Title: EFFECT OF PATIENT CONTROLLED ANALGESIA ON NOCTURNAL SLEEP AND SPONTANEOUS ACTIVITY FOLLOWING LAPAROTOMY

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Introduction. Patient controlled analgesia (PCA) is a promising new therapy for the treatment of the pain of surgery and major trauma.[1,2] Several medical device manufacturers have plans to introduce PCA devices into the American market in 1984. We have performed a comparative examination of nocturnal sleep and spontaneous activity in patients receiving either PCA or intermittent intramuscular injection for the provision of analgesia following laparotomy.

Methods. Seventy-seven patients, ASA I-II, undergoing elective laparotomy were studied (with informed consent and approval granted by the Human Investigations Committee, University of Kentucky, Lexington). Following informed consent, patients were assigned by a computer-generated randomization scheme to one of two study groups in a ratio of two "PCA-dosed" patients for every one "intramuscularly (IM)-dosed" patient. PCA-dosed patients employed devices with an initial incremental dose of 0.6 mg/m^2 BSA morphine sulfate and a six minute lockout interval. IM-dosed patients received an analgesic regimen of intramuscular mophine sulfate 8-12 mg every four hours as needed. PCA therapy was begun upon emergence from anesthesia, and was continued until the morning of the third postoperative day. A questionnaire was completed by patients of both study groups on the afternoon of the third postoperative day.

Results. PCA-dosed patients reported less postoperative pain on a five point ordinal scale than did IM-dosed patients ($p=0.007$). IM-dosed patients reported a greater frequency of nocturnal awakening than did PCA-dosed patients (3.1 vs. 1.9 episodes per night; $p<0.05$). IM-dosed patients reported greater interference with spontaneous activity from both pain and from the sedative effects of the analgesic medication than did PCA-dosed patients. IM-dosed patients reported greater interference with "moving, getting out of bed, and walking" secondary to pain than did PCA-dosed patients (5.3 vs. 3.5 on a 10 point linear analogue scale; $p=0.005$). IM-dosed patients also reported greater interference produced by pain in "taking a deep breath" than did PCA-dosed patients (ordinal scale; $p<0.05$). IM-dosed patients also reported that their pain medication decreased their spontaneous activity more frequently than did PCA-dosed patients (46% vs. 12% of study subjects; $p<0.005$). 47% of PCA-dosed patients stated that spontaneous activity appeared to be increased following a dose of medication.

Discussion. Results of this questionnaire data reaffirm that PCA provides a better analgesic outcome in postoperative patients than does intramusuclar dosing. PCA appears to attenuate nocturnal sleep disturbance created by pain. Finally, dosing with the PCA system appears to produce less interference with spontaneous activity than does intramuscular dosing, and may even enhance spontaneous activity in a significant percentage of patients recovering from major surgery.

References.

1. Bennett RL, Batenhorst RL, Graves D, et al: Patient-controlled analgesia: a new concept of postoperative pain relief. Annals of Surgery 195: 700-705, 1982

2. Graves DA, Foster TS, Batenhorst RL, et al: Patient-controlled analgesia. Ann Intern Med 99: 360-366 (91 ref), 1983