

Title : EFFECT OF EPIDURAL STEROIDS ON NERVES AND MENINGES

Authors : Thomas J. Delaney, M. D., Harold Carron, M. D., John C. Rowlingson, M. D., Albert Butler, M. D., John A. Jane, M. D.

Affiliation: Departments of Anesthesiology and Neurosurgery, University of Virginia Medical Center, Charlottesville, Virginia 22908

INTRODUCTION:

There have recently been several encouraging reports of symptomatic improvement in patients with low back pain following injection of a mixture of a local anesthetic and a corticosteroid preparation into the epidural space. During the past six years in our institution, approximately 6,000 introductions of a local anesthetic combined with triamcinolone diacetate (Aristocort Intralesional) have been performed for the relief of low back pain and sciatica. There is a total dearth of animal or other studies, however, which show the long-term effect of epidurally placed steroids upon neural tissue. It is the purpose of this study to evaluate the effect of triamcinolone diacetate in vehicle and of the vehicle itself on the peripheral nerves, root sleeves, and meninges.

METHOD:

Forty-eight cats weighing 2.5-5.0 kg were divided into four groups. The cats received percutaneous epidural injections at the lumbosacral space of 0.2 ml/kg of the experimental materials as follows:

- Group 1: Normal control, no injection (6 animals)
- Group 2: 2% lidocaine only (12 animals)
- Group 3: 2% lidocaine plus 0.025 ml/kg of the suspending vehicle of triamcinolone diacetate (15 animals)
- Group 4: 2% lidocaine plus 0.7 mg/kg of triamcinolone diacetate in vehicle (15 animals)

Three animals from Groups 1 and 2, and 5 animals from Groups 3 and 4 were chosen at random and were sacrificed at 30 days following injection. The remaining animals were retained for sacrifice at 90 days and one year.

Specimens for both light and electron microscopic examination were taken from the level of injection as well as one level above and one level below the injection site. Sections of the spinal root, root exit zone, and the meninges, including dura and arachnoid, were removed following pentobarbital anesthesia and transcardiac perfusion of formaldehyde-glutaraldehyde fixa-

tive. Both light and electron microscopic sections were examined by examiners who were blind to the source of the sections.

RESULTS:

Microscopic examination revealed minimal localized mononuclear cell meningeal infiltration in 1/3 animals in Group 2 (lidocaine), 4/5 animals in Group 3 (lidocaine-vehicle), 2/5 animals in Group 4 (lidocaine-steroid), and in 2/3 animals in Group 1 (no injection). In addition one animal each in Groups 2 and 4 demonstrated "a few" polymorphonuclear leukocytes in addition to mononuclear cells infiltrating the meninges. Finally 2/5 animals in Group 3 demonstrated very slight thickening of the meninges in the dorsal root exit zone (less than double the normal meningeal thickness). Electron microscopy demonstrated similar findings.

DISCUSSION:

All of these histologic findings were considered to be very mild and unlikely to cause symptoms. These preliminary results suggest that epidurally administered local anesthetic - steroid combinations do not cause significant histologic damage to neural tissue. Tissue from animals sacrificed at 90 days is now being prepared for examination.