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Editorial

Fast-track hip and knee arthroplasty – how fast?

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Fast-track programmes (or Enhanced Recovery after Surgery (ERAS) programmes) for total hip arthroplasty (THA) and total knee arthroplasty (TKA) have evolved over the past 20 years.[1]

Their development has been driven by the questions, "Can the operation be done as an outpatient procedure?" and if not, "Why is the patient in the hospital?" based upon an analysis and modification of undesirable pathophysiological responses delaying recovery.[2]

The data confirms that fast-track approaches can improve clinical and economic outcomes, however their implementation has not been universal. [2,3] For example, whilst length of hospital stay (LOS) has been reduced over the last ten years within the English National Health System (NHS), the national mean LOS remains about 4 – 5 days and rates of outpatient arthroplasty continue to be low [data from Hospital Episode Statistics (HES) available via https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/hospital-episode-statistics]. Comparatively, in Denmark[4] and the USA[5], mean LOS has been reduced to about 2 days for both THA and TKA, and outpatient arthroplasty is now well established in selected patients in many international centres.[6] Importantly, the definition of outpatient surgery within these settings should not include an overnight stay, which is in contrast to other reports using a less than 23 h stay[6], thereby adding some confusion when interpreting the data.

The concept of outpatient arthroplasty is not new. Studies on selected patients demonstrating its feasibility were first published over 10 years ago. More recently, preliminary observations support that such an approach is feasible in about 15 % of unselected patient cohorts within a socialized health care system, and with no apparent increase in complications or re-admissions.[7] Outpatient arthroplasty is therefore an attractive concept in the context of policy changes advocating value-based care models, given the additional capacity and economic benefits it offers, although the economic benefit may be variable and dependent on local factors.[6]

However, recent data from population-based observational studies from US and Canada based upon the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database, have shown that outpatient TKA and THA was associated with higher odds of major and minor complications[5,8]compared with patients discharged after a one-night hospital stay[5] or 1-2 days stay.[8] The US study[5] is the first very large comprehensive evaluation of population based data and includes a propensity matched analysis accounting for comorbidities amongst 226,481 TKA and 140,557 THA patients, with a focus on the safety of outpatient arthroplasty. In addition, a smaller (n=4,391) US private insurance database study also demonstrates a higher risk of perioperative surgical and medical complications compared to standard in-patient TKA.[9] Although these studies may have several limitations including residual confounding, the findings nevertheless are an important reminder that outpatient surgery may not equate to optimized care for every patient, and that ERAS protocols should be based on the concept of "first better – then faster".[2] Consequently, there is a need for improved prediction methods for a safe outpatient procedure.[10] In addition, within an optimised ERAS set up, it may be that for selected high-risk patients, a planned longer stay in hospital may be the best means of accelerating recovery and reducing complications, re-admissions, and morbidity.[2] Consequently, it may be prudent to keep some patients with specific comorbidities in hospital overnight despite them meeting the conventional discharge criteria. This is especially the case, given that the value of discharging a patient home in the evening instead of the next morning is still to be determined from a safety vs. economic perspective.[6] Finally, although apparently safe in several selected settings, we need more generalizable data, including complete post-discharge issues such as emergency department and general practitioner visits as well as use of skilled nursing or other facilities, home nursing care, etc.

Before more widespread recommendations for out-patient arthroplasty, there are some practical caveats that need to be considered. Firstly, the value of an outpatient practice change should only be investigated in an existing optimised fast-track setup, i.e. it should not be a justification for units without an existing properly implemented fast-track program. Secondly, it may be more difficult to implement in some settings, such as hospital vs. specific ambulatory surgery centres (ASC). However, preliminary data suggest an outpatient setup can be performed successfully in both settings.[11]

