

# Neurologic and histologic outcome after intraneural injections of lidocaine in canine sciatic nerves



## Authors:

Kapur<sup>1</sup>; Vuckovic; Dilberovic<sup>1</sup>; Zaciragic<sup>2</sup>; Cosovic<sup>3</sup>; Divanovic<sup>4</sup>; Mornjakovic<sup>3</sup>; Babic<sup>5</sup>; Borgeat<sup>6</sup>; Thys<sup>7</sup>; Hadzic<sup>7</sup>

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## Abstract:

Background:

Inadvertent intraneural injection of local anesthetics may result in neurologic injury. We hypothesized that an intraneural injection may be associated with higher injection pressures and an increase in the risk of neurologic injury.

Methods:

The study was conducted in accordance with the principles of laboratory animal care, and was approved by the Laboratory Animal Care and Use Committee. Fifteen dogs of mixed breed (16-21 kg) were studied. After general endotracheal anesthesia, the sciatic nerves ( $n = 30$ ) were exposed bilaterally. Under direct vision, a 25-gauge, long-beveled needle ( $30^\circ$ ) was placed either epineurally ( $n = 10$ ) or intraneurally ( $n = 20$ ), and 4 ml of preservative-free lidocaine 20 mg/ml was injected using an automated infusion pump (4 ml/min). Injection pressure data were acquired using an in-line manometer coupled to a computer via an analog-to-digital conversion board. After injection, the animals were awakened and subjected to serial neurologic examinations. One week later, the dogs were killed, the sciatic nerves excised and histologic examination was performed by pathologists blind to the purpose of the study. Results:

All **perineural** injections resulted in **low** pressures ( $\leq 5$  psi). In contrast, eight of 20 **intraneural** injections resulted in high pressures (**20-38 psi**) at the beginning of the injection. Twelve **intraneural** injections, however, resulted in pressures of **less than 12 psi**. Neurologic function returned to baseline within 3 h after perineural injections and within 24 h after **intraneural** injections, when the measured injection pressures were **less than 12 psi**. Neurologic **deficits persisted** throughout the study period after all eight intraneural injections that resulted in **high** injection pressures. Histologic examination of the affected nerves revealed fascicular **axonolysis** and cellular infiltration. Conclusions:

The data in our canine model of intraneural injection suggest that intraneural injections do not always lead to nerve injury. High injection pressures during intraneural injection may be indicative of intrafascicular injection and may predict the development of neurologic injury.

**Keywords:** [nerve block](#); [complications](#); [injection pressure](#); [intraneural injection](#); [neurotoxicity](#)

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**Affiliations:** **1:** Departments of **1**Anatomy **2:** Physiology **3:** Histology, Medical School, University of Sarajevo **4:** Veterinary School, University of Sarajevo **5:** Department of Pathology, Medical School, University of Sarajevo, Sarajevo, Bosnia and Herzegovina **6:** Department of Anesthesiology and Intensive Care, Orthopedic University Clinic Balgrist, Zurich, Switzerland **7:** Departments of **7**Anesthesiology, St. Luke's-Roosevelt Hospital Center, College of Physicians and Surgeons of Columbia University, New York, NY, USA

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