

HK68: Is there a role for abbreviated 2 stage exchange arthroplasty?

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RESPONSE/RECOMMENDATION – A number of studies demonstrate that early reimplantation provides similar outcomes to the traditional two stage exchange with a reimplantation window of 4-12 weeks. The role of high-dose local antibiotics to improve clinical outcomes and criteria for selecting suitable candidates have yet to be defined.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE:

RATIONALE

The growing popularity for single stage exchange arthroplasty, raises some questions regarding two-stage exchange arthroplasty and the protocols associated with the latter surgical procedure. One issue related to two-stage exchange arthroplasty relates to the optimal timing of reimplantation.¹ No definite timing window for reimplantation has been identified in the literature to date. With most studies quoting between 4-12 weeks as the optimal window², a common classification by Trampuz and Zimmerli defines intervals of 2–4 weeks (a short interval) and 6–8 weeks (a long interval) until reimplantation.³ Some studies suggest an interval period of 4–6 weeks⁴ or 9 weeks between the stages.⁵ Clinical studies range from a few days to several hundred days or even years, however, an interval of around 60–100 days is mostly reported.⁶⁻¹³ This heterogeneity in clinical practice indicates that the optimal duration of the interval between the stages has yet to be defined.²

There is a paucity of evidence to support earlier than standard long interval reimplantation at 2nd stage. Even in literature, where this early reimplantation has been investigated, there is variable timing to 2nd stage with no consistency across the board. In a cohort of 32 periprosthetic hip infections, Lieberman et al. report no difference between reimplantation at 6 weeks versus 1 year.¹⁴ Haddad et al showed no compromise of success with early reimplantation at 3 weeks in 32 total hip replacements.¹⁵ Burnett et al also reports similar success with a shortened interval of 3-4 weeks compared to 4-6 weeks.¹⁶

Winkler et al. prospectively compared reimplantation at less than 4 weeks (mean 19.3 days, range, 7-27 days) versus longer than 4 weeks (mean 63 days, range, 28-204 days) for 38 patients undergoing second stage PJI. Their group used non biofilm active antibiotics between stages and highly active biofilm- antibiotic treatment following reimplantation. Half the patients were included in the short interval group with no reinfections at a mean follow up of 40 months. One reinfection occurred in the longer interval group.⁸

However, some studies contradict the above and suggest that early reimplantation may compromise outcome. Vielgut et al. retrospectively analysed 72 hip PJI and 4 native hip infection patients operated between 2005 and 2010. All cases were infected but 4 were native joint infections. They found that 90% of a cohort of 40 patients undergoing reimplantation between 4 to 11 weeks remained infection free. The reinfection was higher in patients undergoing early reimplantation (< 4 weeks) or later than 11 weeks. Five patients were in the less than 4 weeks group all of which got reinfected and 23 in the greater than 11 weeks group

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with a 47.8% reinfection rate. Since the study was retrospective, no clear inclusion and exclusion criteria could be applied making the results difficult to interpret.¹⁷

In recent years the role of abbreviated two-stage exchange arthroplasty has been investigated in a number of prospective studies. A study has evaluated implantation of an antibiotic drug eluting device, instead of a spacer, following resection arthroplasty¹⁸. In these cases intra-articular antibiotics, as well as systemic antibiotics were administered. After one week the device was then removed and reimplantation was carried out. The outcome of this protocol has been very encouraging. Numerous presentations and pending publications demonstrate that the local delivery of antibiotics allows for early reimplantation without compromising the outcome of two-stage exchange.

Based on the current available literature, the optimal timing for reimplantation remains unknown. One of the until now used standard protocols of administering six weeks of antibiotics, followed by a two-week drug holiday, and subsequent reimplantation needs to be examined since shorter intervals might have an advantage. The two-week drug holiday is based on little evidence and has also been shown in some studies to be outdated.^{19,20} Accurate and cost-effective tests for optimal reimplantation timing are still needed. Beyond that, however, there is a need to work on selection criteria for choosing patients, in which an abbreviated two-stage protocol yield similar or improved clinical outcomes compared to traditional long interval reimplantation.

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