Staphylococcal Periprosthetic Infection of Hip Hemiarthroplasty. What To Expect Regarding the Incidence of Different Outcomes. Single Center Retrospective Study

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INTRODUCTION: When prosthetic joint infections (PJI), known for their high morbidity, are caused by high-virulence organisms such as staphylococcus, the outcomes are even worse. Previous literature reviewed the outcomes of hemiarthroplasty PJI in general and the factors associated with different outcomes, regardless of the causative organism. This study aims to examine the outcomes of staphylococcal periprosthetic infections after hemiarthroplasty for hip trauma patients, which has not been particularly reported.

METHODS: A retrospective study was performed in our level 1 trauma center to review all the cases of periprosthetic infections in our database. Inclusion criteria were any patient who received hip hemiarthroplasty, was diagnosed with PJI, and had positive bacterial culture and sensitivity results indicating Staphylococcal bacterial growth. The patient's clinical and surgical notes, radiographs, and labs were reviewed to extract all relevant information such as clinical presentation, interventions, and outcomes. Interventions performed included debridement and implant retention (DAIR), two-stage revision, implant removal (IRM), and conservative treatment with antibiotic suppression. Statistical analysis was performed using SPSS version 25.

RESULTS:

Of 2477 hemiarthroplasty cases performed during the study period and reviewed for this analysis, 62 patients (2.5%) with periprosthetic hematomas/infections requiring surgical intervention were identified. Of them, twenty-six cases were excluded for having been diagnosed with non-staphylococcal infections or having negative culture results, leaving 36 cases (36 patients) for analysis and inclusion in the study. Of these patients, 26 were female and 10 were male (ratio 2.6:1), with a mean age of 76.6 years (range 52.6-100) at the time of primary HA surgery. Nineteen cases were treated with a bipolar and 17 were treated with a unipolar hemiarthroplasty. Twenty-five cases received cemented and eleven received cementless stems. Twenty-nine cases underwent at least a single surgical debridement (DAIR) trial; six cases underwent primary implant removal, and one received chronic antibiotic suppression. After a mean follow-up of 42.6 months, only nine cases (31% of the DAIR cases, and 25% of the total cases) had successful debridement and implant retention surgery. The other eventual outcomes included Girdlestone procedure (8 cases, 22.2%), early mortality within 3 months of the primary HA surgery (8 cases, 22.2%), two-stage revision to total hip arthroplasty (THA) (5 cases, 13.9%), one-stage revision to THA (1 case, 2.8%), placement of antibiotic spacer (3 cases, 8.3%), hip disarticulation (1 case, 2.8%), and chronic antibiotic suppression (1 case, 2.8%) (Figure 1, Table 1).

DISCUSSION AND CONCLUSION: Staphylococcus aureus is reported from previous studies to be the causative organism of PJI in about one-third of cases. In this study, staphylococcus aureus was responsible for 23 cases of all the 62 PJI cases in our database (37%) and there were 13 other cases caused by other staphylococcus species (21%). When added, staphylococcus species was responsible for approximately 58% of the infected HA cases in our database. Despite the wide prevalence of Staphylococci as a causative organism in PJI, and HA being one of the most common treatment options for displaced femoral neck fractures in the elderly, no studies have specifically analyzed the outcomes of Staphylococcal HA infection. The literature reported the outcomes of PJI in HA in general or the outcomes of Staphylococcal infection in THA, which is a different setting compared to HA. The results of our study indicate high morbidity, with a low success rate of implant retention, and high cumulative mortality reaching 22.2, 30.5, 41.6, and 50% at the 3-month, 1-year, 3-year, and 5-year follow-up, respectively.

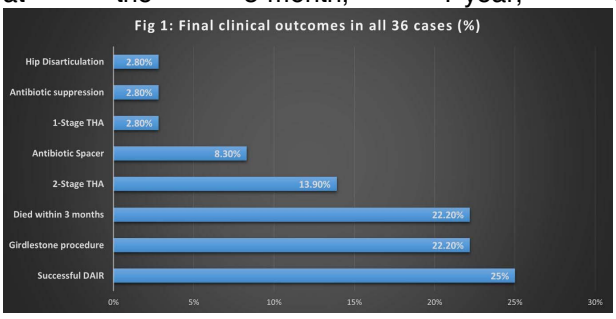

Table 1: Clinical outcomes according to the organism species (36 cases)

	Methicillin-resistant, Staph Aureus (MRSA) (15 cases, 41.7%)	Non-Methicillin-resistant, Staph Aureus (8 cases, 22.2%)	Other staph species (13 cases, 36.1%)	Total cases (36)
Debridement and Implant retention	1 (6.7%)	4 (50%)	4 (30.7%)	9 (25%)
Two-stage THA	2 (13.3%)		3 (23.1%)	5 (13.9%)
One-stage THA			1 (7.7%)	1 (2.8%)
Antibiotic suppression		1 (12.5%)		1 (2.8%)
Died in the first 3 months	5 (33.3%)	1 (12.5%)	2 (15.4%)	8 (22.2%)
Antibiotic Spacer	1 (6.7%)	2 (25%)		3 (8.3%)
Girdlestone	5 (33.3%)		3 (23.1%)	8 (22.2%)
Disarticulation	1 (6.7%)			1 (2.8%)