

SH83. Is there a role for routine exchange of all well-fixed implants in revision shoulder arthroplasty without clinical or radiographic signs of infection?

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Methodology: A comprehensive literature review was performed to identify all studies on modular shoulder arthroplasty systems and their outcomes when undergoing revisions. Searches for the terms “retention”, “well fixed”, “convertible”, “conversion”, “revision”, “reoperation”, and “shoulder arthroplasty” were performed using the search engines PubMed and Embase which were searched through December 2024. Inclusion criteria for our systematic review were all English studies (Level I-IV evidence) that reported on use of convertible systems in cases of revision shoulder arthroplasty. Exclusion criteria were non-English language articles, nonhuman studies, retracted papers, case reports, review papers, studies with less than <10 patients in the sample size, studies without clinical follow-up, and technique papers without patient data. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria were followed. Thirteen articles met inclusion and exclusion criteria and were reviewed.

Answer: Unknown. There is a lack of high-level studies evaluating the routine explant of well-fixed, well-positioned implants in the setting of revision shoulder arthroplasty without clinical or radiographic signs of infection. The current studies do not show supporting evidence for routine exchange, and there is additional risk involved when removing well fixed humeral stems or glenoid components in the absence of any signs of infection.

Strength of Recommendation: Limited

Rationale:

Revision shoulder arthroplasty in the setting of well-fixed components without clinical or radiographic signs of infection poses a decision-making challenge for shoulder arthroplasty surgeons. The high prevalence of *Cutibacterium acnes* in prosthetic joint infection (PJI) of the shoulder often makes diagnosis and treatment of PJI difficult. Options for single-stage revision include a complete revision with removal and explant of well-fixed components and reimplantation, or a modular exchange with retention of well-fixed components (ie humeral stem and/or glenoid component). The main benefit of modular exchange is the avoidance of additional morbidity associated with removal of well-fixed components, while one potential downside with retention of well-fixed components during revision is that in the case of an indolent infection, the retained components may act as a persistent nidus.

The use of modular exchange in revision total shoulder arthroplasty has been reported to result in shorter operative time, less estimated blood loss, and reduced complication rate.¹⁻⁷. Revision of stemmed arthroplasties with complete removal of all components is a more demanding surgery, associated with increased operative time, increased estimated blood loss, and carries with it a possibility for humeral osteotomies and allograft augmentation.^{4,5} Complication rates are also higher for complete exchange of components and include humeral shaft fractures and loss of both humeral and glenoid bone stock.^{8,9}

There is currently a lack of evidence for or against the routine exchange of all well-fixed, well-positioned implants in the setting of revision shoulder arthroplasty without clinical or radiographic evidence of infection. Some studies have reported similar reinfection rates with debridement and retention of well-fixed implants compared to complete single-stage and two-stage revisions, particularly in the acute setting.^{10,11} Kew et al. explored outcomes after debridement, antibiotics, and implant retention (DAIR) found that DAIR was a viable option with similar reinfection rates as compared to two-stage revisions, 29.4% versus 23.8% respectively.¹² However, in other studies that directly compare modular exchange vs complete single-stage revision, complete single-stage revision has been reported to carry a significantly lower reinfection rate.¹³ In studies evaluating complete single-stage exchange, Grosso et al. reported a reinfection rate of 5.9% in patients who underwent complete removal of all cemented components during revision.¹⁴ Furthermore, studies by both Topolski et al. and Kelly & Hobgood demonstrated reinfection rates ranging from 13% to 25% respectively for patients undergoing complete single-stage revision in what was presumed to be aseptic shoulders.^{15,16}

These studies have several major limitations which limit the ability to draw conclusions on the efficacy of modular component exchange versus complete exchange in the setting of patients undergoing revision with well-fixed components without clinical or radiographic signs of infection. First, there is a high level of heterogeneity of patient-related factors and treatment reported amongst the studies available. Most studies that compare complete versus modular component exchange did not specifically identify patients who did or did not have clinical or radiographic signs of infection at the time of revision surgery. Additionally, duration of follow-up was short. Although most studies had a minimum follow up of two years, some included patient's with as little follow up as 10 months, making it difficult to evaluate the risk of infection related complications in complete versus modular component exchange as patients may have experienced infection related complications that were missed due to short follow-up duration.

The current literature lacks evidence to determine the role of routine exchange of all well-fixed components in patients undergoing revision without clinical or radiographic signs of infection. Complete exchange carries risk of significant complications and further bony or soft tissue damage that may outweigh the risk of potential of recurrent infection long-term. Surgeons must weigh the risks and benefits of complete versus modular component exchange in these patients, and further prospective studies with standardized treatment protocols are needed to determine the role of complete vs modular exchange in this setting.

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