

Morbidity and Mortality in Necrotizing Soft Tissue Infections (NSTIs): Hyperbaric Oxygen Versus Standard Therapy in Two Urban Hospitals

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Introduction

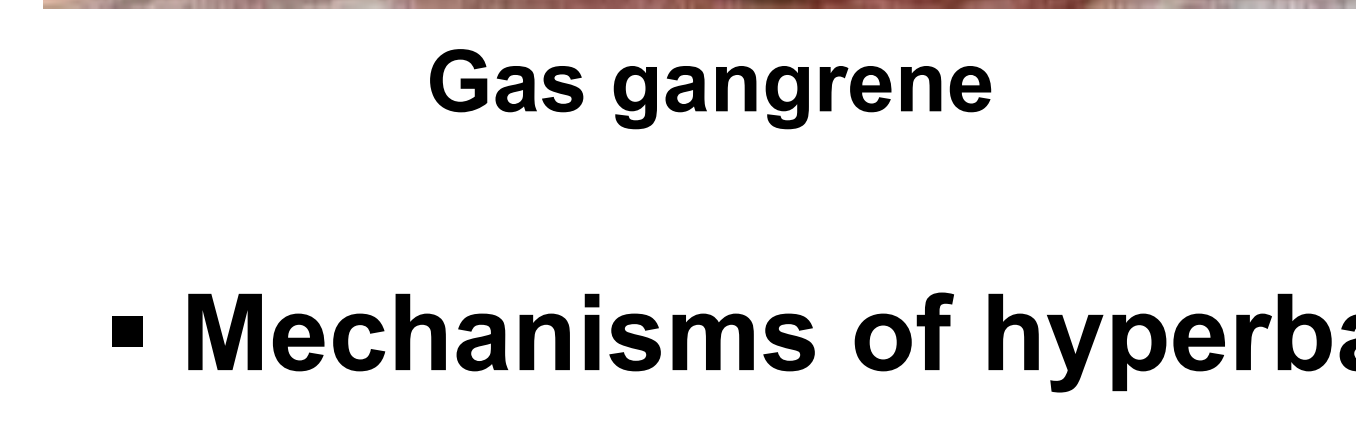
- **Necrotizing Soft Tissue Infections**
 - Necrotizing Fasciitis
 - Gas Gangrene
 - Fournier's Gangrene
- **Prior research examined separately**
 - Mostly case reports/series, no RCTs, largest N<200
 - Relatively rare, time-dependent, emergent condition
 - Similar pathophysiology between all of above
 - Research now groups as NSTI
- **Time sensitive to interventions**
 - Rapidity of tissue destruction
 - Progression to sepsis
 - Multi-system organ failure
 - 9-39% mortality depending on study, institution
- **Standard therapy**
 - Surgical debridement
 - Antibiotics
 - Intensive peri-operative care
- **Adjunctive hyperbaric oxygen (HBO)**
 - Improved mortality outcomes
- **Meta-analysis of statistically significant studies**
 - Odds ratio of 2.29 (1.44-6.92) survival with HBO
- **National Inpatient Sample study (N=45,913)**
 - Odds ratio of 2.24 (1.39-3.59) survival with HBO



