A Comparative Evaluation of Epidural and General Anaesthetic Technique for Renal Surgeries: A Prospective Analysis

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ABSTRACT

Introduction: Chronic renal disease affects most of the persons who report for urological surgery. They have unique pathophysiology relating to both renal diseases and its underlying cause and therefore present a challenge to surgeons and anaesthetists. The spinal block achieves rapid onset and profound surgical anaesthesia with providing post-surgical relief from pain and discomfort by prolonging the blockage effect of epidural catheter. Hence; we comparatively evaluated the epidural and general anaesthetic techniques in patients undergoing renal surgeries.

Material and methods: The present study was carried in the department of general surgery of the institution and included 200 patients who underwent renal surgeries. Ethical approval was taken from the ethical committee of the institution in written after explaining them the entire research protocol. All the patients were divided randomly into two study groups; group A and group B. Group A patients were administered conventional GA while Group B received epidural anaesthesia. Surgeon's satisfaction was based on following chosen criteria's like surgical field bleeding, immobility of the patient, degree of muscle relaxation and the quality of post-operative analgesia in the ward.

Results: Mean age of the patients in group A and group B was 42.5 and 44.1 years respectively. Out of all the patients in both the groups, majority them were males. Mean BMI of the patients in Group A and Group B were 27.4 and 27.2 respectively. No statistically significant results were obtained while comparing the mean duration of surgery, anaesthesia time and BMI in the two study groups. In 77 percent of patients in the group A, the surgeons were extremely satisfied while in group B, this value decreases to 71 percent. However, no statistically significant results were obtained while comparing the excellent results. More than 85 percent of the patients in both the groups were extremely satisfied.

Conclusion: In patients undergoing renal surgeries for various reasons, epidural anaesthesia with ropivacaine and dexmedetomidine can be used with adequate safety.

Key words: Anaesthesia, Epidural, Renal

INTRODUCTION

Chronic renal disease (CRD) affects most of the persons who report for urological surgery. They have unique pathophysiology relating to both CRD and its underlying cause and therefore present a challenge to surgeons and anaesthetists. For assistance of vascular procedures, large number of patients approached for anaesthesia as a part of treatment for undergoing renal replacement therapy (RRT). With the increase in their survival rate, there is also an increase in the frequency of surgeries that are unrelated to their renal disease.[1] The spinal block achieves rapid onset and profound surgical anaesthesia with providing post-surgical relief from pain and discomfort by prolonging the blockage effect of epidural catheter.[2] Hence; we comparatively evaluated the epidural and general anaesthetic techniques in patients undergoing renal surgeries.

MATERIAL AND METHODS

The present study was carried in the department of general surgery of the institution and included 200 patients who underwent renal surgeries. Ethical approval was taken from the ethical committee of the institution in written after explaining them the entire research protocol. All the patients aged between 28 to 58 years and were chosen on the basis of American Society of Anaesthesiologists (ASA) Class-I and II. Patients undergoing various renal surgeries including pyelo-lithotomy, ureterolithotomy, and nephrectomy were included in the present study. All the patients gave consent in writing. Patients with history of any other systemic illness including diabetes of hypertension or any known drug allergy were excluded from the present study. All the patients were divided randomly into two study groups; group A and group B. Group A patients were administered conventional GA while Group B received epidural anaesthesia. On the night before and on the morning of surgery, all patients received ranitidine 150 mg as premedication. Before commencing the surgery, intravenous (IV) access was secured with cannula and pre-determined levels of ringer lactate solutions were administered. Patients' blood pressure, heart rate, oxygen saturation, cardiac activities etc were constantly monitored to record any abnormality. For administration and commencement of proper endotracheal intubation, muscle relaxant was given followed by administration of Propofol and isoflurane in group A patients. Patients were made to sit in group B patients, and needles were inserted in Lumbar vertebrae region after identification of epidural space. 3 mg/kg of ropivacaine up to a maximum of 150 mg (20 ml of 0.75%) were used for delivering epidural anaesthesia. For the assessment of motor blockage levels, modification of Bromage scale was used. Rectus abdominis muscle (RAM) was used for the assessment of the relaxation of abdominal muscle. Surgeon's satisfaction was based on following chosen criteria's like surgical field bleeding, immobility of the patient, degree of muscle relaxation and the quality of post-operative analgesia in the ward. Assessment of any intra-and post surgical pain and discomfort was done for analyzing patient satisfaction. A list of questionnaires was prepared while making protocols for the study which were used

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for the assessment of the scores.

