Optimizing Anesthesia Workflow: When to Switch from Spinal to General Anesthesia in a High Flow Primary Hip and Knee Arthroplasty Program

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INTRODUCTION: In optimizing operating room efficiency for total hip arthroplasty and total knee arthroplasty, spinal anesthesia is often initially preferred over general anesthesia due to faster recovery and lower costs. However, when spinal anesthesia fails, timely conversion to general anesthesia is essential to maintain operating room efficiency. This study examined the duration of spinal anesthesia before conversion to general anesthesia and its impact on anesthesia preparation time and total case time.

METHODS: Data from 436 patients 226 females, 210 males undergoing primary total knee arthroplasty n=219 or total hip arthroplasty n=217 between February 1, 2023, and March 17, 2024, at an ambulatory surgi centre were analyzed. Mean age was 66.2 years range 32 to 88, mean body mass index was 28.6 kg/m2 range 16.9 to 46.7 and mean American Society of Anesthesia grade was 2.4. Anesthesia preparation time was defined as the time from operating room entry to completion of anesthesia preparation; total case time spanned from surgical start to patient exit from the operating room.

RESULTS SECTION: There was a 95.2 percent success rate of spinal anesthesia, with 21 of 436 4.8 percent requiring conversion to general anesthesia. Demographics were similar between groups. Mean anesthesia preparation time was significantly shorter for successful spinal anesthesia 6.2 minutes versus general anesthesia conversions 19.8 minutes, $p<0.0001$. Procedure time averaged 53 minutes range 21 to 151 for spinal anesthesia and 58 minutes range 38 to 83 for general anesthesia conversions $p=0.03$. Total anesthesia time was 9.8 minutes for spinal anesthesia and 23.3 minutes for general anesthesia conversions, with total case time averaging 71.9 minutes and 85.9 minutes, respectively. A Kaplan Meier analysis for spinal anesthesia success was 90 percent at 11 minutes, 80 percent at 9 minutes, and 70 percent at 7 minutes..

DISCUSSION: Over two years, PAO plus arthroscopy cost more and did not improve health utility compared with PAO alone. The point estimates favored PAO alone for both costs and QALYs, and at a willingness to pay of fifty thousand dollars per QALY the probability of cost effectiveness for the combined procedure was zero. Routine addition of arthroscopy is therefore difficult to justify in a publicly funded system. This interpretation is bounded by the two year horizon, variation in intraarticular work, and the absence of productivity costs. Longer follow up and predefined subgroup analyses may identify patients who benefit enough to alter the value assessment.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): For most patients with dysplasia undergoing PAO, adding arthroscopy does not deliver value at two years. Choosing PAO alone can lower system costs without loss of health utility. These results support reserving arthroscopy for clear clinical indications rather than routine use.