The Incidence, Risk Factors, and Microbial Profile of Infected Endoprosthetic Reconstructions
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INTRODUCTION:
Periprosthetic infection is one of the most feared complications following endoprosthetic reconstruction and results in revision surgeries, amputation, or even death. Understanding the risk factors for and microbial profile of these infections is crucial to the development of effective prevention and treatment strategies. The objective of this study was to utilize a large database of endoprostheses to describe the incidence of and risk factors for infection and to characterize the microbial profile of such infections in order to help guide management.

METHODS:
A retrospective review of 813 endoprosthetic reconstructions from January 1, 1980 to December 31, 2019 at a single institution was performed. Demographic, oncologic, procedural, and outcome data was collected and analyzed. The primary outcome of interest was infection resulting in revision surgery or amputation. Prostheses that became infected were compared with uninfected prostheses in order to identify risk factors. Cultured organism(s) were analyzed and stratified by anatomic location.

RESULTS:
Fifty-four out of 813 (6.6%) endoprosthetic reconstructions resulted in infection. The incidence of infection was higher for revision implants (25/187, 13.4%) compared with primary implants (29/626, 4.6%). Age at the time of surgery was significantly higher in the infected group (42.9 +/- 19.6 years) versus the uninfected group (36.1 +/- 21.2 years, p = .014). No significant association was found between infection and perioperative chemotherapy (p = 0.39) or perioperative radiation therapy (p = 0.63). Culture data was unavailable for 6 infected endoprosthesis. S. aureus and S. epidermidis were the most commonly cultured organisms with an incidence of 35.5% (17/48) and 20.8% (10/48), respectively. In total, 22.9% (11/48) of cultures were polymicrobial and 8.3% (4/48) of cultures did not grow any organisms. Some 47.0% (8/17) of S. aureus infections were methicillin-resistant, and 42.9% (3/7) of Enterococcal infections were vancomycin-resistant.

DISCUSSION AND CONCLUSION:
This study outlines rates of infection over time and also identifies risk factors for infection. Revision endoprostheses were roughly three times as likely to develop an infection compared to primary endoprostheses. Based on the modified Henderson classification, there was roughly an equal incidence of late infections compared to early infections. The only risk factor for infection identified in this study was age. Interestingly, although chemotherapy and radiotherapy often result in an immunocompromised state, neither were significantly associated with increased infection rates in this study.

Comprehensive knowledge of the risk factors for and the microbial profile of endoprosthetic infections is crucial to developing effective prevention and treatment strategies. This study demonstrates a relatively high incidence of polymicrobial and antibiotic-resistant infections. Continually maintaining an awareness of these rates is paramount when determining effective antibiotic regimens.