

# Spinal Instrumentation Infections in Children and Adolescents

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**ABSTRACT**

**Background:** Spinal instrumentation infections in children and adolescents pose a unique challenge to the infectious disease clinician and the surgeon. Since 2010, as part of a statewide collaborative, strategies to prevent these infections have been adopted, but even with excellent compliance with these measures, these infections continue to occur although we have experienced a significant decline. Our aim is to describe the clinical and microbiological characteristics of children treated for spinal instrumentation infections at the infectious disease clinic at our institution.

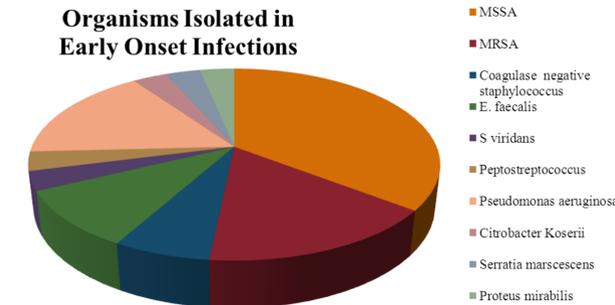
**Methods:** Charts of children presenting with spinal instrumentation infections that were treated by pediatric infectious disease specialist at our institution between the 01- 2005 and 12-2011 were retrospectively reviewed for clinical and microbiology data.

**Results:** Forty five children with spinal instrumentation infection were identified out of 786 spine procedures performed during the study period. Fifty-five per cent were male and 44% of all children had cerebral palsy. Seventeen had early infections, defined as infections within 30 days of the instrumentation. Median time from instrumentation to infection was 14 days for early infections and > 1 year for late infections. Fever and wound drainage/dehiscence were the most common clinical presentation for early and late infections. The CRP was higher in patients with early infections (median 20.2 mg/dl for early and 8.85 mg/dl in the late infections). Sixty-five percent of early infections were mono-microbial and methicillin susceptible *S. aureus* (MSSA) was the most commonly isolated organism (59%). In contrast, 65% of late infections were poly-microbial however; MSSA was isolated in 79% of these patients. *Pseudomonas aeruginosa* was the most common gram negative isolated from early and late infections. (17 and 14% respectively).

**Conclusion:** Methicillin susceptible *S. aureus* was the most common organism isolated from our patients with early and late onset instrumentation infections. Based on this data, cefazolin continues to be the preferred empiric prophylactic peri-operative antibiotic for spinal instrumentation surgeries at our institution. Efforts continue to optimize our bundles as we pursue our goal of zero infections.

**Aim**

❖ To describe the clinical and microbiological characteristics of children treated for spinal instrumentation infections at the Infectious Disease Clinic at our institution.

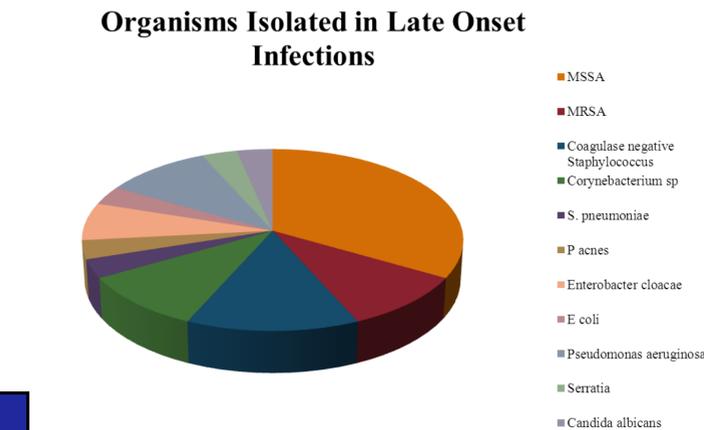


**Materials and Methods**

- ❖ Retrospective Charts Review.
- ❖ Study Period: 01- 2005 and 12-2011.
- ❖ Only charts of children with spinal instrumentation infections treated by pediatric infectious disease specialist at our institution were reviewed.
- ❖ Reviewed for clinical and microbiology data.
- ❖ **Definitions:**  
 ≤ 2 months= Early onset infections.  
 ≥ 2 months= Late onset infections.