STATISTICAL ANALYSIS

All the results were analyzed by SPSS software and unpaired t test and chi square test were used for assessing the level of significance.

RESULTS

Table-1 shows the criteria used for defining the RAM scores. Table-2 and Figure-1 highlight the demographic details of the patients. Mean age of the patients in group A and group B was 42.5 and 44.1 years respectively. Out of all the patients in both the groups, majority them were males. Mean BMI of the patients in Group A and Group B were 27.4 and 27.2 respectively. No statistically significant results were obtained while comparing the mean duration of surgery, anaesthesia time and BMI in the two study groups. Table-3 and Figure-2 shows p-value for surgical satisfaction scores in both the groups. In 77% of patients in the group A, the surgeons were extremely satisfied while in group B, this value decreases to 71%. However, no statistically significant results were obtained while comparing the excellent results. Table-4 and Figure-3 shows p-value for patient satisfaction scores in both the groups. More than 85% of the patients in both the groups were extremely satisfied.

DISCUSSION

CRD comprises of a group of various pathologies as characterized by detection of damage to kidneys or identification of decrease in the functions of the kidney for more than 90 days. CRD have been classified into 5 stages based on the severity of the disease with score 1 being denoted to mildest form and 5 being used for the most severe form. Ife expectancy is minimum for stage 5 diseases if left untreated. End Stage Renal Disease (ESRD) is devoted to stage 5 of the disease which replaces the usually used term i.e. CRD.[3] Rapid induction, less hypotension, cardiovascular stability and better control over airways and ventilation are the advantages of General anaesthesia (GA). Some of the adverse effects are related to it along with numerous benefits it offers, which included pain, risk of anaphylaxis etc.[4] Retaining of conscious state and relatively simple and cost effective technique with less surgical bleeding are the advantages of regional anaesthesia. Chances of deep vein thrombosis and complications post-surgically involving cardiac, pulmonary and gastric region are reduced by its use. Some of the advances technical skills are required for its performance as to some extent, it is technique sensitive.[5] Hence; we comparatively evaluated the epidural and general anaesthetic techniques in patients undergoing renal surgeries. A very neutral ground for comparing the efficacy of two entirely different techniques was provided by the demographic profile of patients in both groups which came out to be similar (Table-1 and Table-2). In both the groups, haemodynamic parameters were also comparable in both groups. While comparing the heart rate, blood pressure, respiratory rate and oxygen saturation during the surgery as compared to baseline, no statistically significant changes were observed except during two stressful periods in GA, intubation and extubation. Literature quotes studies which highlight and compare the combined spinal-epidural anaesthesia and GA for donor nephrectomies and renal transplantation.[6,7] Regional anaesthesia can be safely used for such studies, as reported

Power of muscles (%)	Score of RAM	Parameter
100	0	Able to rise from supine to sitting position with hands behind head
80	1	Can sit only with arms extended
60	2	Can lift only shoulder and scapulae off bed
40	3	Can lift only shoulder off bed
20	4	Only feeling of increase in abdominal muscle tension
0	5	Full abdominal muscle relaxation

Table-1: RAM test

Parameter	Group A	Group B	p-value
Mean age in years	42.5	44.1	>0.05
Male population	68	74	>0.05
Female population	32	26	>0.05
ASA Type I patients	62	72	>0.05
ASA Type II patients	38	28	>0.05
Mean BMI	27.4	27.2	>0.05
Mean duration of surgery in minutes	105	100	>0.05
Total time of anaesthesia	120	125	>0.05
BMI: Body mass index			

Table-2: Demographic details of the patients

Grade	Percentage of patients in Group A	Percentage of patients in Group B	p-value
Excellent	77	71	>0.05
Good	9	17	<0.05
Fair	5	7	<0.05
Poorer	9	5	<0.05

Table-3: p-value for surgical satisfaction scores in both the groups.

Grade	Percentage of patients in Group A	Percentage of patients in Group B	p-value
Extremely satisfied	87	83	>0.05
Satisfied	7	13	<0.05
Not satisfied	6	4	>0.05

Table-4: p-value for patient satisfaction scores in both the groups.

