happen to anyone!!!!!!!!!
- Most cases are seen in the immune compromised: HIV, Etoh, DM,Ca and transplant.
- Young athletes the newest group
- Incomplete or under treatment of serious infection.

What is NSTI

- Infection that spreads along tissue plains affecting anatomical structures: skin,fat and muscle.
- Toxins produced by the bacteria thrombose even large vessels ahead of the infection.
- CDC reports > 1500 new cases yearly

History

- 1883 Fournier described penile and scrotal gangrene.
- 1924 Meleney isolated pure hemolytic streptococci in a patient with Fournier's.
- Cullen first described post operative bacterial synergistic gangrene following a appendectomy in 1925.

History

- Necrotizing Fasciitis was first described in 1948.
- Clostridia first cultures in deep tissue infection, 1952.
- Hemolytic staphylococcus aureus linked to the “Flesh Eating Bacteria” 1988.
- MRSA the bacteria of the millennium.

Etiology

- Hypoxia to tissue.
- Decrease in cellular metabolism, defense reduction of membrane.
- Decrease leukocyte function.
- Localized tissue trauma.
- Reduced host defense.

Classification

- Type of microorganism.
- Type of tissue involved.
- Therapy required.
- Rate of progression.
- Initial findings at presentation: bullae, pain and gas.

Diagnosis

- HIGH INDEX OF SUSPICION !!!!!!!
- Poor condition of patient.
- Absence of the usual signs of tissue inflammation.
- Fever and elevated WBC out of proportion to wound.

Diagnostic Aids

- Gram Stain of deep tissue.
- Plain radiographs looking for gas or sub-Q air.
- CT scan
- Culture using deep tissue, not swab.
- Operating Room: debridement

Necrotizing Fasciitis

Incubation	1- 4 days
Onset	Acute
Toxicity	2+
Pain	Moderate to severe
Exudate	Perfuse serosang
Odor	None initially
Gas	None initially

Clinical Presentations

- Necrotizing Fasciitis
- Necrotizing Cellulitis
- Myonecrosis

Necrotizing Fasciitis

Muscle	Viable
Skin	Cellulitic
Mortality	> 35 %

- Bacteria usually aerobic strep and staph with anaerobic symbiosis +/_ bacteroids and rarely clostridia, e-coli.

Necrotizing Cellulitis

Incubation	1-2 days
Onset	Acute
Toxicity	3+
Pain	Out of proportion
Exudate	“dirty dish water”
Odor	“wet rodent”, foul
Gas	Present

Myonecrosis

Incubation	1-3days.
Onset	Semi- acute
Toxicity	1+
Pain	Severe
Functional loss	Acute
Exudate	None
Odor	None

Necrotizing Cellulitis

Muscle	Involved: “cooked”
Skin	Cellulitis and gangrene
Mortality	> 75%

Myonecrosis

Gas	Usually present ****
Muscle	Dead anatomic groups
Skin	Intact
Mortality	> 35%
Morbidity	> 60% high amp rate

Treatment

- The Gold Standard for almost forever was:
- Surgery: wide and extensive debridement to viable tissue, reoperation anticipated.
- Antibiotics: broad coverage for aerobic and anaerobic bacteria
- MRSA is public enemy #1 and is presumed present and treated.

The Ohio State Experience

- 225 patients from 1999- 2008
- Ages 22 – 82 yo
- > 50% DM
- 25% documented immunocompromised
- 20% misdiagnosed
- Mortality depended on time of diagnosis and treatment.

Treatment 2010

- All major medical and surgical texts: "Some authors suggest that Hyperbaric Oxygen treatment may have some benefit, but it remains controversial." Or, "It is cumbersome and may delay life saving surgery."
- This is not what we do at OSU !!!

Group 1

- Patients transferred to OSU after diagnosis and treatment done at another institution.
- Average delay in transfer 3-5 days
- Number of surgical debridement >3
- All started on broad spectrum antibiotics
- All need redebridement upon arrival at OSU
- Mortality despite HBO > 75%

Group 2

- Patients transferred for other facilities within 24hrs of diagnosis.
- No treatments done before arrival at OSU except appropriate antibiotics.
- Upon arrival: surgical debridement, HBO, 2nd look surgery and HBO bid until symptoms and cultures negative.
- Mortality < 15%

Why Hyperbarics

- HBO is the placement of a patient in a closed acrylic tube, pressurized > 1ATA with 100% oxygen.
- It is bacterialcidal
- It increases WBC activity
- It neutralizes toxins
- It causes angiogenisis.

Group 3

- All cases seen at OSU and diagnosed in < 12hrs.
- All cases treated by protocol: antibiotics, surgery and HBO (critical care as needed)
- Mortality < 5%

Surgery

- Role #1 create decompression fasciotomies
- Role #2 debride only obviously dead tissue
- Role#3 2nd and 3rd looks after HBO day 1 mandatory
- Role #4 amputation is procedure of last resort.


Initials JL MR# 040240
Date 4-7-04 Wound# 1
Location Left Leg
NATIONAL HEALING CORPORATION


Initials SS
MR# 080431
Date 4-23-08
Wound # 1
Location R. GROIN
Medical Center
National Healing

Conclusion

- Always suspect the worst case scenario
- Treatment is a three headed monster; massive antibiotics, surgery and HBO
- If you do not have direct access to HBO , find the nearest center and get your patient there ASAP.
- Mortality is care dependant.