# Does epidural magnesium sulphate causes medulla spinalis injury in rabbits?

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## Objective

Magnesium is an intracellular ion that has analgesic properties via calcium regulation and N-methyl-D-aspartate receptors (1).

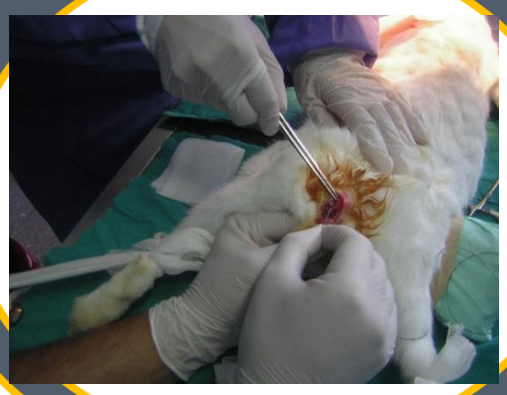
However, the safety of neuroaxial magnesium is not proved.

The aim of this experimental study is to investigate the possible neurotoxicologic effects of epidural magnesium sulphate ($MgSO_4$) on medulla spinalis in rabbits.

## Methods

After ethic committee's approval 18 male Albino New Zealand rabbits were enrolled into the study. Epidural catheter was inserted into the sacral canal under ketamine (2).

Development of motor and sensorial block 5 minutes after administration of 1 mL of 1 % lidocaine verified the placement of the catheter.



**Group Control (n=6):** 0.20 mL isotonic saline was administered via epidural catheter.

**Group M150 (n=6):** One mL of 150 mg.mL-1 MgSO4 (~ 0.6 mmol elemental magnesium) (pH=6.20) was administered via epidural catheter then catheter was flushed with 0.20 mL isotonic saline.

**Group M450 (n=6):** One mL of 450 mg.mL-1 MgSO4 (~ 1.8 mmol elemental magnesium) (pH=6.10) was administered via epidural catheter then catheter was flushed with 0.20 mL isotonic saline.

Catheter's placement was localized by laminectomy. Spinal sections were taken between 5 cm rostral and caudal segments from the tip of the catheter. The sections were stained both hematoxylin-eosin and Cresyl violet. The slides were examined using a light microscope.

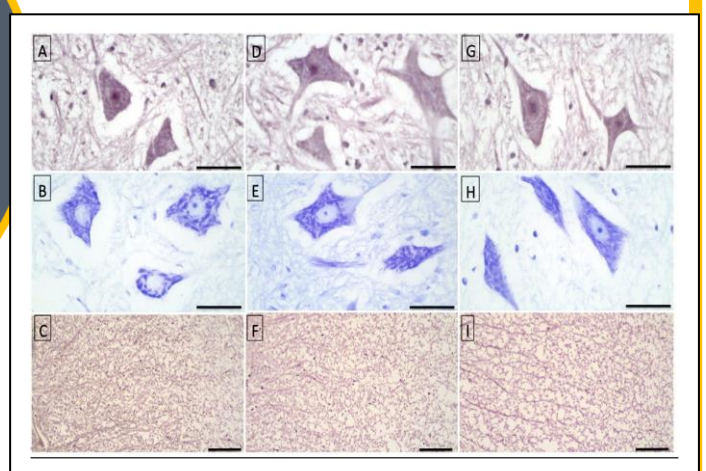



**Figure:** A-B, D-E, G-H anterior horn (Multipolar motor neurons) and bar = 50 mm (x40), C, F, I white matter (Myelinated axon sections) and bar =150 mm (x10). A, B, C: Control group, D, E, F: Group 150, G, H, I: Group 450. A, D, G, C, F, I: Haematoxylin eosin, B, E, H: Cresyl violet

## Results

Nissl body loss, vacuolization, myelin irregularity, gliosis and fibrosis in grey and white matter samples were assessed. There were no signs of histological tissue damage. There was **no statistically significant histopathological difference** between groups.

## Conclusion

This is the first study that investigates spinal cord injury after epidural magnesium administration to our knowledge. These results are important since epidural route is the second most common route for $MgSO_4$. In this study we report that even relatively higher doses of epidural $MgSO_4$ did not cause any spinal cord injury. Further studies need to be performed to adapt these findings to clinical practice.