Nevertheless, in addition to these contextual factors, the most important challenge for future improvement within the outpatient ERAS setting is better understanding and control of undesirable peri-operative pathophysiological responses such as pain relief, control of inflammatory responses and orthostatic intolerance, optimal blood management, prevention of cognitive dysfunction to name a few.[12] Future optimisation and reduction of these post-surgical sequelae therefore represent a prerequisite for further development and increased use of outpatient THA and TKA. As mentioned above, there is a need to be able to successfully identify patients at risk of complication or re-admission preoperatively and prior to the discharge stage. Of special importance will be the need for identifying ways to predict high pain and inflammatory responders[12], so that related pathophysiology can be modified and allow optimal post-discharge rehabilitation strategies.[2]

Nevertheless, for high performing THA and TKA ERAS centres, outpatient surgery has been the natural evolution, and the results have led to widespread enthusiasm for the approach across healthcare systems, industry, and the media. Yet, for some patients it may be better to modestly prolong their hospital stay. This may especially apply to sites without an already established successful fast-track protocol, where outpatient arthroplasty may not be possible or lead to

increased re-admissions and morbidity. Additionally, the outpatient approach should not be based upon an increased use of post-discharge care facilities with secondary cost and safety challenges. Summarizing, there is a delicate balance between implementation of well-agreed evidence for THA and TKA ERAS care vs. moving too fast to more widespread implementation of the promising outpatient approach given the fact that more patients with comorbidities or need for revision surgery are operated. We should be mindful to "walk before we run" and remember that the ERAS concept is based on reduction of undesirable pathophysiological responses to surgery in order to enhance recovery, meaning "first better, then faster".

References

1. Kehlet H. Fast-track hip and knee arthroplasty. *Lancet* 2013; **381**: 1600-2
2. Wainwright TW, Kehlet H. Fast-track hip and knee arthroplasty - have we reached the goal? *Acta Orthop* 2019; **90**: 3-5
3. Memtsoudis SG, Fiasconaro M, Soffin EM, et al. Enhanced recovery after surgery components and perioperative outcomes: a nationwide observational study. *Br J Anaesth* 2020; **124**: 638-47
4. Petersen PB, Jorgensen CC, Kehlet H. Temporal trends in length of stay and readmissions after fast-track hip and knee arthroplasty. *Danish medical journal* 2019; **66**: A5553
5. Liu J, Elkassabany N, Poeran J, et al. Association between same day discharge total knee and total hip arthroplasty and risks of cardiac/pulmonary complications and readmission: a population-based observational study. *BMJ Open* 2019; **9**: e031260
6. Vehmeijer SBW, Husted H, Kehlet H. Outpatient total hip and knee arthroplasty. *Acta Orthop* 2018; **89**: 141-4
7. Gromov K, Jorgensen CC, Petersen PB, et al. Complications and readmissions following outpatient total hip and knee arthroplasty: a prospective 2-center study with matched controls. *Acta Orthop* 2019; **90**: 281-5
8. Nowak LL, Schemitsch EH. Same-day and delayed hospital discharge are associated with worse outcomes following total knee arthroplasty. *Bone Joint J* 2019; **101-b**: 70-6
9. Arshi A, Leong NL, D'Oro A, et al. Outpatient Total Knee Arthroplasty Is Associated with Higher Risk of Perioperative Complications. *J Bone Joint Surg Am* 2017; **99**: 1978-86
10. Johnson DJ, Castle JP, Hartwell MJ, D'Heurle AM, Manning DW. Risk Factors for Greater Than 24-Hour Length of Stay After Primary Total Knee Arthroplasty. *J Arthroplasty* 2020; **35**: 633-7
11. Sershon RA, McDonald JF, 3rd, Ho H, Goyal N, Hamilton WG. Outpatient Total Hip Arthroplasty Performed at an Ambulatory Surgery Center vs Hospital Outpatient Setting: Complications, Revisions, and Readmissions. *J Arthroplasty* 2019; **34**: 2861-5
12. Kehlet H. Enhanced postoperative recovery: good from afar, but far from good? *Anaesthesia* 2020; **75 Suppl 1**: e54-e61