Combined intrathecal and epidural magnesium sulfate supplementation of spinal anesthesia to reduce post-operative analgesic requirements: a prospective, randomized, double-blind, controlled trial in patients undergoing major orthopedic surgery.


Department of Anesthesia and Intensive Care Medicine, La Sapienza University of Rome, II Faculty of Medicine, S. Andrea Hospital, Rome, Italy.

BACKGROUND: New ways of decreasing post-operative analgesic drug requirements are of special interest after major surgery. Magnesium sulfate (MgSO(4)) alters pain processing and reduces the induction and maintenance of central sensitization by blocking the N-methyl-D-aspartate (NMDA) receptor in the spinal cord. We investigated whether supplementation of spinal anesthesia with combined intrathecally and epidurally infused MgSO(4) reduced patients' post-operative analgesia requirements.

METHODS: In a randomized, prospective, double-blind, placebo-controlled trial, we enrolled 120 consecutive patients undergoing orthopedic surgery during spinal anesthesia (levobupivacaine and sufentanil). Patients were randomly assigned to receive intrathecal MgSO(4) (94.5 mg, 6.3%), epidural MgSO(4) (2%, 100 mg/h), intrathecal and epidural MgSO(4) combined or spinal anesthesia alone (controls). Post-operative morphine consumption was assessed in all groups by patient-controlled analgesia (PCA).

RESULTS: Of the 120 patients enrolled, 103 (86%) completed the study. Morphine consumption at 36 h after surgery was 38% lower in patients receiving spinal anesthesia plus epidural MgSO(4) [-14.963 mg; 95% confidence interval (CI), -1.44 to -28.49 mg], 49% lower in those receiving spinal anesthesia plus intrathecal MgSO(4) (-18.963 mg; 95% CI, -5.27 to -32.65 mg) and 69% lower in the intrathecal-epidural combined group (-26.963 mg; 95% CI, -13.73 to -40.19 mg) relative to control patients receiving spinal anesthesia alone. No complications developed during the post-operative course or at 1 month after surgery.

CONCLUSION: In patients undergoing orthopedic surgery, supplementation of spinal anesthesia with combined intrathecal and epidural MgSO(4) significantly reduces patients' post-operative analgesic requirements.

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