Risk Factors for Perioperative Nerve Injury Related to Total Hip Arthroplasty

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INTRODUCTION:

While Total Hip Arthroplasty (THA) is regarded as a safe procedure, there is potential for nerve injury, which can have devastating consequences for patients and medico-legal implications. Prior studies have reported risk factors for sustaining nerve injury related to THA. However, they have been limited to institutional data and/or small sample sizes. The current study aimed to leverage a large, national, administrative database to assess independent risk factors for sustaining nerve injury with THA.

METHODS:

The 2010 to 2021 PearlDiver M157 database was queried for adult THA cases. Our institutional review board (IRB) found studies utilizing the current dataset to be exempt from review.

Those with postoperative nerve injury documented within 90-days of THA were identified. Patient age, sex, body mass index (BMI), Elixhauser Comorbidity Index (ECI), fracture indication, and surgery type (index versus revision) were assessed for correlation with nerve injury by multivariate analyses.

RESULTS:

From a total of 750,695 THA cases, nerve injury was identified for 2,659 (0.35%). Multivariate analysis revealed independent predictors of nerve injury in decreasing odds ratio (OR) order to include: revision procedure (OR: 2.14), female sex (OR: 1.35), ECI (incrementally, ECI 1-2 [OR 1.27], ECI 3-4 [OR: 1.43], and ECI ≥ 5 [OR: 1.59]) and younger age (OR: 1.02 per decade decrease) ($p<0.05$ for each). Pertinent negatives for associations with nerve injury by multivariate analysis included underweight BMI (<20), and fracture indication. Individuals with a morbidly obese BMI status (≥35) had a decreased risk of nerve injury (OR: 0.83, p=0.017).

DISCUSSION:

Nerve injury following THA was found to be low at 0.35%. Factors independently associated with this adverse outcome were defined, of which the greatest risk was seen with revision procedures. While postoperative outcomes vary depending on the specific clinical scenario, these risk factors may be helpful for risk stratification and patient counselling.

SIGNIFIANCE/CLINICAL RELEVANCE:

The large patient numbers in this current analysis of a large national administrative database affords greater statistical power to further examine risk factors for nerve injury after THA. These risk factors, derived from the largest cohort to date, can inform clinical decision making and enhance patient safety.

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IMAGES AND TABLES:

Table 1: Univariate and Multivariate analysis of risk factors for nerve injury 90-days after THA

Variable	No Nerve Injury	%	Nerve Injury	%	p-value	Multivariate Odds Ratio with 95% CI		p-value
Total	748,036	99.65	2,659	0.35				
Age (Per Decade Decrease)	64.83 ± 10.20		63.39 ± 10.37		**<0.001**	1.02	(1.01, 1.02)	**<0.001**
Sex					**<0.001**			**<0.001**
Male	327,023	43.72	977	36.74		REF		
Female	421013	56.28	1,682	63.26		1.35	(1.25, 1.47)	
BMI					**<0.001**			
< 20	16,188	2.16	84	3.16		0.90	(0.66, 1.24)	0.528
20-34	51,725	6.91	243	9.14		REF		
35+ (Morbid Obesity)	174,075	23.27	723	27.19		0.83	(0.72, 0.97)	**0.017**
Comorbidities					0.329			
ECI = 0	72,864	9.74	193	7.26		REF		
ECI 1-2	186,138	24.88	624	23.47		1.27	(1.08, 1.50)	**0.003**
ECI 3-4	162,123	21.67	620	23.32		1.43	(1.22, 1.69)	**<0.001**
ECI >=5	56,420	7.54	243	9.14		1.59	(1.32, 1.93)	**<0.001**
Fracture Indication					**<0.001**			0.946
No Fracture	723,450	96.71	2,550	95.90		REF		
Fracture	24,586	3.29	109	4.10		1.01	(0.83, 1.23)	
Revision Surgery					**<0.001**			**<0.001**
Non-Revision Case	679,110	90.79	2,182	82.06		REF		
Revision Case	68,926	9.21	477	17.94		2.14	(1.93, 2.36)	

BMI, Body Mass Index
ECI, Elixhauser Comorbidity Index
Bold p-value = statistical significance at p < 0.05

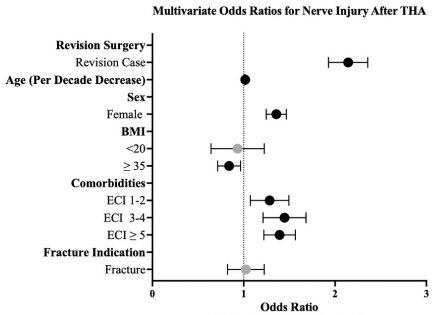

Figure 1: Forest Plot of Multivariate Odds Ratios for Risk Factors Associated with Nerve Injury 90 Days After Total Hip Arthroplasty