



Postoperative Delirium after Total Joint Arthroplasty: Trends and Impact of Enhanced Recovery after Surgery Protocols

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INTRODUCTION

- Aging population → increased demand for total joint arthroplasty (TJA), specifically total knee arthroplasty (TKA) and total hip arthroplasty (THA), and increased burden of post-op delirium
- Rise in outpatient THA/TKAs may shift delirium burden to the home setting and increase readmissions
- Gap in literature of the impact of Enhanced Recovery After Surgery (ERAS) protocols on post-op delirium
- **Study objectives:**
 - 1) Quantify the incidence of post-op delirium over time in THA/TKA patients
 - 2) Assess the association between ERAS utilization and delirium

METHODS

- **Study population:** patients undergoing elective TKA/THA from 2016-2023 from the Premier Healthcare database (retrospective cohort)
- **Outcome variables** for delirium using ICD-10 codes and billing codes for antipsychotics commonly used to treat delirium:
 - 1) **Index delirium:** delirium occurring during surgical encounter
 - 2) **Delirium readmission:** delirium associated with 30-day readmission
 - 3) **Any delirium:** either 1 or 2 above
- **ERAS variable** 2 ways:
 - 1) **Binary:** taking a value of 1 for patients treated with at least 80 percent of ERAS components³ and 0 otherwise
 - 2) **Categorical:** three groups – low (<6 ERAS components), medium (6 ERAS components), high (>6 ERAS components)
- Use of gabapentinoids and ketamine excluded from the ERAS variable because of their known associations with delirium^{4,5}
- **Analysis:**
 - Cochran-Armitage trend tests
 - Multivariable mixed-effects logistic regression models

Figure 1. Incidence of Postoperative Delirium During Surgical Hospitalization in TKA and THA Patients

