IMPACT OF TYPE OF SURGICAL MANAGEMENT ON THE INCIDENCE OF RECURRENT SURGICAL SITE INFECTIONS FOLLOWING HIP AND KNEE REPLACEMENTS IN CALGARY, ALBERTA

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Background

- Recurrent complex surgical site infections (SSIs) following hip and knee replacements are associated with decreased quality of life for patients and increased economic burden to healthcare systems.
- The Infectious Diseases Society of America (IDSA) guidelines suggest different surgical strategies for SSIs be made depending on duration of symptoms, pathogen, or joint age, however there are no current universally accepted guidelines for management of recurrent infections.
- Different surgical strategies for SSIs include debridement and implant retention (DAIR), DAIR with liner exchange, one stage revision (prosthesis is replaced in a single operation) and two stage revision (a temporary spacer or joint replacement is fitted, with a definitive prosthesis replacement in a second operation).

Objective

To evaluate whether causative pathogen and type of initial surgical management for complex SSIs, following hip and knee replacements, impacts the incidence of recurrence of SSI.

Methods

- Alberta Health Services Infection Prevention and Control (IP&C) prospectively collects data on all complex SSI that occur within 90 days after primary total hip and knee replacement in Calgary, Alberta.
- Data from IP&C were collected from April 1, 2012 to March 31, 2019 in order to complete a retrospective chart review on all patients who underwent primary hip or knee arthroplasty and developed a complex SSI
- Multiple variables were collected from the chart including age, gender, body mass index, type of surgical management for the complex SSI, timing of SSI in relation to initial arthroplasty, causative pathogen for the complex SSI, surgeon (i.e. revision surgery done by the same surgeon who had done the primary arthroplasty or a different surgeon), and causative pathogen for the complex SSI
- The primary outcome explored was rate of recurrence of SSI following the different strategies of surgical management

Results

PATIENT CHARACTERISTICS (N=142)	DAIR	DAIR AND LINER EXCHANGE	ONE-STAGE	TWO-STAGE	NO SURGERY
NUMBER (%)	25 (17.6%)	95 (66.9%)	13 (9.1%)	8 (5.6%)	1 (0.7%)
MEAN AGE (YR)	66.2	66.4	73.4	64.6	51.7
MALE %	64	52.6	69.2	75	100
MEAN BMI	31.9	37	41.8	33.5	
CAUSATIVE ORGANISM N (%)					
S. Aureus	9 (36%)	30 (31%)	3 (23%)	5 (63%)	1 (100%)
CoNS	6 (24%)	18 (19%)	4 (31%)	1 (13%)	
Gram negative organism	3 (12%)	6 (6%)	0	1 (13%)	
Multiple organisms	1 (4%)	14 (15%)	2 (15%)	0	0
OUTCOMES N (%)					
CURE	15 (60%)	72 (76%)	10 (77%)	5 (63%)	
RE-INFECTION	8 (32%)	19 (20%)	2 (15%)	3 (38%)	
UNKNOWN	2 (8%)	4 (4%)	1 (8%)	0	

Table 1: Patient characteristics, causative organisms, and outcomes for those who developed complex SSIs following primary hip and knee replacements stratified by type of surgical management.

- No significant difference in recurrence rates of complex SSI when stratified by surgical management (p=0.8).
- Of the causative pathogens for complex SSI following primary hip and knee arthroplasty, *Staphylococcus aureus* (*S.aureus*) (including methicillin-resistant *S. aureus* (MRSA)) accounted for 35.2% of total first SSI and 50% of recurrences.

CAUSATIVE PATHOGEN OF FIRST SSI N(%)	RE-INFECTION CASES	RE-INFECTION WITH SAME ORGANISM	RE-INFECTION WITH DIFFERENT ORGANISM
STAPHYLOCOCCUS AUREUS	16 (50%)	4	8
COAGULASE NEGATIVE *STAPHYLOCOCCUS*	6 (19%)	2	2
GRAM NEGATIVE ORGANISM	4 (13%)	2	0
MULTIPLE ORGANISMS	1 (3%)	0	1

Table 2: Re-infection cases stratified by pathogen showing number and percent of total re-infection cases. Subsequent columns demonstrate of those with re-infection, what number were from re-infection with the same organism as primary SSI or a different organism. Those with re-infection and unidentified organism are not shown.

- A significantly higher proportion of *S.aureus* infections (including MRSA) had a recurrent infection compared to all other pathogens (p=0.045). Of the 32 total recurrences of infection, only 28.1% were identified as being due to the same pathogen as the initial SSI.
- Time to first infection in days stratified by surgical intervention for initial management: two stage was 46.25 (Standard deviation (SD) 14.94), DAIR was 25 (SD 16.8), DAIR with liner exchange was 25.81 (SD 17.8), and one stage was 18.46 (SD 8.58).
- Proportion of first revision SSI with the same surgeon as initial arthroplasty – one stage (69%), DAIR with liner (46%), DAIR (48%) and two stage revision (38%).

Conclusions

- *S.aureus* was the most common pathogen causing initial and recurrent SSIs. This reinforces that *S.aureus* complex SSIs would likely benefit from early recognition and aggressive treatment.
- Recurrence of SSI was not impacted by type of surgical management strategy for initial complex SSI.
- This study is limited by a small sample size. These findings contribute to the paucity of literature in this area and suggest a need for expansion to larger populations.

References

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Acknowledgements

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