



Incidence and Management of Post-Dural Puncture Headache (PDPH) in Patients Undergoing Total Joint Arthroplasty

Bradley Lee MD¹, William Qiao MD¹, Pa Thor PhD¹, Maya Tailor BA¹, Juliet Rowe MPH¹, Justine Jorgensen BA^{1,2}, David Kim MD¹, Sang Kim MD¹, Michael Singleton MD¹, Stephen McCracken MD¹, Mikhail Goman MD¹, Alexandra Sideris PhD^{1,3}, Jashvant Poeran MD PhD^{1,3}, Jiabin Liu MD PhD^{1,3}

¹Department of Anesthesiology, Critical Care, and Pain Management, Hospital for Special Surgery, New York, NY; ² Robert Wood Johnson Medical School, Rutgers, New Brunswick, NJ; ³ Pain Prevention Research Center, Department of Anesthesiology, Critical Care & Pain Management, Hospital for Special Surgery, New York, NY



INTRODUCTION

- Neuraxial anesthesia is commonly used for joint replacement surgery
- Inadvertent dural puncture and post-dural puncture headache (PDPH) are known complications with neuraxial anesthesia
- PDPH can negatively impact recovery after surgery
- Risk and management of PDPH in patients undergoing joint arthroplasty is not well known
- Study objective: to determine the incidence, risk factors, and management of PDPH in non-parturient patients who experience unintended dural puncture during lumbar epidural placement for total hip and knee arthroplasty

METHODS

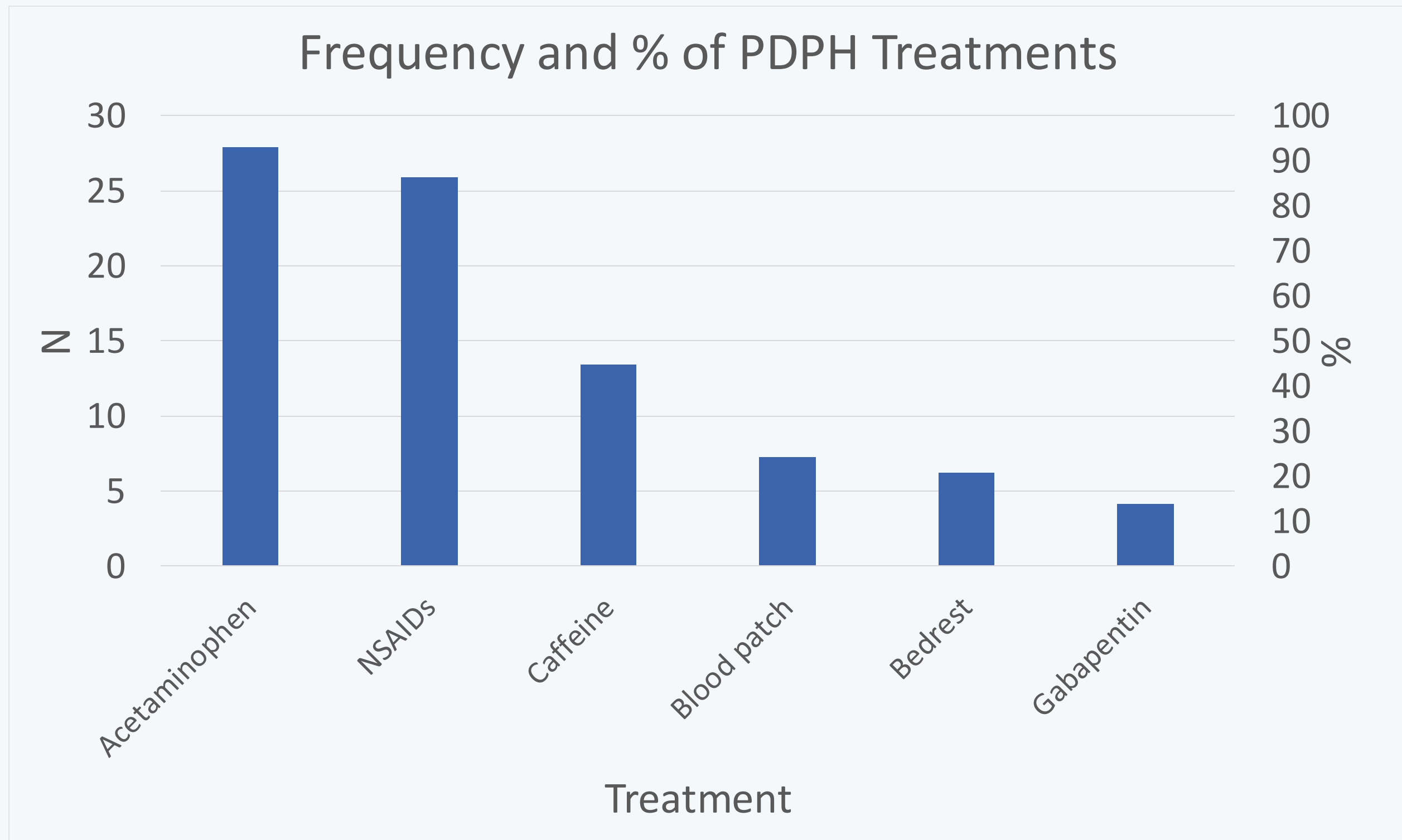
- Retrospective chart review of total joint arthroplasty cases from January 1st 2016 - April 30th 2023 to identify cases with inadvertent dural puncture from neuraxial anesthesia using a 20-gauge or larger needle/catheter.
- Two independent co-investigators chart reviewed to assess frequencies of PDPH symptoms and treatment modalities, as well as long-term outcomes.
 - Chi-square tests, Fisher’s exact tests, and Mann-Whitney U tests were used for statistical comparisons
 - A backward elimination procedure for logistic regression was performed to identify predictors of PDPH risk

PDPH is uncommon in joint arthroplasty patients after inadvertent dural puncture. Younger age and lower BMI are key risk factors for PDPH, and conservative treatments are preferred.

Table 1. Final logistic regression model of PDPH status on variables of interest after backward selection

Variable	Parameter Estimate	P-value	Odds Ratio	95% CI
Age	-0.0972	<0.0001	0.907	(0.877, 0.918)
BMI	-0.0859	0.0089	0.918	(0.860, 0.979)

Figure 1. PDPH Treatments



RESULTS

- Of 77,586 patients receiving neuraxial anesthesia, 640 (0.82%) had an inadvertent dural puncture and 29 (4.5%) of these went on to develop PDPH.
- Younger age was significantly associated with increased risk ($p<0.0001$); each one-year increase in age reduced odds of PDPH by 9.3%.
- Lower BMI was significantly associated with higher risk ($p=0.0089$); each one-unit BMI increase reduced odds by 8.2%.
- There was no significant association between sex and PDPH occurrence.
- Majority of patients were treated conservatively with NSAIDs (89.7%) and acetaminophen (93.1%).
- 24.1% (7 patients) required an epidural blood patch.
- Three patients reported long-term sequelae (chronic headaches).

DISCUSSION

- PDPH is uncommon (4.5%) in joint arthroplasty patients after inadvertent dural puncture, which is significantly lower than the parturient population (>80%).
- Younger age and lower BMI are key risk factors for PDPH in this demographic suggesting anatomical differences may influence susceptibility.
- No significant association was found between sex and PDPH risk, differing from previous research findings.
- Conservative treatments were highly effective and only a small percentage required an epidural blood patch.

References →

