incident-free procedure. Each representative has extensive training in iv therapy and procedures.

John Parks
Director, Regulatory Affairs and Quality Assurance
Baxter Corporation
Mississauga Ontario

Emergence phenomena after ketamine anaesthesia: the influence of music

To the Editor:

Emergence from ketamine anaesthesia in the postoperative period may be associated with visual, auditory, proprioceptive and confusional illusions which may progress to delirium.[1] Droperidol[2] and benzodiazepines[1] can reduce or mitigate these reactions but there is no uniform agreement concerning their effectiveness. In this letter we present the results of a study, conducted to ascertain the effect of music on the emergence phenomena after ketamine anaesthesia.

Eighty ASA-I patients aged 10–25 yr undergoing minor surgical procedures of less than 45 min under ketamine anaesthesia were randomly divided into two groups of 40. All the patients were given intravenous diazepam in the dose of 0.2 $mg \cdot kg^{-1}$. Headphones were applied to all the patients and music of the patient's choice was switched on in the study group five minutes before giving ketamine 2 $mg \cdot kg^{-1}$ *iv*, while the control group received no music. Supplemental doses of ketamine 1 $mg \cdot kg^{-1}$ were given every ten minutes whenever required. Headphones were removed two hours after the last dose of ketamine. Two days after surgery the patients answered a questionnaire based on that of Garfield *et al.*[3]

The incidence of dreams in the study group (23/40) was higher ($P < 0.05$) than that in the control group (12). However, none of the patients in the study group had unpleasant dreams with horror, while ten of the control group reported unpleasant experiences. More patients in the study group (32/40) opted to have a similar anaesthetic than in the control group (10/40) ($P < 0.01$) while ten patients in the control group and none in the study group refused to have a similar anaesthetic in future ($P < 0.01$).

Thus although the addition of music with ketamine anaesthesia increases the incidence of emergence phenomena the quality of wakening is pleasant and more acceptable to patients. The reasons for the differences are not known but may be attributed to the modulation of sensory experiences by music.

S.P. Ambesh MD
Ajay Kumar MD
Purnima Sarkar MBBS
Anil Bajaj MD
Department of Anaesthesiology
Postgraduate Institute of Medical
Education & Research, Chandigarh-160012 (India)

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Support for nalbuphine reversal of opioids: quantitative considerations

To the Editor:

The recent report by Blaise, Nugent, McMichan and Durant in your journal concluded against the use of nalbuphine after 50–75 $\mu g \cdot kg^{-1}$ fentanyl had been given during anaesthesia for abdominal aortic surgery.[1] My impression of this use of nalbuphine is that it is employed to reverse narcosis and respiratory depression in a dose of 0.05 $mg \cdot kg^{-1}$ to 0.3 $mg \cdot kg^{-1}$

Latasch, Probst and Dudziak considered, in patients who had received 7 $\mu g \cdot kg^{-1}$ fentanyl for induction of anaesthesia and a further 200 μg every 15 min, that the narcosis would be reversed with 20 mg nalbuphine.[2]

In that dose nalbuphine displaces fentanyl from mu opioid receptors to facilitate breathing and a concomitant lessening of mu antinociception. Kappa receptor moderated analgesia may be obtained with larger doses of nalbuphine (e.g., multiples of the 20 mg dose). Since nalbuphine is a potent anaesthetic,[3] smaller doses, if sufficient, should be acceptable in the recovery room.

When opioids are used in large doses for major surgery, "large" doses of nalbuphine reversal seem to be warranted. By increasing the dose nalbuphine in proportion to the dose of opioid patients can be made comfortable, normotensive, eucapnic and normoxic and the catheter can be extubated after major surgery.