

# A Prospective Study Evaluating Epidural and General Anaesthetic Technique for Renal Surgeries.

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## ABSTRACT

**Background:** Regional epidural anesthesia has been reported to have fewer side effects when compared with general anaesthesia, with comparable surgeon and enhanced patient's satisfaction. Aim: To compare epidural anaesthesia and general anaesthesia in patients undergoing renal surgeries. **Methods:** Our study included 80 patients who underwent renal surgeries from December 2015 to November 2016. The study subjects were randomly grouped into 2 groups. Group A included 40 patients and were administered conventional general anaesthesia, while Group B received epidural anaesthesia with 3 mg/kg of ropivacaine and 1 µg/kg of dexmedetomidine. Along with cardio-respiratory parameters, surgeon's satisfaction, patient's satisfaction and side effects were observed and analyzed. **Results:** Group B showed better patient's satisfaction scores and higher incidence of dry mouth as side effect during the post-operative period. Whereas the side effects of nausea and vomiting were higher in Group A (P < 0.001). **Conclusion:** Epidural anaesthesia may be safely and effectively used in patients undergoing renal surgeries.

**Keywords:** Anaesthesia, Epidural, Renal, Percutaneous nephrolithotomy.

## INTRODUCTION

Chronic renal disease (CRD) affects the majority of the patients who report for urological surgery. Anesthesia techniques used for renal surgeries have been categorized as regional and general anaesthesia (GA). The advantages of GA is that it provides better muscle relaxation and controlled diaphragmatic motion during the surgery. Latest studies showed that regional anaesthesia (RA) can be safely used for renal surgeries.<sup>[1,2]</sup> The advantages of RA is that it provides better haemodynamic stability with negligible blood loss during surgery, lower occurrence of toxicity from anaesthetic agents and has fewer post-operative complications.<sup>[3,4]</sup>

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Recently dexmedetomidine, alpha2-adrenoceptor agonist is used as an anaesthetic adjuvant for GA and RA. Studies have shown it to be a better epidural

adjuvant with additional stable cardio-respiratory parameters, without any side effects and higher sedation scores when compared with clonidine.<sup>[5,6]</sup>

We carried out our study in patients undergoing elective renal surgeries under GA or epidural anaesthesia with ropivacaine and dexmedetomidine. We compared the surgical conditions, surgeon's satisfaction intra-operatively and patient's satisfaction in the post-operative period in the two groups and also haemodynamic parameters and the side-effects associated with the two anaesthesia techniques.

## MATERIALS AND METHODS

We carried our study in 80 patients undergoing renal surgeries from December 2015 to November 2016, after obtaining institutional ethical committee approval. Consent was obtained from all the patients. Initially 96 patients were enrolled in the study. 16 patients were excluded as they did not meet the inclusion criteria. 80 patients were divided randomly into two groups of 40 each. We followed the methodology used by Bajwa et al (2014).<sup>1</sup>

Group A patients (n=40): Were administered conventional GA and Group B patients (n=40): Received epidural anaesthesia.

**Inclusion criteria**

1. Patients undergoing upper limb surgeries under brachial plexus block,
2. Patients above 18 years of age,

**Exclusion criteria:**

1. Patients with diabetes mellitus,
2. Patients with uncontrolled hypertension,
3. Patients with cardiac rhythm disturbances,
4. Patients with severe pulmonary disease,
5. Patients with hepatic impairment,
6. Patients with cerebrovascular disorder and
7. Patients who refused for epidural anaesthesia.

In Group A patients, induction of anaesthesia was achieved with propofol 2 mg/kg, butorphanol 0.02 mg/kg, isoflurane, oxygen and vecuronium 0.1 mg/kg as a muscle relaxant to facilitate endotracheal intubation with appropriate sized endotracheal tube. An intravenous (IV) infusion of diclofenac sodium (75 mg) was given just before the conclusion of surgery for post-operative analgesia. The residual muscle blockade was antagonised with neostigminitee and glycopyrrolate. The patients were extubated after adequate recovery and thereafter kept in the recovery room for 4 hour and vital parameters as well as side-effects were observed for and treated as and when required.

In Group B patients, epidural space was identified with 18G Touhy needle in L2-L3 or L3-L4 intervertebral space with the loss of resistance to air technique. Epidural catheter was threaded, directed cephalad and secured. 3 mg/kg of ropivacaine admixed with 1 µg/kg of dexmedetomidine was injected through the catheter into the epidural space. Surgical field bleeding, immobility of the patient, degree of muscle relaxation and the quality of post-operative analgesia in the ward were taken as criteria for surgeon’s satisfaction. Whereas patient satisfaction criteria were any pain or discomfort during surgery and in the post-operative period. These scores were measured by the questionnaires prepared during the planning stage of the study.

