

EVALUATION OF EFFECT OF TIMING OF NEOSTIGMINE AND ATROPINE IN REVERSAL OF NEUROMUSCULAR BLOCKAGE

Orthopaedics

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Abstract:

This multicentric study is carried out in 40 patients. The antimuscarinic effects of atropine were studied in these patients to whom neostigmine had after the surgeries were over to reverse the action of muscle relaxants. Neostigmine was given to alternate after 3 minutes or together with atropine and the effect of two procedures were compared for heart rate and blood pressure changes. ECG was monitored to review any arrhythmia. ECG in about half the patients from each group confirmed earlier work that the Muscarinic effects of neostigmine on the heart can be prevented by giving the Atropine either before or together with neostigmine.

Keywords : Neostigmine, Atropine, Reversal

Introduction:

Neostigmine methylosylate is routinely used to reverse the action of non-depolarizing muscle relaxants postoperatively and its muscarinic effects are minimized by administration of atropine. It is known that in certain circumstances atropine can give rise to initial bradycardia and to avoid the possibility of summation of atropine and neostigmine on the heart. It is easier to administer atropine after some minutes for tachycardia to develop before giving neostigmine. However, need of preceding neostigmine by atropine been questioned since it has been shown the initial effect of atropine and neostigmine mixture is tachycardia^{1,2}. It must be appreciated that it remains to be shown whether the muscarinic effects of neostigmine are as effectively blocked in organs other than the heart when given mixed with atropine rather than after atropine in the classical manner. The results are reported in various studies to compare the amount of secretions from the glands of oral cavity when neostigmine is given together with and after atropine. Any dose of atropine

sufficient to inhibit peristaltic movement of the bowel is more than enough to have completely blocked secretions by the salivary glands.

Material and methods:

In forty cases for the laproscopic cholecystectomy, patients anaesthetised by me were reversed alternately with neostigmine preceded by or simultaneously with atropine. The patients were divided into two groups as the timing of atropine and neostigmine. The types of abdominal operations included in group 1 and 2 were comparable.

Detail of patients in the study :

Sex	Atropine with neostigmine	Atropine before neostigmine
Male	12	7
Female	8	13
Total	20	20

Anesthesia procedure :

Patients were pre-medicated with Midazolam 0.1 mg/kg one hour before surgery, GA was

induced either with Propofol 2mg/kg and vecuronium 0.1 mg/kg. cuffed ETT was put after 3 minutes. anaesthesia was maintained with Oxygen and nitrous oxide and isoflurane with mech. Ventilation. Muscle relaxation was continued till end of surgery. After surgery, the reversal was made with neostigmine 0.04 mg/kg and atropine 0.02mg/kg. Atropine was given either 3 minutes before or together with neostigmine in alternate cases.

Results :

In all the cases in each group an ECG was continuously recorded during the reversal period. Analysis of the records showed that in all cases where atropine and neostigmine mixture was given. Initially developed tachycardia as described by Kemp and Morton². It indicates that the muscarinic effect of the neostigmine on the heart can be prevented by giving the atropine either before or mixed with atropine. The pulse rate revealed that there was no obvious difference between patients who had been given neostigmine together with or preceded by atropine.

Discussion:

Evaluation of the results of administration of neostigmine and atropine in reversal of neuro-muscular blockade at different timings shows that patients anaesthetised with N₂O with vecuronium reveals that neostigmine does not provide serious cardiac arrhythmias during reversal, if arterial carbon dioxide tension is not secondary to hypoventilation. Serious cardiac arrhythmias and even transient cardiac arrest observed by Riding and Robinson (1961), although the pH was higher and the PaCO₂ lower than the present values as depicted in Table I.

Table I

	Baraka	Riding and Robinson
Ph	7.12-7.30	7.28 -7.40
PaCO ₂ (mmHg)	45-90	33-59
Added Co ₂	2.5 -5%	Spontaneous Respiration

The discrepancy could be attributed to the difference in the method of producing high PaCO₂. Hypoventilation might not only lead to hypercarbia but also to hypoventilation. Jacob and associates (1955) have shown that cardiac responses are more frequent and more serious when hypoxia is present. In view of these findings, it is apparent that adequate oxygenation must be ensured throughout the

whole period of reversal in order to minimize the cardiac hazards of neostigmine.

The results show that a dose of atropine more effectively can block the muscarinic effects of neostigmine at the heart. A study is necessary to establish whether there is an optimal interval by which atropine should precede neostigmine. Any dose of atropine sufficient to prevent the peristaltic movements of the bowel is more than enough completely to have blocked secretions by the salivary glands³.

Cardiac arrest has been reported following the use of neostigmine to reverse the muscle relaxation obtained by d- tubocurarine chloride in anaesthetised patients⁴.

The integrity of anastomoses of the bowel could well be in danger because of vigorous peristalsis in the early postop period⁵.

Conclusion :

Our study reveals that adverse cardiac effects are less in those patients in which atropine and neostigmine are given together. It is more reliable and safe to give them in combination. However, the pulse rates later in the ward showed no obvious difference between patients who had been given neostigmine together with or preceded by atropine

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