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Original Research Article.

Assessment of Efficacy of Dexmedetomidine under Combined Spinal Epidural Anesthesia at a Tertiary Care Teaching Hospital

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ABSTRACT

Background: Dexmedetomidine is a highly selective α2 adrenergic agonist with an affinity of 8 times greater than clonidine and hence allows the use of higher doses with less α1 effect. Hence; the present study was undertaken for assessing the efficacy of Dexmedetomidine under combined spinal epidural anesthesia.

Materials and Methods: A total of 100 patients were enrolled in the present study. All the patients received isobaric levobupivacaine intrathecally and dexmedetomidine in normal saline epidurally. Complete demographic details and clinical history of all the patients was obtained. Preoperative hematological and biochemical profile of all the patients was obtained. All the anesthetic procedures were carried out under the hands of skilled and experienced anesthetists. Incidence of intra-operative and postoperative adverse events was recorded separately. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance.

Results: Mean time taken for sensory regression to S1 was 356.12 minutes. Mean time taken for rescue analgesia was 362.55 minutes. In the present study, hypotension was found to be present in 4 patients, bradycardia was found to be present in 3 patients and nausea and vomiting was found to be present in 5 patients.

Conclusion: Dexmedetomidine is an effective agent under combined spinal epidural anesthesia in patients undergoing elective surgical procedures.

Keywords: Anesthesia, Dexmedetomidine, Spinal.

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INTRODUCTION

Regional anesthesia is the preferred mode of anesthesia for major abdominal surgeries in present times. While epidural and spinal blockades are well-established regional anesthetic techniques, combined spinal-epidural technique has become increasingly popular in the last few years.[1-3] Combined spinal epidural (CSE) technique appears to be more complicated at first sight than either epidural or spinal block, intrathecal drug administration and placement of the epidural catheter are both facilitated by the various modifications of the combined spinal epidural technique.[4] Dexmedetomidine is a highly selective α2 adrenergic agonist with an affinity of 8 times greater than clonidine and hence allows the use of higher doses with less α1 effect.[5]

Hence; under the light of above mentioned data, the present study was undertaken for assessing the efficacy of Dexmedetomidine under combined spinal epidural anesthesia.

MATERIALS AND METHODS

The present study was commenced in the Department of Anaesthesiology, Lady Hardinge Medical College & Smt. S. K. Hospital, New Delhi (India) and it included assessment of efficacy of Dexmedetomidine under combined spinal epidural anesthesia. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol.

Inclusion Criteria

- Patients scheduled to undergo elective surgical procedure,
- Patients within the age group of 25 to 60 years,
- Patients with negative history of any other systemic illness,
- Patients with negative history of any known drug allergy

After meeting the inclusion criteria, a total of 100 patients were enrolled in the present study. All the patients received isobaric

levobupivacaine intrathecally and dexmedetomidine in normal saline epidurally. Complete demographic details and clinical history of all the patients was obtained. Preoperative hematological and biochemical profile of all the patients was obtained. All the anesthetic procedures were carried out under the hands of skilled and experienced anesthetists. Continuous monitoring of all the cardio-respiratory parameters was done during the entire surgical procedures. Incidence of intra-operative and postoperative adverse events was recorded separately. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

In the present study, a total of 100 subjects were assessed. Mean age of the patients was 37.5 years and 36.8 years respectively. There were 31 males and 19 females. Mean BMI of the patients of the present study was 25.8 Kg/m^2, while mean weight was 68.5 Kg. In the present study, mean rime taken for loss of pinprick sensation at T10 was 5.84 minutes. Mean time taken for sensory regression to S1 was 356.12 minutes. Mean time taken for rescue analgesia was 362.55 minutes. In the present study, hypotension was found to be present in 4 patients, bradycardia was found to be present in 3 patients and nausea and vomiting was found to be present in 5 patients.

