

Incidence and Surgical Management of Secondary Spine Infections: A Case Series Study of 4,921 Consecutive Patients



Introduction

- Secondary spine infections (SSI) that develop because of a spine procedure, are among the most common and feared complications in orthopaedic spine surgery.
- Incidence in the literature has been noted between 0 – 18%¹⁻³.
- Associated with increased morbidity, mortality, hospital stays, and medical and surgical management¹⁻³.
- Results in excessive cost to the patient and healthcare system, in some cases a 4x or \$100,000 increase².
- Historically linked with obesity⁴, diabetes⁵, tobacco use⁶, longer and more invasive procedures⁷, implants⁸, and trauma⁹.

Methods

- We reviewed our institutional database of 4,921 consecutive patients undergoing spine surgeries between 2015-2025.
- Patients with SSI requiring operative management were included. Primary spine infections, non-operative SSI, and non-infectious surgical site complications (ex. hematomas) were excluded.
- Incidence of SSI, demographics, primary and revision surgical characteristics, spine related healthcare utilization (ED visits, readmissions, subsequent reoperations, antibiotics), intraoperative culture and infection data, and clinical outcomes were assessed.

Results

- Of the 4,921 consecutive spine operations, 170 developed secondary infections requiring surgical management (incidence of 3.5%, or 35 infections per 1,000 surgery-years).
- Demographics: 17 Hispanics and 153 Non-Hispanics; and 10 Asians, 14 African Americans, and 115 Caucasians.
- 112 cases were elective and 58 non-elective; 113 primary and 57 revision; 24 deformity, 123 degenerative, 12 trauma, and 11 tumor; and 21 non-instrumented cases and 149 instrumented.

References

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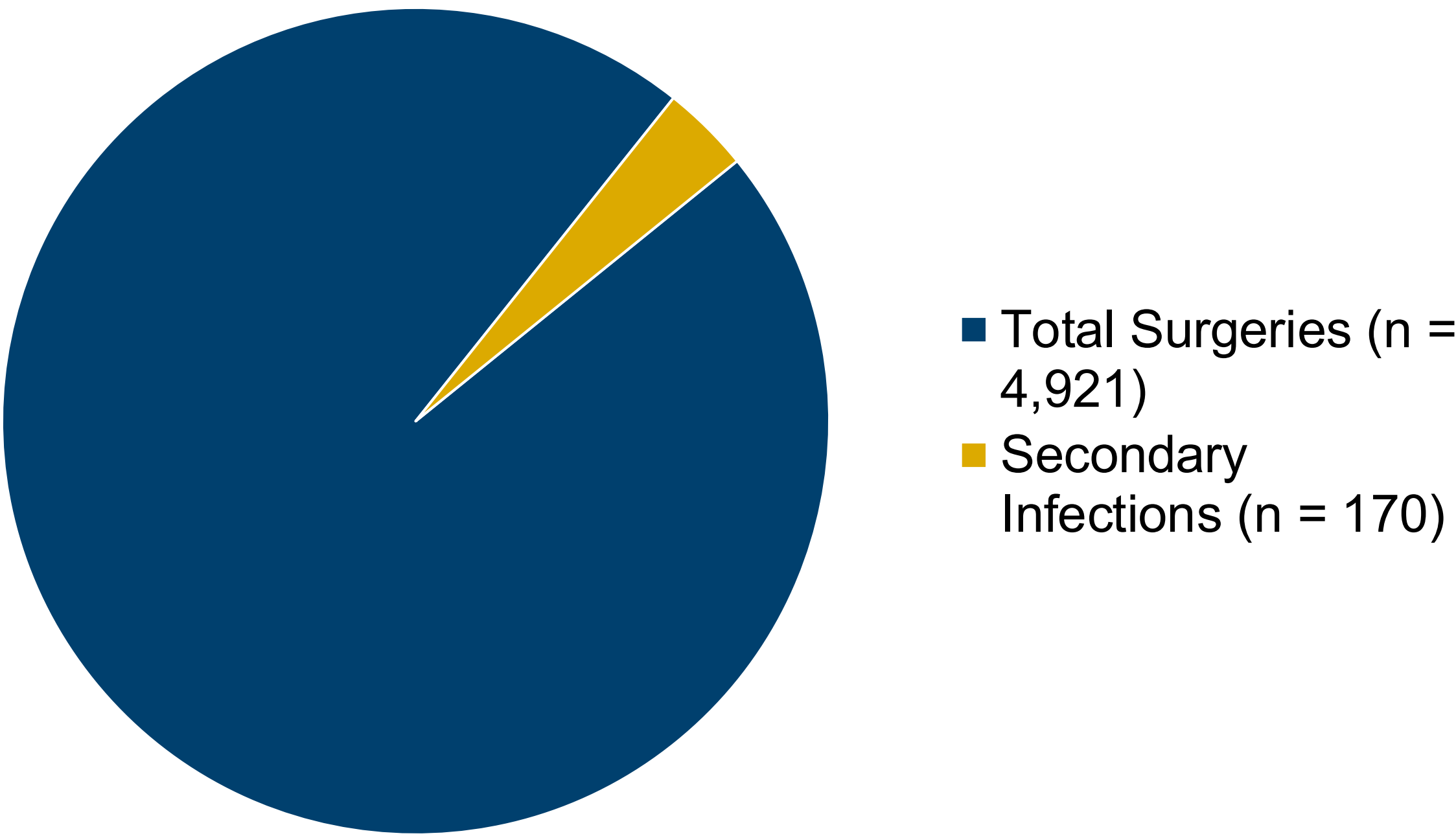
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Cohort Characteristics

