Evolving Patterns of Anesthetic Technique in Total Hip Arthroplasty

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Background

Total hip arthroplasty (THA) is one of the most common elective orthopedic procedures in the US, including primary, conversion, and revision cases

- CMS removed THA from the Medicare inpatient-only list in January 2020, accelerating outpatient pathways[1]

Anesthetic options include general, neuraxial (spinal/epidural), and monitored anesthesia care (MAC)/IV sedation, often paired with peripheral nerve blocks

- Neuraxial anesthesia has been associated with fewer complications and shorter operative times than general anesthesia for THA[2-4]
- ICAROS consensus (2019) issued a strong recommendation for neuraxial anesthesia in hip arthroplasty[5]

In this study, we characterize how anesthetic technique for THA changed over a decade (2010–2020) using a national surgical quality database.

Methods

- **Study Design and Data Source:** Retrospective cohort study using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database from 2010–2020
- **Study population:** Adults ≥18 years undergoing primary, conversion, or revision THA, identified by CPT codes [27130, 27132, 27134, 27137, 27138]; cases missing the anesthetic type variable were excluded, leaving **2,643 patients**
- **Exposure:** Primary anesthetic technique as recorded in NSQIP, classified as **general anesthesia**, **MAC/IV sedation**, or **neuraxial anesthesia** (ex. spinal or epidural)
- **Outcomes:** Overall distribution of anesthetic technique across the study period and annual change in the use of each technique
- **Statistical analysis:** Annual proportions reported as n (%); temporal trends assessed with the Cochran–Armitage test for linear trend, significance set at $p < 0.05$. Analyses performed in IBM SPSS Statistics, version 30 (IBM Corp., Armonk, NY)

Results

- Of **2,643** THA cases, 1,601 (60.6%) received general anesthesia, 719 (27.2%) neuraxial, and 323 (12.2%) MAC/IV sedation
- **General anesthesia declined** from 80.0% (2010) to 53.7% (2020) (Cochran-Armitage Z = -9.5, $p < 0.001$)
- **Neuraxial anesthesia increased** from 20.0% to 29.0% (Z = 5.8, $p < 0.001$), peaking at 36.8% in 2019
- **MAC/IV sedation increased** from 0% to 17.3% (Z = 6.3, $p < 0.001$), peaking at 18.3% in 2019

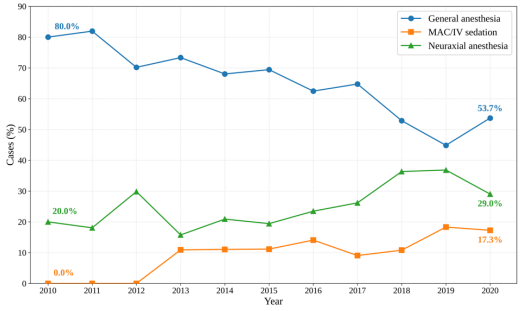


Figure 1. Annual proportion of total hip arthroplasty cases by primary anesthetic technique (general anesthesia, MAC/IV sedation, and neuraxial anesthesia), ACS NSQIP 2010–2020 (n = 2,643).

Year	General, n (%)	MAC/IV Sedation, n (%)	Neuraxial, n (%)	Total, n
2010	28 (80.0%)	0 (0.0%)	7 (20.0%)	35
2011	68 (81.9%)	0 (0.0%)	15 (18.1%)	83
2012	80 (70.2%)	0 (0.0%)	34 (29.8%)	114
2013	121 (73.3%)	18 (10.9%)	26 (15.8%)	165
2014	166 (68.0%)	27 (11.1%)	51 (20.9%)	244
2015	193 (69.4%)	31 (11.2%)	54 (19.4%)	278
2016	173 (62.5%)	39 (14.1%)	65 (23.5%)	277
2017	193 (64.8%)	27 (9.1%)	78 (26.2%)	298
2018	176 (52.9%)	36 (10.8%)	121 (36.3%)	333
2019	179 (44.9%)	73 (18.3%)	147 (36.8%)	399
2020	224 (53.7%)	72 (17.3%)	121 (29.0%)	417
Total	1,601 (60.6%)	323 (12.2%)	719 (27.2%)	2,643

Table 1. Annual distribution of primary anesthetic technique among adults undergoing total hip arthroplasty, ACS NSQIP 2010–2020. MAC, monitored anesthesia care; IV, intravenous.

Discussion

- General anesthesia remained the most common technique for THA, but its share fell by roughly 26% over the decade, reaching a bottom of 44.9% in 2019.
- Growth in neuraxial use parallels evidence of fewer complications with neuraxial anesthesia[2-4] and the 2019 ICAROS recommendation for hip arthroplasty[5]; general anesthesia nonetheless still accounted for over half of cases in 2020 suggesting a potential lag in the adoption of recommendations.
- Rising MAC/IV sedation likely reflects wider use of peripheral nerve blocks within multimodal, opioid-sparing pathways[6]
- The 2020 reversal coincided with the COVID-19 pandemic and the removal of THA from the inpatient-only list[1], both of which may have shifted case mix and anesthetic workflow
- Inclusion of conversion and revision THA, which are longer and more complex, may favor general anesthesia, although spinal anesthesia has shown benefits in revision THA[7]
- **Limitations:** NSQIP captures only the primary anesthetic, so combined techniques are not distinguished; small sample size limits accuracy in early years; causality cannot be established due to the retrospective nature of the study.

Conclusions

- **Anesthetic practice for THA shifted away from general anesthesia from 2010 to 2020**
- Neuraxial anesthesia and MAC/IV sedation together accounted for **46%** of THA cases by 2020, up from 20% in 2010
- General anesthesia remains the majority technique despite guideline support for neuraxial anesthesia



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