TITLE: VARYING NARCOTIC REQUIREMENTS AMONG ORTHOPEDIC PATIENTS

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It generally is appreciated that orthopedic patients have different analgesic requirements than do patients undergoing other types of surgery. However, what has not been recognized is that within this post-surgical population there is a wide range of analgesic requirements. This report details our experience providing patient controlled analgesia in patients recovering from a variety of orthopedic procedures.

Methods. Following approval by the institutional IRB, a total of 119 patients who had undergone ankle ORIF (n=12), back fusion (n=9), femur rodding (n=11), tibia reconstruction (n=4), anterior cruciate ligament repairs (ACL) reconstruction (n=5), laminectomy (n=17), total hip replacement (n=48), and total knee replacement (TKR) (n=12) were assessed. Patients were evaluated with respect to pain using a visual analog scale anchored with 0=no pain and 10=worst pain imaginable, analgesic requirements (morphine), average baseline dose per hour and patient age. Comparison of groups was done by descriptive statistical analysis.

Results and Discussion. As noted in the Table, ankle and back fusion were associated with significantly higher VAS scores than other procedures. At the other extreme, hip surgery generally was associated with a lower VAS score. Furthermore, hip surgery patients required significantly less analgesic medication. This may be attributed in part to the nature of their surgery, and possibly to the significantly older age of this patient population.

Whereas, when dealing with abdominal surgery, one makes a distinction between lower and upper abdominal surgery which thereby dictates analgesic requirements, it becomes clear that it is not only the site of surgery but the nature of surgery that is critical in the orthopedic patient. Persistent bone pain in young, otherwise healthy, individuals seem to require large amounts of narcotic which still fail to provide adequate analgesia. It appears that PCA offers improvements over IM medication, but the persistent bone pain might also benefit from supplemental analgesia (e.g., NSAID; additional narcotics, antispasmodics or basal infusions) in certain situations.

	VAS Pain Mean±SD	Mean	Range	Narcotic Avg. Dose/Hr	Age Mean±SD
ACL	5.0±1.4	4	4-7	4.6±1.6	26±7.1
Ankle	6.3±1.9	6	4-10	3.4±1.6	48.4±17.5
Femur	5.9±2.5	5	2-10	3.6±2.8	34.2±16.1
Back Fusion	6.2±2	6	3-9	5.4±4.8	33.6±8.9
Hip	2.6±1.9	3	0-6	1.2±1	67±12.3
Lami	4.4±2.3	5	3-10	2.8±2	49.6±13.7
Tibia	4.8±1.9	5.5	2-6	3.0±0.4	22.8±1.6
TKR	5.3±3	5.5	0-10	2.1±0.8	61.7±16.4

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TITLE: INTERPLEURAL BUPIVACAINE ANALGESIA DURING AND AFTER HEPATIC ARTERY CHEMOEMBOLIZATION

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Hepatic arterial chemoembolization (HACE) is a procedure in which embolic material mixed with chemotherapeutic agents is selectively injected into the hepatic arteries of patients with hepatic neoplasms. The substance occludes the hepatic arteries of patients for a period of days to weeks, gradually releasing chemotherapeutic agents in close proximity to the tumor. While this technique can improve the response and reduce the systemic side effects compared to intravenous chemotherapy, HACE is associated with the immediate onset of severe right upper quadrant pain, which can persist for hours following the procedure.

This controlled, double-blinded study evaluated the analgesic efficacy of bupivacaine (group A) vs. saline (group B) injected via interpleural catheters in 6 patients undergoing HACE. Patients with history of pneumothorax, pleurodesis, or bleeding diathesis were excluded from the study. All patients gave informed consent and received 75 mcg of fentanyl prior to interpleural catheter insertion. ECG, non-invasive blood pressure monitors, and pulse oximeters were used on all patients. Epidural kits containing a 20-gauge open tip epidural catheter and an 18-gauge Tuohy needle were used (Burron Medical Inc., Bethlehem, PA). The pleural space was identified by the hanging drop technique. The catheter was threaded 5 cm into the pleural space, and the needle was removed. Patients randomized to group A received 2 $mg \cdot kg^{-1}$ of 0.5% bupivacaine with 1:200,000 epinephrine, while patients in group B received an equivalent volume of saline. Both groups were given intravenous fentanyl in response to patient discomfort by an anesthesiologist blinded to the patient group. No benzodiazepines were used. Narcotic use, hemodynamics, and visual analogue pain scores during the procedure were compared. The Student's T-test was used to determine significant differences between the experimental and control groups. All patients received morphine infusion for pain control following the procedure. In 2 patients from group A and 1 from group B, the morphine infusion was inadequate, and these 3 patients received interpleural bupivacaine 4-10 hours following the procedure. In these patients, visual analogue pain scores and morphine infusion requirements were compared 30 minutes following the bupivacaine injections.

The two groups were similar in age, weight and ASA physical status. While the average intensity and duration of pain did not significantly differ between the two groups, the worst level of pain experienced by group A was about half (48%) of that experienced by group B ($p<.05$). During the embolization, mean arterial pressures increased in group B, with no change in group A ($p<.05$). Two patients in group B had elevations in their blood pressure which warranted the administration of labetolol and/or hydrazine. This was judged necessary by the blinded anesthesiologist due to excessive sedation and inadequate hemodynamic control. No patient in the bupivacaine group required vasodilator therapy. During the procedure group A received a mean of 0.92 $mcg \cdot kg^{-1}$ of fentanyl, while group B received 5.4 $mcg \cdot kg^{-1}$ ($p=.05$). For patients who had interpleural catheters dosed following the procedure, average pain intensity decreased by 55%, while narcotic infusion requirements simultaneously decreased by 75% ($p<.05$). There were no pneumothoraces detected on chest radiographs nor adverse effects from the local anesthetic agents.

The authors conclude that interpleural bupivacaine blunts the pain and the hemodynamic sequelae during HACE, and also reduces pain and narcotic requirement after the procedure.

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