Date :

Title : NALBUPHINE IN "BALANCED" ANESTHESIA: ITS ANALGESIC EFFICACY AND HEMODYNAMIC EFFECTS

Author : N.R. Fahmy, M.D.

Affiliation: From the Anesthesia Services of the Massachusetts General Hospital and the Department of Anaesthesia, Harvard Medical School, Boston, Massachusetts 02114

Introduction

Nalbuphine hydrochloride (Nubain, Endo) is a new synthetic narcotic agonist-antagonist analgesic of the phenathrene series. It is chemically related to both the widely used narcotic antagonist, naloxone, and the potent narcotic analgesic, oxymorphone. Because it has been proved effective in treating pain of varying intensities in a wide variety of clinical situations, we examined its efficacy as an analgesic during nitrous oxide-narcotic-relaxant (balanced) anesthesia.

Methods

A double-blind, parallel group study was conducted on 70 patients of both sexes whose average age was 37 years and average weight 72 kg. These patients were undergoing similar orthopedic procedures. Nalbuphine and morphine were supplied in identically-appearing 2 ml vials (10 mg/ml) that were coded, labelled and randomized by Endo Laboratories so that the double-blind experimental design could be accomplished.

Premedication consisted of 0.1 mg/kg of the study medication and scopolamine, 0.2 to 0.4 mg, administered intramuscularly one hour before induction of anesthesia. Sedation, apprehension, excitement, heart rate, systemic blood pressure, and respiratory rate were assessed before and one hour after premedication. Nalbuphine or morphine, 0.2 to 0.4 mg/kg, was then administered intravenously, followed 10 minutes later by intravenous diazepam, 0.2 mg/kg. A sleep dose of thiopental was then administered, followed by succinylcholine, 1 mg/kg, to facilitate endotracheal intubation. Anesthesia was maintained with N_2O-O_2- and curare. Ventilation was controlled at a tidal volume of 10 to 12 ml/kg and a rate of 8 per minute. During operation, 2 mg increments of the study drug were given when signs of inadequate analgesia were observed. Muscle relaxation was reversed at end of operation.

Measurements were performed before and 5 minutes after the initial intravenous dose of nalbuphine or morphine; 5 minutes after diazepam; at time of surgical incision; every 15 minutes for one hour after incision; and one hour postoperatively. Measurements included hemodynamic and blood gas variables. Also, rate of recovery to wakefulness, adequacy of ventilation (tidal and minute volumes and arterial blood gases), and side effects were recorded.

Results

The most important results include: (1) Both drugs were effective in producing sedation and allaying anxiety and apprehension preoperatively. (2) Nalbuphine administration was associated with cardiovascular stability. There were no significant changes in cardiac output, arterial or right atrial pressures, heart rate, stroke volume and ECG. With morphine, however, bradycardia and hypotension occurred in some patients. (3) A small significant increase in Pa_{CO_2} occurred with both drugs. (4) Effective intraoperative analgesia was obtained with either drug. However, a slightly higher amount of nalbuphine was required in some patients: 1.0 to 1.5 mg/kg as opposed to 1 mg/kg of morphine. (5) Incidences of postoperative respiratory depression and vomiting were significantly less with nalbuphine. (6) Low incidence of psychomimetic effects with both drugs.

Discussion

Results of this study demonstrate that nalbuphine is an effective intraoperative analgesic and compares with morphine. Hemodynamic stability is obtained together with a lower incidence of postoperative vomiting and respiratory depression. Romagnoli and Keats[1] compared the hemodynamic consequences of nalbuphine (10 mg) and morphine (10 mg) in patients with coronary artery disease during cardiac catheterization. They found no significant change in any measured hemodynamic variable following either drug. These findings are in agreement with our results. Psychomimetic effects were infrequent. In this respect, nalbuphine differs from pentazocine, which is associated with a higher incidence of psychomimetic side effects.

Thus, nalbuphine is an effective intraoperative analgesic with a lower incidence of side effects.

Reference

1. Romagnoli A, Keats AS. Comparative hemodynamic effects of nalbuphine and morphine in patients with coronary artery disease. Bull Tex Heart Inst 5: 19-24, 1978.