



EVALUATION OF THE ROLE OF TRANSDERMAL NITROGLYCERINE PATCH ON POSTOPERATIVE ANALGESIA.

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ABSTRACT

Introduction: Various regimens have been adopted to enhance the reliability of regional anaesthesia, in terms of its hemodynamic stability, rapid onset of blockade and long lasting postoperative pain relief. Our study compared the effectiveness of transdermal nitroglycerine patch for enhancement of post operative analgesia along with bupivacaine heavy injection intrathecaly. **Study design:** A prospective type of study. **Material and Method:** Study was carried out in 60 patients divided into two groups each. One received Intrathecal inj. bupivacaine hydrochloride (heavy) 0.5% mg 15 mg along with Placebo patch and other received Intrathecal inj. bupivacaine hydrochloride (heavy) 0.5% mg 15 mg along with Nitroglycerine transdermal patch (25 mg). Results were analyzed. **Results and Conclusion:** Application of Nitro-glycerine transdermal patch (25 mg) increases the post operative analgesia and decreases the rescue analgesic requirements without any significant adverse effects.

KEYWORDS: Nitroglycerine transdermal patch, spinal anesthesia, postoperative pain.

INTRODUCTION

Pain is such an uncomfortable feeling that even a tiny amount of it is enough to ruin every enjoyment.^[1] Pain is derived from the 'latin' word 'poena' which means penalty or punishment.^[2] Evidence suggests that inadequate relief of postoperative pain may result in harmful physiologic and psychologic consequences that lead to significant morbidity and mortality which may delay recovery and the return to daily living.^[3]

The use of nitroglycerine for intraoperative and postoperative pain control has been recently explored. Systemic nitroglycerine administration was found to be a useful addition to spinal anesthesia. Postoperatively, visual analogue scale (VAS) scores were lowered and the need for other analgesic medications was reduced when nitroglycerine patches were administered in addition to spinal ketamine,^[4] spinal neostigmine^[5] and spinal sufentanil.^[6]

Nitroglycerine is metabolized to nitric oxide (NO) in the cell.^[11,12] Nitric oxide cause an increase in the intracellular concentration of cyclic guanosine monophosphate, which produces pain modulation in the central and peripheral nervous system.^[7,8] Nitric Oxide generators also induce antiinflammatory effects and analgesia by blocking hyperalgesia and the neurogenic component of inflammatory edema by topical application.^[8] Another possible mechanism includes an

analgesic effect through the direct stimulation of peripheral fibers mimicking the actions of locally applied acetylcholine.^[7,8]

Nitroglycerine, a nitric oxide generator, may enhance antinociceptive effect of opioid and neostigmine by several possible mechanism as vasodilation to counteract inflammation induced vasoconstriction and by direct action on the μ receptor thereby enhancing opioid effect. Endogenous nitric oxide is necessary for tonic cholinergic inhibition of spinal pain transmission.^[9]

MATERIAL AND METHOD

This was a prospective, randomized, placebo- controlled, double-blind study. Ethical approval was taken from the local ethical committee. ASA grade I or II patients scheduled for elective total abdominal hysterectomy, aged between 30 and 50 years and weighing between 45 and 65 kg were included. Patients with a contraindication to spinal anaesthesia and major neurological, cardiovascular, metabolic, respiratory, hepatic, renal disease or coagulation abnormalities were excluded from the study. Pre-anaesthetic examination was done on the previous day of surgery which includes patients' height, weight, general examination, systemic examination of cardiovascular system, respiratory system, central nervous system and examination of spine. Patients were kept fasting overnight. Patients were premedicated with intravenous injection ondansetron 4 mg 30 min before

spinal anaesthesia. Patients were shifted to the operation theatre and intravenous access was secured with 18G cannula.

Patients were randomized by a computer into two groups (group B, BN) consisting of 30 subjects each. Pain was assessed by the Visual Analog Score (VAS) scale. Heart rate and blood pressure were recorded at baseline and periodically.

After lumbar puncture, patients in the two groups (group B, BN) received different combination of drugs. Fifteen degree head-down tilt was given after intrathecal drug administration. The nitroglycerin patch was applied on non-anaesthetized area which has a total nitroglycerin content of 25 mg per patch and delivered nitroglycerin at 20-25 $\mu\text{g}/\text{cm}^2/\text{h}$. The placebo patch was prepared by cutting the ECG electrode in the same shape as the NTG patch. The drug combinations and placebo patch were prepared by the first anaesthesiologist; however, various observations were made by a second anaesthesiologist who was involved after the procedure had been performed. The cephalad spread of analgesia and the degree of motor blockade of the lower limbs was recorded every minute. The level of sensory blockade was assessed by loss of sensation to pin prick. Motor blockade was determined according to the Bromage scale.^[10]

Group B: Intrathecal inj. bupivacaine hydrochloride (heavy) 0.5% mg 15 mg
Along with Placebo patch

Group BN: Intrathecal inj. bupivacaine hydrochloride (heavy) 0.5% mg 15 mg
Along with Transdermal patch nitroglycerine 25 mg.