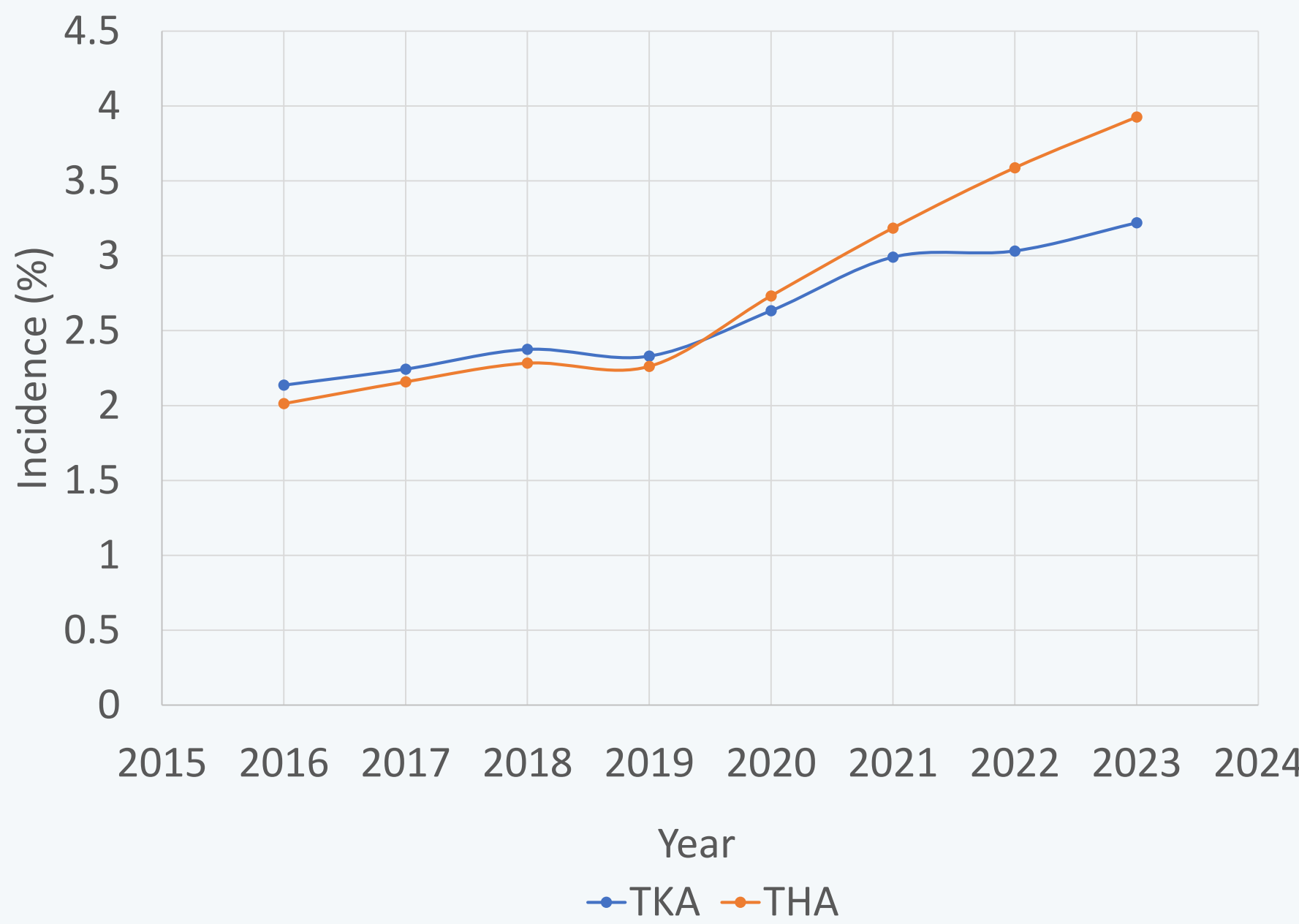
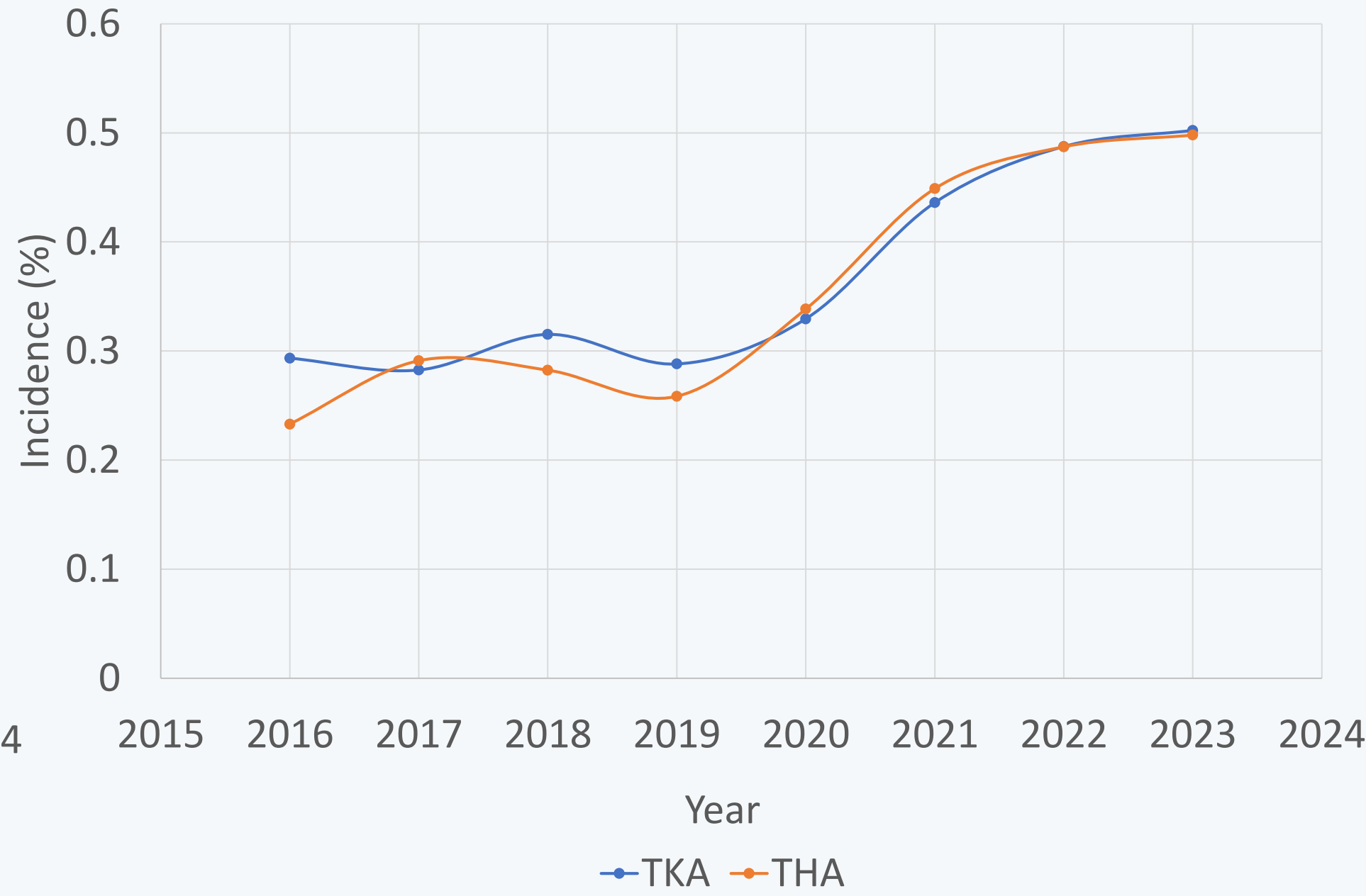