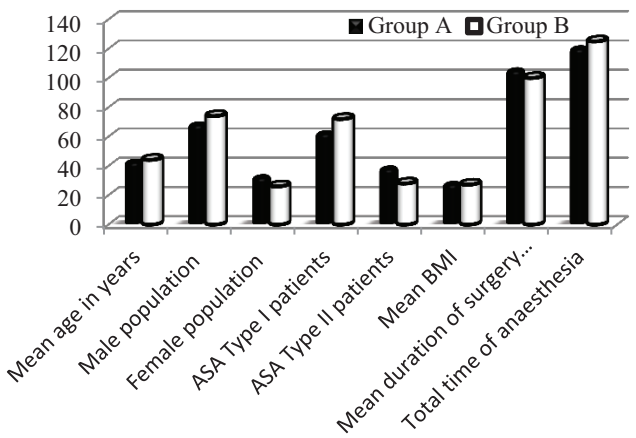

Figure-1: Demographic details of the patients

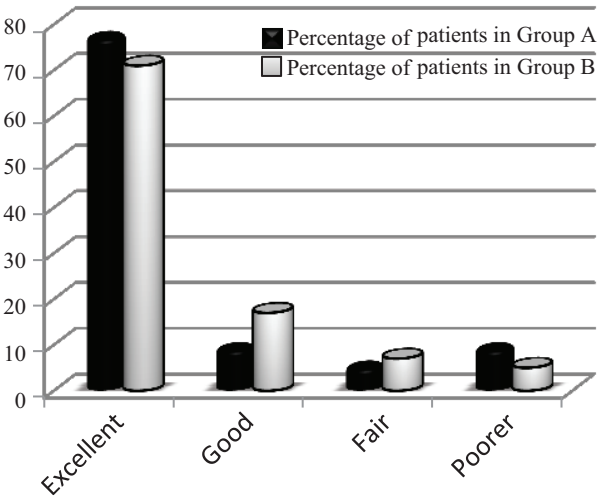

Figure-2: Surgical satisfaction scores in both the groups.

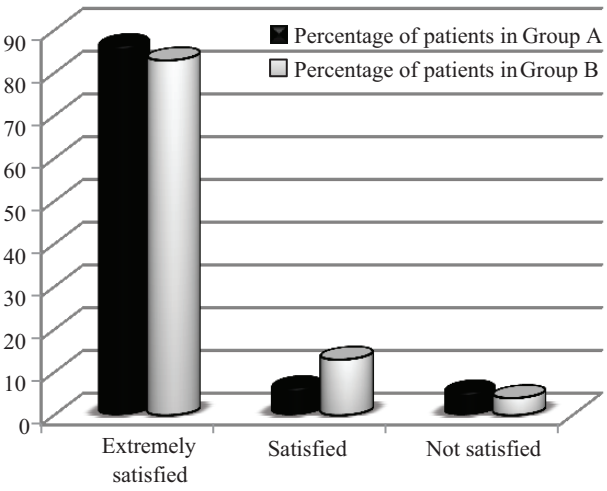

Figure-3: Surgical satisfaction scores in both the groups

by the results of above mentioned studies. The disadvantage generally seen with the combined approach is the haemodynamic instability and unpredictable sensory blockade levels.[8] Since requirements of both spinal and epidural anaesthetic techniques are fulfilled by combined spinal-epidural anaesthesia (CSEA), it is becoming increasingly popular with passage of time.[9] CSEA offers rapid onset and reliability of a spinal block with low drug dosage. With an epidural catheter, it is possible to titrate and prolong the neuraxial blockade and to provide the postoperative pain relief.[10-12] Bhosale et al evaluated the combined spinal-epidural technique in patients undergoing renal transplantation with respect to demographics, intra-operative anaesthesia, hemodynamic, postoperative analgesia, and untoward adverse events. They analyzed 50 consecutive patients scheduled for elective renal transplantation over a period of 4 months who consented for combined spinal-epidural anaesthesia. From the observation, they concluded that combined spinal-epidural anesthesia is a useful regional anesthetic technique which contains the reliability offered by spinal block and versatility given by epidural block in cases of renal transplantation.[13] Bajwa et al compared the general anaesthesia (GA) with epidural anaesthesia in patients undergoing renal surgeries and concluded that patients undergoing renal surgeries can be effectively manages by epidural anaesthesia.[14]

CONCLUSION

From the above results, it can be concluded that in patients undergoing renal surgeries for various reasons, epidural anaesthesia with ropivacaine and dexmedetomidine can be used with adequate safety. Further studies in this field of medicine are required for better exploration the effectiveness and safety of various anaesthetic techniques.

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