

*Research Article***Effect of Neostigmine on hemodynamic when added to Bupivacaine for Brachial Plexus Block****Ibrahim A. Youssef, Abeer A. Mohamed Hassanien, George A. Hanna and Hebat Allah A. Ali Mohamed**

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Abstract

Aim of the work: Aim of work was to evaluate the effect of Neostigmine on hemodynamic when added to Bupivacaine for Brachial Plexus Block. **Methods:** This double-blinded randomized controlled clinical trial was carried out in Minia university hospital, faculty of medicine. The study included 80 patients, aged from (18-75) years, ASA I, II scheduled to undergo elective forearm and hand surgeries under ultrasound guided supraclavicular brachial plexus block. **Results:** The results of this study found that demographic (age, sex, weight and ASA classification and surgical duration) were statistically insignificant between the two groups. Hemodynamics (HR) were statistically significant between the groups. They were lower in Neostigmine groups.

Keywords: Neostigmine, Brachial Plexus Block**Introduction**

Upper limb surgeries are mostly performed under peripheral blocks such as the brachial plexus block. Peripheral nerve blocks not only provide intraoperative anesthesia but also extend analgesia in the post-operative period without any systemic side-effects⁽¹⁾.

These techniques involve the injection of local anesthetic agents in close proximity to the brachial plexus, temporarily blocking the sensation and ability to move the upper extremity. The subject can remain awake during the ensuing surgical procedure, or s/he can be sedated or even fully anesthetized if necessary⁽²⁾.

There are several techniques for blocking the nerves of the brachial plexus. These techniques are classified by the level at which the needle or catheter is inserted for injecting the local anesthetic — interscalene block on the neck, supraclavicular block immediately above the clavicle, infraclavicular block below the clavicle and axillary block in the axilla⁽³⁾

Aim of the work

Aim of work was to evaluate effect of Neostigmine on hemodynamic and the side effects when Adding Neostigmine to Bupivacaine for Ultrasound Guided Supracla-

vicular Brachial Plexus Block in Forearm surgeries.

The primary outcome was to assess hemodynamic changes.

The secondary outcome was to assess any adverse effects.

Patients and Methods

This double-blinded randomized controlled clinical trial was carried out in Minia university hospital, faculty of medicine. After obtaining approval of the departmental scientific and ethical committee, Eighty (80) patients of both sexes, ≥ 18 years old, ASA I-II, undergoing supraclavicular brachial plexus block for elective forearm surgeries were included in the study.

Patients were randomly allocated into Two equal study groups each contain (40) patients: Patients in Group A received supraclavicular block using 25mL of 0.5% bupivacaine and 1 mL normal saline and patients in Group B received 25 mL 0.5% bupivacaine and 1 mL neostigmine (0.5 mg).

Preoperative assessment and preparation:

A careful assessment of medical history was done. General examination (heart rate (HR), blood pressure (BP) and physical examination

(chest, heart, abdomen, site of injection and other systems) were carried out. Routine investigations were done (CBC, Coagulation profile, renal function tests, liver function tests),

Explanation of visual analogue scale was done. On patient's arrival to the operating room, a 20 G intravenous cannula was inserted in a peripheral vein of unaffected limb and standard monitoring commenced as Noninvasive blood pressure (NIBP), Electrocardiography (ECG), and Oxygen saturation (SpO₂). Preparation as for general anesthesia and resuscitation drugs were prepared.

Results

The study included 80 patients, aged from (18-75) years, ASA I, II scheduled to undergo elective forearm and hand surgeries under

ultrasound guided supraclavicular brachial plexus block.

There was no statistically significant difference between both groups according to preoperative data (HR, BP, SO₂)

hemodynamic in the studied groups:

Heart Rate in the studied groups: Intra operative heart rate (beat /min): there was no statistically significant difference between two groups except at time intervals of 40, 60 minutes and there was no statistically significant differences between both groups as regard Oxygen Saturation (SPO₂%) at intra operative times.

Postoperative heart rate: there was statistically significant difference between both groups at time intervals 2, 4, 6, 8, 12 hours postoperative that was lower in group (B) than in group (A) as showing in table

Table: Comparison between groups according to postoperative heart rate

Postoperative HR	Group A N = 40	Group B N = 40	P - value
Heart rate 2hours			
Range	63 – 88	59 - 78	0.001*
Mean ± SD	74.8 ± 6.3	65.7 ± 5.4	
Heart rate 4hours			
Range	60 - 88	58 - 77	0.001*
Mean ± SD	74.4 ± 6.1	65.5 ± 5.6	
Heart rate 6hours			
Range	65 - 87	58 - 77	0.001*
Mean ± SD	74.5 ± 5.4	65.6 ± 5.5	
Heart rate 8hours			
Range	63 - 87	59 - 79	0.001*
Mean ± SD	74.6 ± 5.5	65.2 ± 5.3	
Heart rate 12hours			
Range	63 - 88	58 - 77	0.001*
Mean ± SD	74.6 ± 6.2	65.5 ± 5.4	

*: Significant difference in between groups (p value ≤ 0.05)

Mean arterial blood pressure: Intra operative mean arterial blood pressure: there was no statistical significant difference was between the studied groups at intra operative times. Post operative mean arterial blood pressure (mmHg.) there were no statistical significant difference was between the studied groups at post operative times .

Discussion

Peripheral nerve stimulation the standard approach for the last years is now being largely superseded by ultrasound-guidance which has become increasingly popular because of the number of advantages that it offers compared with other nerve localization methods.

There is now evidence available demonstrating that ultrasound-guidance improves both the quality and the speed of block onset⁽⁴⁾.

Brachial plexus block is most commonly used regional nerve block of the upper extremity, which avoids the undesired effect of anesthetic drugs used during general anesthesia and the stress of laryngoscopy and tracheal intubation. Patients can also enjoy postoperative period free from nausea, vomiting, cerebral depression and immediate postoperative pain⁽⁵⁾.

In disagreement with our results, Elbahrawy and Alaa 2015 in which Ninety-three patients of ASA physical status III with chronic renal failure were randomly allocated to three groups according to brachial plexus block solution. The control group received 20ml of 0.5% bupivacaine added to 10ml of normal saline solution and the two neostigmine groups received 250 and 500µg of neostigmine (groups N250 and N500, respectively). They reported no significant differences in hemodynamics, including heart rate and mean blood pressure in the three groups. Which is antagonist with our study as we found decrease in heart rate, The side effects seen with neostigmine were usually associated with systemic absorption but did not require treatment.

This study showed no significant side effects from the addition of 500 µg neostigmine to brachial plexus block with 0.5% bupivacaine. In accordance with these results, Yang et al., 1998 and Gentili et al., 2001 reported no significant side effect associated with either intramuscular or intra-articular administration of 0.5 mg neostigmine. They also noticed that the incidence of nausea, vomiting, and bradycardia was not statistically different between patients who did and those who did not receive neostigmine.

Liu et al., 2005 documented no complications such as nerve injury or puncture of the axillary vessels with ultrasound-guided axillary brachial plexus block in patients with chronic renal failure.

Recommendations

Based on the current study, we recommend the effects of neostigmine in patients ASA III, IV should be studied.

The Combined use of ultrasound with nerve stimulator to provide more accurate nerve localization especially in obese patients and this may enhance good block.

References

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