Patients were allowed to receive rescue analgesics on demand. Duration of analgesia was measured as time from intrathecal drug administration to the patient's first request for analgesic. Rescue analgesia was provided by injection diclofenac sodium 75 mg intramuscular (IM) in the gluteal region and requirement was recorded for 24 h. The duration of motor block was calculated from the time of attainment of Bromage Grade IV motor blockade (onset of motor block) till the reversal to Bromage Grade II. The NTG/Placebo patch was removed after 24h.

The data of present study were recorded in the computer and continuous data was analysed by student's t-test and chi square test. Any possible significance has been determined considering it statistically significant if it's $p < 0.05$. Statistical test used for this study were mean, median, standard deviation, student t-test, chi square test and Kruskal Wallis test (for pain score). All were analysed by using SPSS software 11.5.

OBSERVATIONS

A total of 60 patients were enrolled in the study. The time interval from intrathecal drug administration to 2-segment sensory regression was significantly prolonged in group BN (91 ± 23 min) as compared with group B (81 ± 21 min) ($P < 0.05$) [Table 1]. Duration of motor blockade was 118 ± 41 min, 121 ± 27 min, in the B, BN groups, respectively [Table 1]. Statistical significance was found in group B and group BN.

Table 1: Characteristics of sensory and motor blockade.

	Group B	Group BN	Significance
Time for 2 segment regression(min.)	81 \pm 21	91 \pm 23	P<0.05
Total duration of analgesia(min.)	122 \pm 31	144 \pm 27	P<0.05
Onset of motor block(min.)	9 \pm 1.2	7.7 \pm 11	P<0.05
Total duration of motor block(min.)	118 \pm 41	121 \pm 27	p>0.05
Number of IM Diclofenac inj. in 24 hours.	3.3	2.9	p>0.05

Table 2: Characteristics of haemodynamics and incidence of side-effects (intra-operative and early post-operative period).

Side Effects	Group B	Group BN
>20% fall in MAP	3	2
Bradycardia	2	3
PONV	3	2
Headache	1	3

SUMMARY AND CONCLUSION

The onset of sensory and motor block was noted in all the groups. Onset of analgesia was early with nitroglycerine patch group as compared to placebo group 7.7 ± 11 min & 9 ± 1.2 min respectively. Total duration of analgesia was more in nitroglycerine patch 144 ± 27 min as compared to placebo group 122 ± 31 min. Pain scores were good in group BN as compared to B group.

There was no significant changes in vital parameters in both the groups. Mild bradycardia was easily managed with intravenous atropine. Hypotension was corrected with crystalloid infusion. Headache was seen in BN group due to use of nitroglycerine patch.

BIBLIOGRAPHY

1. Will Rogers. American entertainer, famous for his pithy and homespun humour, 1879-1935.
2. Harper, Douglas. "Penal-Etymology". Online Etymology Dictionary. Retrieved 2013-04-08.
3. The need of Taxonomy. *Pain.*, 6(3): 247-252.
4. Wu CL, Naquibuddin M, Rowlingson AJ. The effect of pain on health-related quality of life in the immediate postoperative period. *Anesth Analg*, 2003; 97: 1078-85.
5. Perkins FM, Kehlet H. Chronic pain as an outcome of surgery: A review of predictive factors. *Anesthesiology*, 2000; 93(4): 1123-33.
6. Macrae WA. Chronic pain after surgery. *Br J Anaesth*, 2001; 87: 88-98.
7. Wu CL, Naquibuddin M, Rowlingson AJ. The effect of pain on health-related quality of life in the immediate postoperative period. *Anesth Analg*, 2003; 97: 1078-85.
8. Perkins FM, Kehlet H. Chronic pain as an outcome of surgery: A review of predictive factors. *Anesthesiology*, 2000; 93(4): 1123-33.
9. Wu CL, Naquibuddin M, Rowlingson AJ. The effect of pain on health-related quality of life in the immediate postoperative period. *Anesth Analg*, 2003; 97: 1078-85.
10. Bromage PR. A comparison of the hydrochloride and carbon dioxide salts of lidocaine and prilocaine in epidural analgesia. *Acta Anaesthesiol Scand*, 1965; 16: 55-9.