

Authors: George Grammatopoulos, Paul M. Courtney, Guillem Bori

QUESTION 2: Is there a minimum number of periprosthetic joint infection (PJI) procedures that surgeons should perform annually that qualifies them as experts in the management of PJIs?

RECOMMENDATION: While the optimal number of PJI cases a surgeon needs to perform annually to improve outcomes has not been established in the literature, some data suggests that surgeons that care for more PJI patients will have better results than lower volume arthroplasty surgeons. Further studies are needed to identify the minimum number of PJI cases a surgeon should perform to reduce complications and improve outcomes.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 97%, Disagree: 1%, Abstain: 2% (Unanimous, Strongest Consensus)

RATIONALE

A recent publication derived from the European Bone Joint Infection Society (EBJIS) reported on a survey based on the annual conference's delegates from all over the world [1]. It was surprising that even in this highly specific group of experts, most of them work in institutions that manage less than 50 PJIs cases per year. In a recent publication from a United Kingdom (UK) Bone Infection Unit (BIU), 362 hip PJIs were reported over a 13-year period, which were treated under the care of 10 consultant (staff) arthroplasty surgeons; this equates to three cases of hip PJI per year per staff member if the workload was evenly spread [2]. Similarly, data from a high-volume UK centre (1,000 total hip arthroplasties (THAs) per year), reported on 131 hip PJIs treated over a 13-year period by 4 surgeon (3 per year) [3]. A recent publication from another European BIU reported on 81 knee PJIs treated over a 1-year period; however, the number of surgeons treating these cases was not included [4]. Lastly, data from a high-volume United States center, reported on 205 hip PJIs over a 13-year period (16 per annum), although the number of surgeons treating the patients was not described [5]. These studies, however, failed to compare the results of higher- and lower-volume PJI surgeons.

A comprehensive systematic review failed to identify any publication that tested a surgeon's case volume as a variable for infection eradication rates or outcomes following PJIs. There are several studies, however, that demonstrate that a surgeon's case volume improves outcomes in primary arthroplasty. The arthroplasty literature suggests that in primary hip arthroplasty, 35 cases per year is the optimal number above which complications reduce significantly [6,7]. A significant amount of work investigating the effect of surgeon and hospital volume on outcomes following knee arthroplasty has been performed [8,9]. Both hospital and surgeon volume were associated with decreased morbidity, mortality and length of stay. In a recent study on outcome following unicompartmental knee arthroplasty (UKA), surgeons performing more than 30 cases per year have a significantly reduced revision rate [10]. The minimum number of cases required for improved outcome in revision work is unknown. Of interest, 80% of surgeons in the UK's national joint registry performing knee revisions undertook 10 or fewer per annum, and similarly 60% of surgeons performing hip revisions undertook ten or fewer per annum [11]. The above observations have led to the development of revision networks in order to 'centralize' the services in the UK in an effort to improve outcomes. Furthermore, data has shown that in addition to volume, the degree to which a surgeon specializes in a specific procedure may be as important as the volume of cases due to factors such as muscle memory, higher attention and faster

recall [12,13]. Extrapolating these results to revision arthroplasty for PJIs, we suggest a minimum surgical volume of 25 cases per year for a surgeon to qualify as an expert in PJIs, but further studies are needed to define the optimal number. With only a few retrospective studies identifying an association between surgeon volume and outcomes in primary and revision arthroplasty, we issue a limited recommendation.

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