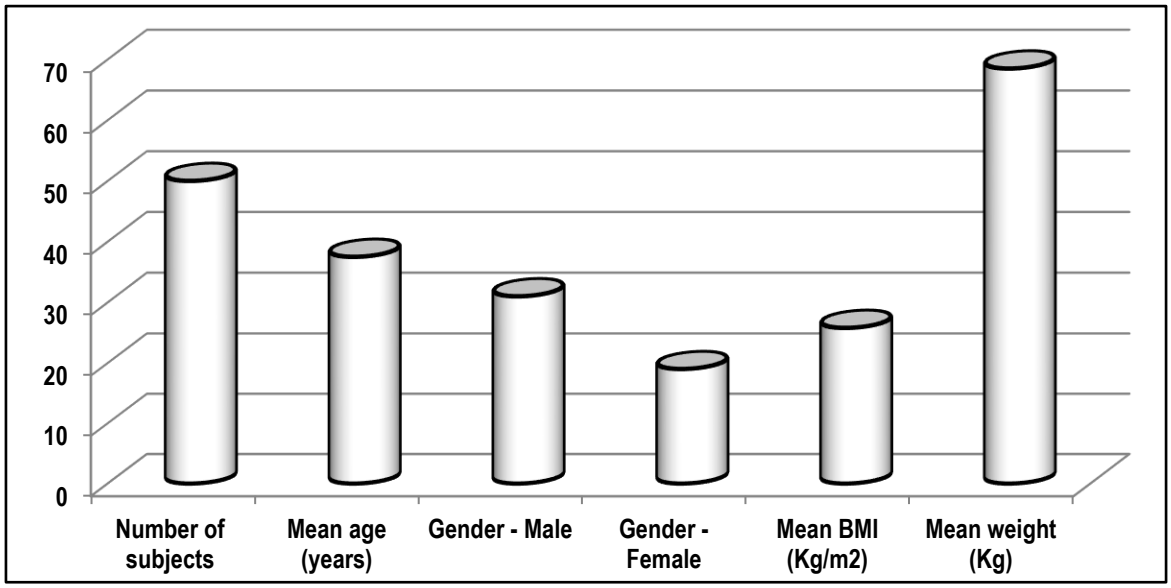
Table 1: Clinical parameters

Parameter	Value
Time taken for loss of pinprick sensation at T10 (minutes)	5.84
Time taken for sensory regression to S1 (minutes)	356.12
Time taken for rescue analgesia (minutes)	362.55

Table 2: Complications

Complications	n	%
Hypotension	4	28.6
Bradycardia	3	21.4
Nausea and vomiting	5	35.7
Others	2	14.3
Total	14	100

Graph 1: Demographic profile



DISCUSSION

Neuraxial adjuvants such as opioids, sodium bicarbonate, adrenaline, α-2 adrenoceptor agonists, N-methyl-D-aspartate antagonists, and GABA receptor agonists are used to improve, hasten, or prolong analgesia and decrease the adverse effects associated with high doses of the local anesthetic agent. Dexmedetomidine is a highly selective α-2 adrenergic agonist that acts on both pre- and post-synaptic sympathetic nerve terminal and central nervous system, thereby decreasing the sympathetic outflow causing sedative, antianxiety, analgesic, sympatholytic, and hemodynamic effects.[1,2,6] Hence; under the light of above mentioned data, the present study was undertaken for assessing the efficacy of Dexmedetomidine under combined spinal epidural anesthesia.

In the present study, a total of 100 subjects were assessed. Mean age of the patients was 37.5 years and 36.8 years respectively.

