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Title: All-cause cancellation of primary total shoulder arthroplasty at a single institution: prevalence, reasons and risk factors

Introduction: Cancellation of elective surgery represents a pervasive and potentially avoidable issue that disrupts the operating room flow and surgeon schedule, increases administrative burdens, and imparts significant costs to the institution. In order to potentially mitigate the cancellation of elective orthopaedic procedures, particularly those in close proximity to the planned surgical date, a more comprehensive understanding of the reasons for cancellation is needed. Patient-driven cancellations have consistently been reported to comprise a significant proportion of surgical cancellations and may represent avoidable scenarios. Furthermore, elective surgery cancellation secondary to surgeon- or systems-driven reasons can have a significant negative effect on a patient's emotional, physical and financial well-being. A prior study examining the predictors for cancellation following shoulder surgery found that older age, undergoing arthroscopic rotator cuff repair, a longer distance from the hospital, and longer time from the last outpatient visit to the scheduled surgery was independently associated with a higher risk for cancellation. The negative consequences of a surgical cancellation become magnified when the case is ultimately not rescheduled.

The purpose of the current study was to determine: 1) the prevalence and specific reason for short-term cancellation of primary shoulder arthroplasty; 2) the risk factors and timing for the cancellation; and 3) whether canceled patients ultimately underwent shoulder arthroplasty at a later date. We hypothesized that patient-related factors would comprise the biggest reason for short-term surgical cancellation of elective TSA and that patients with a history of prior TSA cancellation would more likely cancel surgery again.

Methods: The patients were categorized into three groups as:1) no cancellation; 2) cancellation with re-scheduling (CRS); and 3) cancellation without re-scheduling (CNRS). Baseline demographic data such as age referred to the time of the case booking. With regards to the number of preoperative outpatient visits amongst cancelled patients, this reflected only those visits that occurred prior to the date of cancellation. The reasons for cancellation were categorized broadly as: 1) patient-driven; 2) surgeon- or anesthesiologist-driven; 3) system-driven; and 4) medical optimization-driven.

Results: There were 489 patients included in the study, of which 225 (46%) were aTSA and 264 (54%) were rTSA. The median age at the time of booking for the entire cohort was 68 years (IQR 61,74) and included 318 (65%) females. Of the total cases, 127 (25.9%) were cancelled prior to the planned surgical date. Sixteen (13%) of cancellations occurred on the day of surgery and 13 (10%) occurred within 24 hours of surgery but prior to presentation in the hospital on the day of surgery. Of the total cancellations, 50 (39%) were classified as CRS and 77 (61%) as CNRS. The median time from booking to the planned surgical date was 51 days (IQR 40,69).

There was a significant difference between the three groups with regards to the diagnosis of depression (P=0.044), median number of preoperative/pre-cancellation outpatient visits (P=0.014), median ACCI (P=0.049), having an all-cause ED visit within 12 months prior to planned surgery (P=0.002), and having a history of a prior ipsilateral TSA cancellation (P<0.001). The interval difference from booking to planned surgical date was not significantly different between non-cancelled cases (49 (IQR 34,62) and CRS cases (50 (IQR 41,62)) (P=0.497), though there was a significant difference between non-cancelled cases and CNRS cases (51 (IQR 40,74)) (P=0.01).

Discussion: Cancellation of elective TSA remains a prevalent issue and a significant number of these cancellations do not reschedule surgery. The majority of cancellations in our study were patient-driven with most patients simply changing their mind, followed by deficiencies in medical optimization. Given the negative financial implications of the cancellations, in addition to the resulting disruption to office surgical scheduling and hospital workflow, additional research into the effect of specific intervention strategies aimed at reducing patient- and medical driven cancellations is indicated. Specifically, ensuring that patients have the opportunity to obtain sufficient information regarding the procedure planned and the perioperative course by increasing the number of preoperative outpatient visits or providing other means by which to reach out to the surgical team with questions, could reduce this risk.