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Can We Save the Implant: Rib-based Implant Removal Rates and Risk Factors Following Irrigation and Debridement Surgery (I&D)?

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Disclosures

- **Patrick J. Cahill**
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- **All other authors have nothing to disclose**

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Rib-based Implant Wound Complications

- **Infection common**
  - Ranging from 10% to 32%
- **Multiple procedures to manage spinal deformity**
  - Increases risk of infection
- **Lack of consensus regarding implant management**
  - Remove implant at initial presence of infection vs multiple I&D

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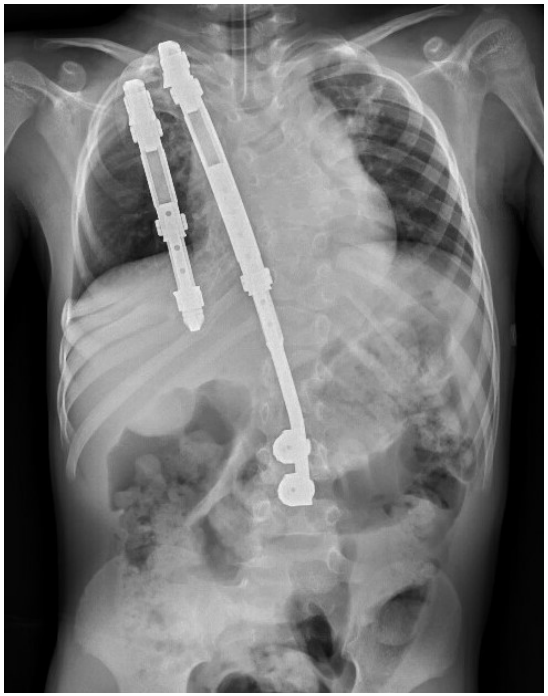
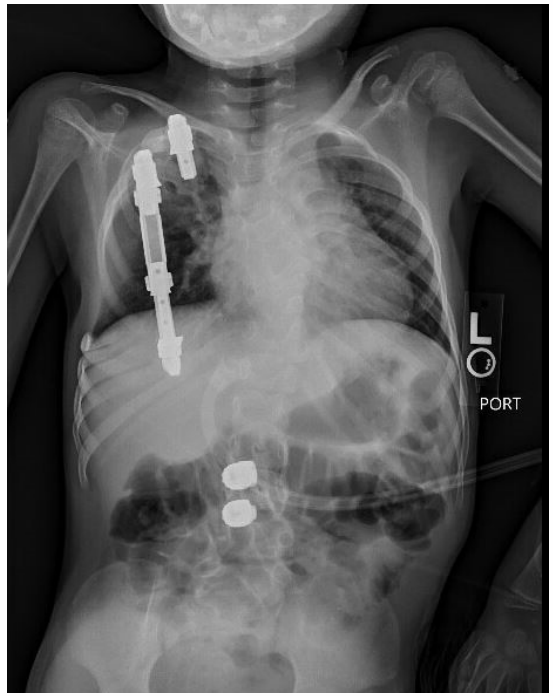
What are the predictive factors for implant removal?





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Methods

- Retrospective review
  - EOS patients at a single institution
- Patients with an infection requiring an I&D
- Rib-based VEPTR instrumentation
- 2 year follow up
- Inclusion in multivariate analysis dependent on significant ($p<0.1$) in univariate analysis