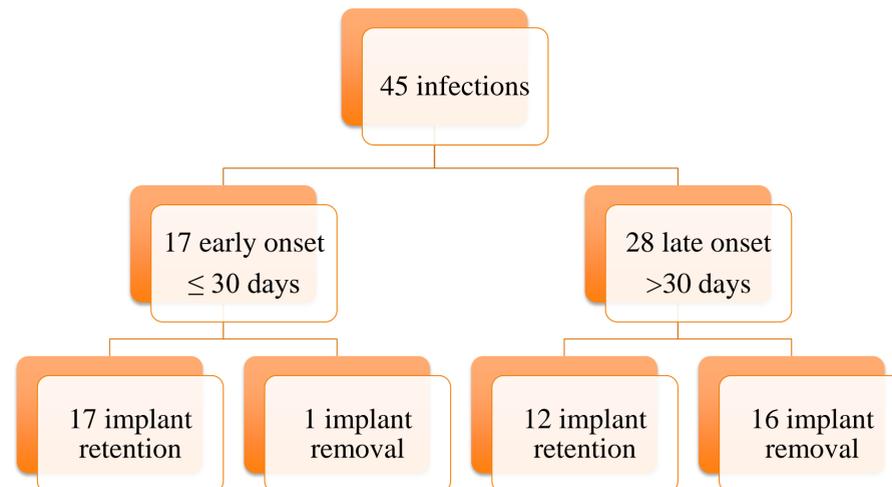
**Results**

- ❖ 786 spine procedures were performed during the study period.
- ❖ 45 infections were identified.
- ❖ 55% male and 44% had Cerebral Palsy.
- ❖ Early onset infections were mostly mono-microbial and late onset were polymicrobial .



**Background**

- ❖ Spinal instrumentation infections in children and adolescents pose a unique challenge to the infectious disease clinician and the surgeon.
- ❖ As part of a statewide collaborative, strategies to prevent these infections have been adopted which have resulted in an a dramatic decline in surgical site infections. These have included:
  - 1) Not using razors
  - 2) Pre-operative bathing with Chlorhexidine
  - 3) Chlorhexidine gluconate as surgical prep of choice
  - 4) Appropriate antibiotic timing including re-dosing
  - 5) Huddles held immediately when infections happen
- ❖ Specifically, spinal implant infections rates have declined from 7.4/100 cases in 2009 to 2.1/100 cases in 2012 .
- ❖ We have we experienced a significant decline in the number of infections with excellent compliance with these measures, however, these infections continue to occur.



Instrumentation infection	Time to infection median (range)	Signs/Symptoms	WBC X10E9/L median (range)	CRP mg/dL median (range)	ESR mm/h median (range)
<b>Early</b> N=17	14 days (7-30 days)	76% fever 88% Wound drainage	<b>17.2</b> (8.1-23.9)	<b>20.2</b> (4.6-37.9)	<b>96</b> (34-140)
<b>Late</b> N=28	2.67 years (0.25- 7.8 yrs.)	50 % fever 75% Wound drainage	<b>11.2</b> (6 -37.6)	<b>8.85</b> (0.3-36.4)	<b>66</b> (6-105)

**Conclusions**

- ❖ Methicillin susceptible *S. aureus* was the most common organism isolated from our patients with early and late onset instrumentation infections.
- ❖ Based on this data, cefazolin continues to be the preferred empiric prophylactic peri-operative antibiotic for spinal instrumentation surgeries at our institution.
- ❖ Efforts continue to optimize our bundles based on different patient characteristics as we pursue our goal of zero infections.