Predictors for Wound Infection After Deformity Correction Surgery in Neuromuscular Scoliosis

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Introduction

• Neuromuscular is a subset of patients with early onset scoliosis resulting in compromised quality of life measures.

• Complications are more prevalent in neuromuscular (NMS) versus idiopathic scoliosis correction surgery.

• The main objective of this study is to elucidate risk factors in NMS with a focus on surgical site infection after deformity correction surgery.
Methods

• A retrospective review was performed of all patients treated surgically for NMS from January of 2008 to December 2016 with a minimum of 6-months follow-up

• Demographics, pre-op to last follow-up radiographic parameters, time to presentation of infection (TPP), primary pathogens involved, associated risk factors, and necessary details regarding wound infection were recorded.
Results

• 102 patients, 53 males and 49 females with a mean age of 14.0 years (2.7±SD), follow-up was 2.53 months (SD±1.66)

• 14.7% of patients developed wound infection; 100% were deep wound infections and mean time to presentation was 2.14 months (SD±4.95)

• Increase in body weight, lumbar lordosis, pulmonary comorbidity, myelomeningocele repair, seizures, and previous operations were significant predictor identified.
Results

- Primary offending pathogens were E-Coli (40%), Proteus Mirabilis (33%), Pseudomonas aeruginosa (26%), Enterococcus Faecalis (26%), Klebsiella Pneumoniae/Oxytoca (20%), and/or less common pathogen were Serratia Marcescens (13%), MRSA (13%), and Staphyloccoccus Aureus (13%).

- 60% were gram negatives, 20% were gram positives, and 20% were inflicted to both types.

- 100% of patients underwent wound washout + topical antibiotics (Vanc+Tobra) and were treated with IV antibiotics followed by the oral antibiotics.
Wound Infection Presentation Based on Types of Bacterial Flora

- **Gram negative (multiple organisms)**: Time to presentation in days
- **Gram negative (single organism)**
- **Polymicrobial (mixed flora)**
- **Gram positive (single organism)**

The graph shows an increase in time to presentation with different types of bacterial flora.
Surgical Site Infection Treatment Algorithm In NMS

**Superficial**
- **Wound Erythema**
  - Observe (keep area sterile)
  - Continue follow up in clinic until healed
- **Minor Crusting Of Wound Margins**
  - Culture with gram positive pathogens
  - Oral Antibiotics 4-6 weeks (wound cultures optional)
- **Supra-fascial Collection**
  - Wound Washout with topical antibiotics (Vancomycin + Tobramycin) followed by IV antibiotics 6-12 weeks followed by oral long term antibiotics per ID recs
  - Continue IV Antibiotics for longer duration in case of persistent infection/cultures are positive per infectious disease recs

**Deep/Wound Dehiscence**
- **Sub-fascial Collection**
  - Cultures (Gram negatives +/- gram negatives)
  - Wound Washout with topical antibiotics (Vancomycin + Tobramycin) followed by IV antibiotics 6-12 weeks followed by oral long term antibiotics per ID recs and removal of hardware is preferable
  - Continue IV Antibiotics for longer duration in case of persistent infection/cultures are positive per infectious disease recs
- **Sub-fascial Collection With Multiple Washouts**
  - Cultures (Gram negative + mixed flora)
  - Removal of hardware followed by wound Washout with topical antibiotics (Vancomycin + Tobramycin) followed by IV antibiotics 6-12 weeks followed by oral long term antibiotics per ID recs and removal of hardware
  - Continue IV Antibiotics for longer duration in case of persistent infection/cultures are positive per infectious disease recs

Continue follow up in clinic until healed
Conclusions

- 100% of infections were deep; gram negatives were the primary pathogens and presented early after an initial correction surgery.

- For subfascial/deep infections, removal of hardware + topical antibiotics (Vancomycin+Tobramycin) have been recommended.

- All deep infections required wound washout followed by the use of IV antibiotics and long term oral antibiotics until complete healing is ensured.