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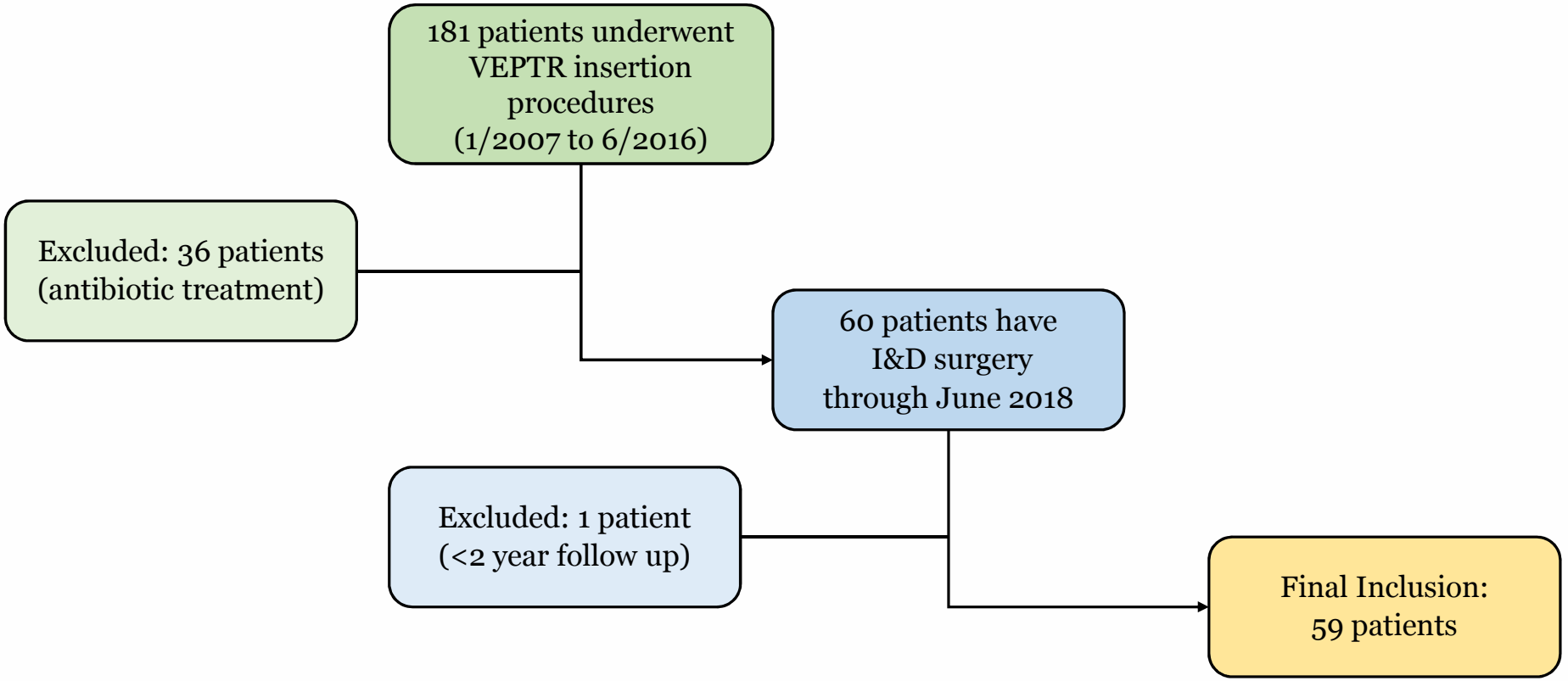
Flow Diagram



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Patient Demographics

Predictive Factor	Removal Implant (n=29)	Retained Implant (n=30)	p-value
Age at Implant Surgery (years)	4.44 ± 3.67	4.74 ± 4.09	0.766
Gender			
Male (%)	15 (52%)	10 (33%)	0.162
Female (%)	14 (48%)	20 (67%)	
Etiology			
Neuromuscular	15	14	
Syndromic	3	3	0.786
Congenital	11	12	
Idiopathic	0	1	
Pelvis fixation (yes / no)	20 / 9	18 / 12	0.472
Years of follow up (years)	5.44 ± 2.16	4.86 ± 1.92	0.275
<5%tile weight (%)	17 (59%)	13 (43%)	0.24
Average BMI (kg/m^2)	17.32 ± 2.86	18.52 ± 3.57	0.19
Non-ambulatory (%)	20 (69%)	12 (40%)	**0.026**
Gastronomy tube (%)	24 (83%)	18 (60%)	**0.054**
History of MRSA infection	10 (34%)	5 (17%)	0.116

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Treatment Variables

Predictive Factor	Removal Implant (n=29)	Retained Implant (n=30)	p-value
Total number of wound problems	3.03 ± 1.84	1.43 ± 0.63	**<0.0001**
Total number of I&D procedures	5.62 ± 4.24	2.57 ± 1.33	**0.0007**
Days to I&D procedure	76.19 ± 61.40	53.88 ± 34.97	**0.095**
Days on antibiotics	39.313 ± 27.11	53.30 ± 32.01	**0.093**
Days in hospital	15.82 ± 18.25	17.99 ± 36.19	0.771