There were 31 males and 19 females. Mean BMI of the patients of the present study was 25.8 Kg/m^2, while mean weight was 68.5 Kg. Mean rime taken for loss of pinprick sensation at T10 was 5.84 minutes. Dexmedetomidine acts by binding to G-protein that coupled α2 adrenergic receptors, which are found in peripheral, central, and autonomic nervous systems, various vital organs, and blood vessels throughout the body. There are three subtypes of these receptors, namely α2A, α2B, and α2C, each having different functions and activities. When compared with clonidine, dexmedetomidine is considered to have more affinity for α2A and α2C receptors. Dexmedetomidine significantly reduces opioid requirements and has sympatholytic effect that can attenuate the stress response to surgery.[7]

In the present study, mean time taken for sensory regression to S1 was 356.12 minutes. Mean time taken for rescue analgesia was 362.55 minutes. In the present study, hypotension was found to be present in 4 patients, bradycardia was found to be present in 3 patients and nausea and vomiting was found to be present in 5 patients. Shaikh SI et al evaluated the analgesic effects of epidural α2 agonists-dexmedetomidine and clonidine in conjunction with intrathecal levobupivacaine in combined spinal epidural anesthesia (CSEA). A prospective, randomized controlled study was done to assess and compare the efficacy and clinical profile of two α2 adrenergic agonists, clonidine, and dexmedetomidine administered epidurally in combination with intrathecal levobupivacaine in CSEA. The study was conducted for 1 year. Sixty adult patients physical status Class I and II undergoing below umbilical surgeries under CSEA were included in the study after a valid consent. Patients were randomly assigned into two groups, to receive either epidural dexmedetomidine (1.5 μg/kg) or clonidine (2 μg/kg) in 10 ml normal saline along with 0.5% isobaric levobupivacaine 15 mg (3 ml). Block characteristics, ability to provide sedation, duration, and quality of analgesia and side effects were studied and compared between the groups. The characteristics of intraoperative block were comparable among two groups. As compared to clonidine, dexmedetomidine provided a better sedation and prolonged analgesia, evidenced by the distribution of visual analog scale scores and requirement rescue analgesic among two groups. The side effect profile of the two drugs was comparable. Dexmedetomidine at 1.5 μg/kg epidurally with intrathecal levobupivacaine is a better adjuvant compared to clonidine at 2 μg/kg epidurally in CSEA because of better sedation, prolonged analgesia, and safe side-effect profile.[8]

Regional analgesia techniques reduce neuroendocrine stress response, thromboembolic phenomenon and requirement of parenteral analgesics in the postoperative period. The duration of effective analgesia is dependent on the dose and concentration of local anesthetics. Higher the volume and concentration, greater will be the incidence of local anesthetic systemic toxicity. Opioids as additives extend postoperative pain relief along with improving the quality of analgesia, but they result in urinary retention, sedation and pruritis. Nonopioids such as clonidine, ketamine, neostigmine, tramadol, midazolam and dexmedetomidine have been evaluated as epidural adjuvants.[9-11]

Sharma A et al assessed the efficacy of low-dose dexmedetomidine and neostigmine with bupivacaine for postoperative analgesia in orthopedic surgeries. Combined spinal-epidural anesthesia was performed in 60 American Society of Anesthesiologists I and II patients who required lower limb surgeries of ≤3 h duration. The epidural drug was administered at the end of surgery with patients randomized into three groups. Group I, II and III received 6 ml of 0.25% bupivacaine alone, with 1 ug/kg of neostigmine and with 0.5 ug/kg of dexmedetomidine + 1 ug/kg of neostigmine, respectively. The patients were prescribed 50 mg tramadol intravenous as rescue analgesic. Patients were assessed for hemodynamic parameters, pain scores, duration of analgesia, rescue analgesic requirements and the incidence of side-effects over the next 10 h. Patients in Group III had significantly longer mean duration of analgesia (273.5 min) compared to Group II (176.25 min) and Group I (144 min). There was increased requirement of fluids to maintain blood pressures in Group III. Neostigmine did not cause significant incidence of gastrointestinal side effects. Epidurally administered dexmedetomidine and neostigmine exhibit synergism in analgesic action.[12]

CONCLUSION

Under the light of above obtained results, the authors concluded that Dexmedetomidine is an effective agent under combined spinal epidural anesthesia in patients undergoing elective surgical procedures. However; further studies are recommended in further for better exploration of results.

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