Necrotizing fasciitis

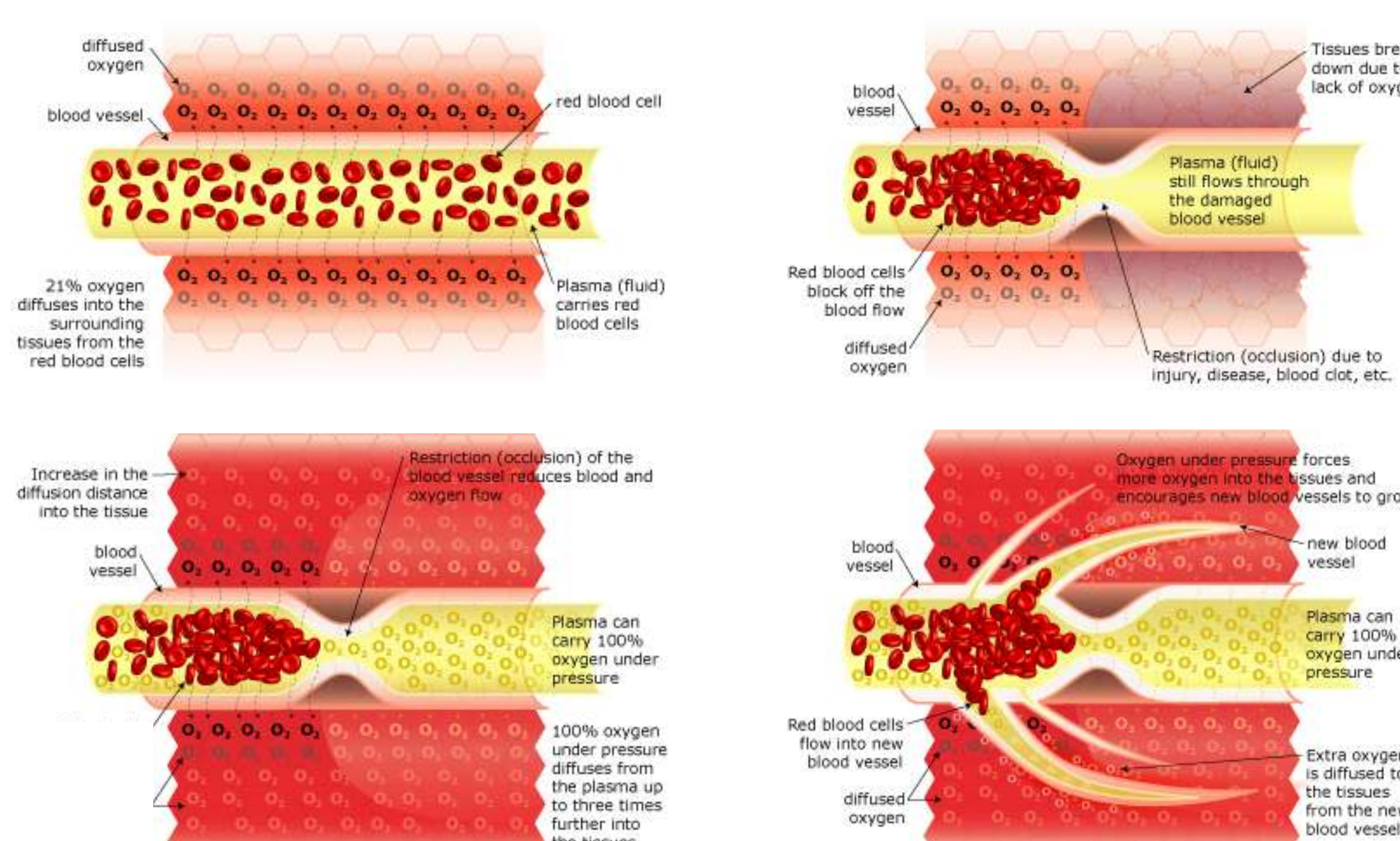


Fournier's Gangrene



Gas gangrene

- **Mechanisms of hyperbaric oxygen (HBO)**
- Improves tissue oxygenation
- Inhibits bacterial reproduction and toxin production
- Reduces local inflammatory response and edema
- Stimulates development of new blood vessels
- Increased fibroblast activity and collagen synthesis



Study in Progress

- **Q1:** Do patients with NSTI who receive standard therapy and adjuvant HBO have a lower odds of inpatient mortality than those who receive standard therapy alone?
- **Q2:** Do patients with NSTI who receive standard therapy and adjunctive HBO differ in the number of debridements received, the length of time spent in the ICU, and the overall length of inpatient stay from those who receive standard therapy alone?
- **Two-center, retrospective, case-control study**
 - NSTI patients from 2001-2011
 - Regions Hospital: 220 patients
 - Hennepin County Medical Center: 274 patients
- **Chart abstraction**
 - Demographics
 - Risk factors (Immunosuppression, diabetes, vascular d/z)
 - Vital signs and laboratory parameters
 - Illness severity
 - Antibiotic, surgical and HBO treatments
 - Length of stay (inpatient and ICU)
 - Inpatient death

Planned Analysis

- Descriptive statistics and comparison between groups
- Wilcoxon two sample test for continuous variables
- Fisher exact test for categorical variables
- Multivariate logistical regression
- Adjusted odds ratios for survival/mortality