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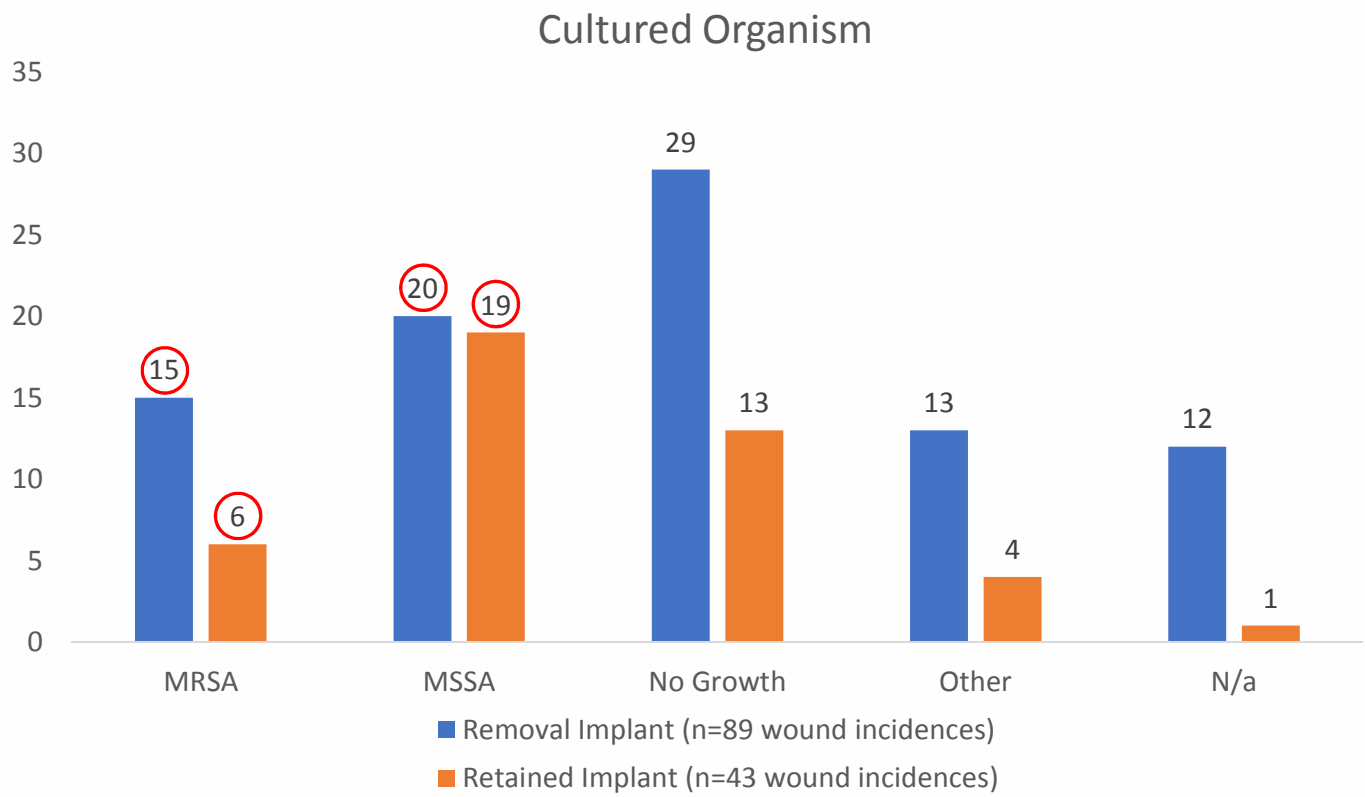
MSSA: Most Common Cultured Organism

- **Infecting organism identified in:**
  - 54% of wound incidences in removal implant cohort
  - 67% of wound incidences in retained implant cohort



Note: MRSA, methicillin-resistant *Staphylococcus aureus;* MSSA, methicillin-sensitive *Staphylococcus aureus;* Other organisms include Pseudomonas Aerguinosa, Enterobacter cloacae complex and Serratia Marcescens

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Cephalexin Most Prescribed Antibiotic

- **Culture positive subanalysis**
  - Cephalexin = most prescribed antibiotic in both cohorts

	Removal Implant (n=89 wound incidences)	Retained Implant (n=43 wound incidences)	p-value
Infecting Organism			
MRSA	15	6	
MSSA	20	19	
No Growth	29	13	0.06
Other	13	4	
n/a	12	1	
Type of Antibiotic			
Cephalexin	31	19	
Clindamycin	18	12	
Ciprofloxacin/Ciproflaxin	15	4	0.255
RifAMPin	13	12	
Other	14	3	
None/ n/a	11	4	