	Infected cohort (n=171)
Mean Age (years)	58.7
Female (%)	54.7%
Not Hispanic White (%)	67.6%
Primary Surgeries (%)*	66.5%

*Secondary infection from a primary spine surgery as opposed to a revision



Healthcare Utilization and Outcomes

	Infected cohort (avg.)		Infected cohort
Subsequent Surgeries	2.0	Hardware removal (%)	28.2
Subsequent ED visits	1.5	Staged surgeries (%)	31.2
Subsequent readmissions	2.1	Plastics assistance (%)	14.7
Total Length of Stay (days)	18.0	Positive wound culture (%)	65.3

Directly related to initial spine surgery

Microbiology and Antibiotics

	Infected cohort
Monomicrobial (%)*	56.8
Secondary source of infection (%)*	26.1
Total duration of antibiotics (days)	153.7
Lifelong antibiotics needed (%)	20.6

*Of the 111 with positive intraoperative culture

Discussion

- A secondary spine infection rate of 35 infections per 1,000 surgery-years, or 3.5%, is consistent with the literature.
- There were no notable associations with race/ethnicity, sex, or age.
- Most infections were from elective, primary, degenerative, instrumented cases, but there was a wide spread of case types.
- Patients frequently returned to the ED, hospital, and operating room for infection management and sequelae.
- There were high associated healthcare costs, with an average of over 2.5 weeks of hospital stay, and occasional hardware removals, staged surgeries, and multi-surgeon teams required.
- Most patients had positive intraoperative bacterial culture, with most being monomicrobial but many being polymicrobial, with *Staphylococcus aureus* being the most common pathogen.
- Patients occasionally acquired a secondary source of infection, with urine and blood infections being most common, and most with the same pathogen as the SSI.
- On average, patients required over 5 months of antibiotics, with some requiring 3 or more antibiotics and/or lifelong antibiotics.

Conclusion

- In a single-institution case series study of 4,921 consecutive patients, the incidence of secondary spine infection was 3.5%, and resulted in frequent ED visits, long hospital admissions, multiple reoperations, and long-term antibiotic courses.

References

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