Figure 2. Incidence of Delirium Readmissions in TKA and THA Patients



ERAS protocols may play a critical role in minimizing delirium risk, especially in THA patients, where ERAS utilization was associated with a 15.4% reduction in odds of delirium.

Table 1. Logistic regression of any delirium on ERAS as a binary variable in TKA and THA patients*

Cohort	Predictor	OR	95 % CI	p-value
TKA	ERAS: >= 80% of ERAS components vs. <80%	0.952	(0.921, 0.984)	0.004
THA	ERAS: >= 80% of ERAS components vs. <80%	0.881	(0.846, 0.918)	<0.0001

Table 2. Logistic regression of any delirium on ERAS as a 3-group categorical variable in TKA and THA patients*

Cohort	Predictor	OR	95 % CI	p-value
TKA	ERAS – high vs. low	0.918	(0.870, 0.969)	0.002
	ERAS – medium vs. low	0.953	(0.904, 1.005)	0.076
THA	ERAS – high vs. low	0.846	(0.791, 0.906)	<0.001
	ERAS – medium vs. low	0.941	(0.879, 1.008)	0.084

*Covariates include: age, gender, race, ethnicity, anesthesia type, hospital teaching status, insurance type, region, Deyo comorbidity index, discharge year, urban/rural status, hospital size, opioid dispensation group. Random intercept included for hospital

RESULTS

- Among 1,387,871 THA/TKA cases, incidence of delirium during surgical encounter, readmissions, and combined was 2.50%, 0.33%, and 2.73%, respectively
- Incidence of delirium readmissions and index delirium increased significantly (p-values <0.0001) from 2016 to 2023 (Figures 1, 2).
- ERAS (binary) associated with lower odds of any delirium in both TKA and THA (Table 1)
- ERAS (three-group categorical) (Table 2):
 - high ERAS had significantly lower odds of delirium compared to low ERAS (TKA and THA)
 - medium ERAS did not have significantly different odds of delirium compared to low ERAS (TKA and THA)
- Both models showed a larger effect of ERAS on delirium in THA patients than in TKA (Table 1, 2)

DISCUSSION

- Rising burden of index delirium and delirium readmissions in TKA/THA patients
- ERAS protocols could be used to combat this rising burden - were associated with decreased odds of post-operative delirium, especially in THA patients
- The increase in delirium incidence over time, despite rising ERAS adoption, suggests other contributing factors
- These findings provide new evidence for the benefits of ERAS beyond enhancing physical recovery, also showing promise in reducing adverse cognitive effects like delirium
- Limitations: retrospective study design and potential undercoding of delirium
- Future studies needed to validate results and to explore specific ERAS components that are most strongly associated with delirium

References →

