TITLE: PHYSOSTIGMINE DOES NOT SPEED RECOVERY FOLLOWING RECTAL METHOHEXITAL INDUCTION IN PEDIATRIC OUTPATIENTS

AUTHORS: RS Hannallah, M.D., MD Abramowitz, M.D., WA McGill, M.D., BS Epstein, M.D.

AFFILIATION: Department of Anesthesiology & Child Health and Development, Children's Hospital National Medical Center and The George Washington University Washington, D.C. 20010

Introduction. The use of rectal methohexital has been recommended for induction of anesthesia in young unpremedicated children. Recovery is not significantly delayed after short (30 min.) surgical procedures[1]; however, the presence of any residual narcosis may be a limiting factor in delaying discharge following very brief procedures (10 min.) especially in outpatients. Physostigmine, which specifically reverses somnolence induced by anticholinergic drugs, has been reported to produce a non-specific arousal effect that reverses post-operative somnolence induced by a variety of depressant agents[2]. We designed this double blind randomized prospective study to objectively determine if in short stay patients scheduled for bilateral myringotomy in whom rectal methohexital was used for induction of anesthesia, the intravenous administration of physostigmine in the recovery room would expedite recovery and shorten hospital stay.

Methods. This pilot study was approved by the institutional review board. Informed consent was obtained from the parents of 15 children (1-3 years old) scheduled for bilateral myringotomy as outpatients.

Anesthesia was induced with a 10% solution of rectal methohexital in a dose of 25 mg/kg, and maintained with N_2O/O_2/Halothane using a face mask and T-piece system. No other supplemental agents were used. At the end of surgery the children were transported to the Post-Anesthesia Recovery Room (PARR). The progress of recovery was objectively evaluated every five minutes using Steward's post-anesthesia recovery scoring system[3]. As soon as the child showed signs of responsiveness (a score of at least 1/6 but less than 5), a solution containing either physostigmine 60 mcg/kg or saline was injected intravenously by one of the investigators over a period of 60 seconds in a double-blind randomized fashion. Patients who were very awake (scores of 5 or 6 on admission to PARR) were not included in the study. Atropine was not used, but the drug was kept available to be injected if the heart rate dropped more than 20 bpm. Recovery scores were recorded at 5, 15, 30, 45, 60, 90, 120 and 180 minutes, and until PARR and short stay recovery unit (SSRU) discharge criteria were met. All patients were observed for a minimum of three hours to find out if resedation occurred, and were called at home within 24 hours of anesthesia for long term follow-up.

Results. Eight children received physostigmine and seven received saline within five minutes of admission to PARR. The two groups were comparable in age and duration of anesthesia and surgery. There were no significant differences in the recovery scores between the two groups at 5, 15, 30 and 45 minutes following injection or at any other time during the recovery period. Children who received physostigmine met PARR discharge criteria within 34 minutes vs. 43 minutes for the placebo (saline) group, and SSRU discharge criteria within 197 and 151 minutes respectively. The differences are statistically not significant ($P > .30$, two-sample t-test). There was no slowing of the heart rate with the slow injection of physostigmine in any patient, and atropine was not used.

Five children soiled their diapers in the PARR, and four vomited in the SSRU. All were in the physostigmine group. That difference is statistically significant for soiling ($P < .037$, Fisher's exact test), but not for vomiting ($P > .1$).

Discussion. Two conclusions can be made from this study: First, even following very brief surgical procedures (9-12 min.) recovery following rectal methohexital induction was not long, and patients met discharge criteria and were ready for discharge from the PARR within 34 minutes. Second, intravenous use of physostigmine did not speed recovery. While physostigmine's ability to reverse somnolence induced by anticholinergic drugs represents a specific antagonistic action, its reported ability to reverse post-operative somnolence induced by other depressant agents[2] probably represents a non-specific arousal response. One can only speculate that the failure to demonstrate such a response in our patients may be due to the possibility that physostigmine does not have an analeptic effect on methohexital induced somnolence (other studies showed that physostigmine failed to reverse any of the clinical effects of such sedatives as lorazepam[4]), or that the patients recovered fairly rapidly on their own, so that a speedier recovery could not be accomplished. Vomiting and/or soiling were two undesirable side effects which appeared to be associated with the use of physostigmine.

References

1. Goresky GV, Steward DJ: Rectal Methohexitone for induction of anaesthesia in children. Canad Anaesth Soc J 26: 213, 1979.

2. Hill GE, Stanley TH, Sentker CR: Physostigmine reversal of postoperative somnolence. Canad Anaesth Soc J 24: 707, 1977.

3. Steward DJ: A simplified scoring system for post-operative recovery room. Canad Anaesth Soc J 22: 111, 1975.

4. Pandit UA, Kothary SP, Samra SK, et al: Physostigmine does not reverse Lorazepam effects. Abstract. Anesthesiology 55: A281, 1981.