Note: MRSA, methicillin-resistant *Staphylococcus aureus;* MSSA, methicillin-sensitive *Staphylococcus aureus;* Other organisms include Pseudomonas Aerguinosa, Enterobacter cloacae complex and Serratia Marcescens

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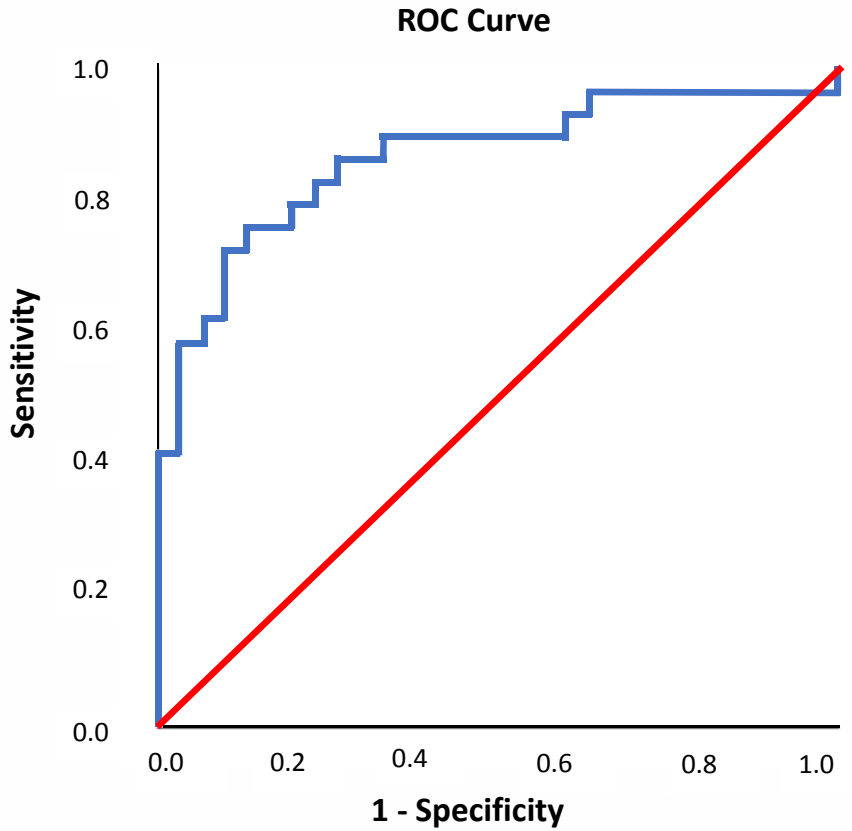
ROC Curve: Prediction Model

- **Variables in the final model:**
  - Total # wound problems (OR: 6.00, p=0.001)
  - Days to I&D procedure (OR: 1.03, p=0.039)
  - Gastrostomy tube (OR: 5.7, p=0.07)
- **AUC = 0.864**



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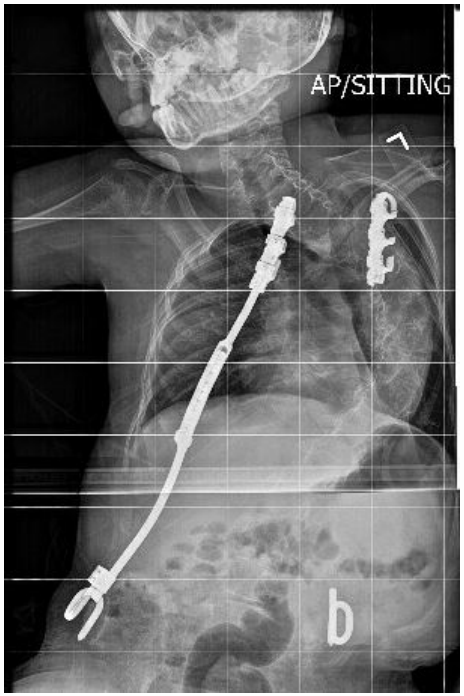
Conclusion

- **Duration** from onset of **infection until I&D** inversely correlates with ability to retain implants
- Potential predicative clinical factors:
  - Presence of gastrostomy tube
  - History of previous wound problem
- Recommendation:
  - After about 3 I&Ds → remove hardware
  - Consider antibiotic Cephalexin for > 60 days



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Thank you!

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