

Diabetes Mellitus Increases the Risk of Post-Dural Puncture Neuralgia After Spinal Anesthesia for Cesarean Delivery: A Retrospective Cohort Study

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Introduction

Post-dural puncture neuralgia (PDPN) is an underrecognized, debilitating complication, distinct from post-dural puncture headache. Diabetes mellitus (DM) may predispose to PDPN via microvascular ischemia, connective-tissue fibrosis, and chronic inflammation. We hypothesized higher PDPN incidence in diabetic women undergoing cesarean delivery under spinal anesthesia, amplified by poor glycemic control and multiple puncture attempts.

Results

- PDPN incidence: 18.7% (DM) vs 6.3% (non-DM); OR 3.2 (95% CI 1.8–5.6), $p<0.001$.
- HbA1c $>7\%$: 27.1% vs 9.8%; OR 4.1, $p=0.003$.
- ≥ 3 puncture attempts: OR 2.4, $p=0.02$.
- MRI LF inflammation: 42% (DM) vs 18% (non-DM), $p<0.001$.
- Needle gauge: NS ($p=0.34$).

Methods

Design: Retrospective cohort (2015–2023).
Population: 600 women (18–45 yrs) undergoing cesarean delivery.
Groups: Diabetic ($n=300$) vs matched non-diabetic controls ($n=300$) by age (± 5 yrs) and BMI (± 3 kg/m²).
Outcome: PDPN = new-onset radicular pain ≤ 6 weeks postpartum confirmed by a neurologist.
MRI criteria: Ligamentum flavum (LF) thickening >3 mm + T2 hyperintensity.
Covariates: HbA1c, puncture attempts, needle gauge, chronic back pain, gestational DM.
Analysis: Multivariate logistic regression; IRB-approved; STROBE-compliant.

Discussion

DM increases PDPN risk >3 -fold, magnified by poor glycemic control and multiple punctures. Mechanisms: advanced glycation, ligamentous fibrosis, microangiopathy, and pro-inflammatory priming. MRI LF thickening and T2 hyperintensity support neuroinflammation as a radiologic correlate.

Conclusion

DM markedly elevates PDPN risk after spinal anesthesia for cesarean delivery. Prevention should emphasize perioperative glycemic optimization and minimizing puncture attempts (consider ultrasound guidance). Persistent radicular symptoms warrant MRI. Prospective multicenter studies are needed.

Key Findings (Visualized)