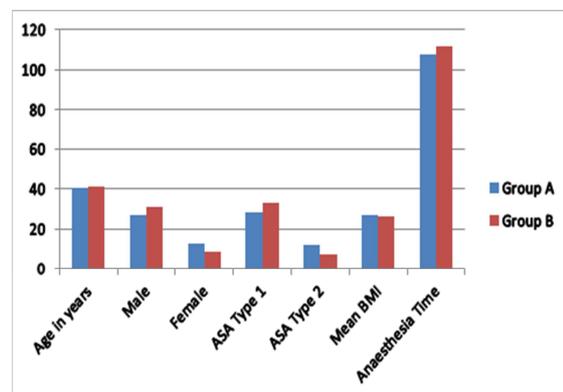
Side-effects such as nausea and vomiting, headache, respiratory depression, shivering and dry mouth were noted during the post-operative period in both groups. The data was analysed by SPSS for windows (version 17) statistical package (SPSS Inc., Chicago, IL). The data were expressed as mean ± standard deviation (SD). The parametric and normally distributed data in the groups were compared with ANOVA for repeated measurements so as to identify the differences between the groups. Non-parametric data in both groups were compared with Mann–Whitney U-test and Wilcoxon test. P < 0.05 was considered statistically significant while P < 0.001 as highly significant.

**RESULTS**

The demoFigureic characteristics like age, gender distribution, American Society of Anaesthesiologists (ASA) physical status, body mass index, duration of surgery and total anaesthesia time were comparable in both groups and no significant difference was observed [Table 1 & Figure 1].

**Table 1: DemoFigureic data and Anaesthesia time in both groups.**

DemoFigureic variable	Mean ± SD ( n = 40)		P value
	Group A	Group B	
Age in years	40.8±7.8	41.5±8.7	0.7058
Gender (Male/Female)	27/13	31/9	0.75
ASA physical status (I/II)	28/12	33/7	0.56
BMI	26.8±1.6	26.3±1.2	0.11
Total Anaesthesia Time	108±56	112±39	0.71



**Figure 1: DemoFigureic data and Anaesthesia time in both groups.**

The surgical conditions were excellent in the most of the patients in both groups. Whereas most of the patients were extremely satisfied in both the groups [Table 2, Figure 2 & 3].

**Table 2: Data showing Patient and Surgeon satisfaction scores.**

Satisfaction scores	Grade of satisfaction	n =40				P value
		Group A		Group B		
		No	%	No	%	
Surgeon satisfaction	Excellent	32	80	30	75	0.29
	Good	3	7.5	6	15	0.15
	Fair	1	2.5	3	7.5	0.15
	Poor	4	10	1	2.5	0.08
Patient satisfaction score	Extremely Satisfied	35	87.5	32	80	0.18
	Satisfied	3	7.5	7	15	0.08
	Not Satisfied	2	5.0	1	2.5	0.28

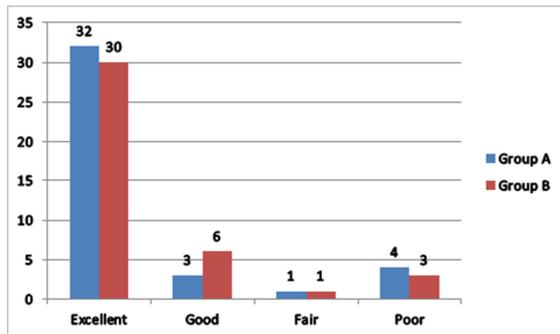


Figure 2: Surgical satisfaction scores in both the groups.

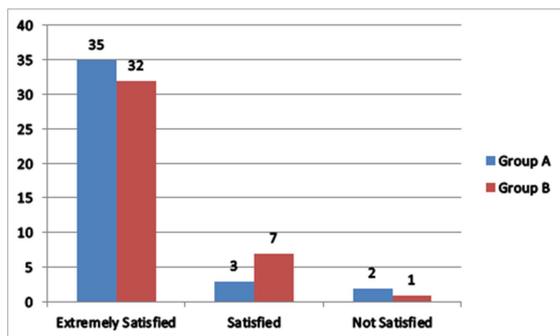


Figure 3: Patient satisfaction scores in both the groups.

We found fewer side effects in Group B as compared with Group A [Table 3 & Figure 4]. The occurrence of headache in the post-operative period was comparable in both the groups, whereas other side-effects such as, nausea and vomiting, respiratory depression and shivering were observed more frequently in Group A patients. On the other hand, the frequency of occurrence of dry mouth was much high in Group B patients when compared with Group A patients which was highly significant ( $P < 0.001$ ).

Table 3: Side effects of patients in both groups.

Side effects	n =40 (%)				P value
	Group A		Group B		
	No.	%	No.	%	
Nausea and vomiting	6	15.0	2	5.0	0.06
Headache	2	5.0	1	2.5	0.28
Respiratory depression	1	2.5	0	0	-
Shivering	9	22.5	1	2.5	<0.05
Dry Mouth	2	5.0	14	35	<0.05

## DISCUSSION

CRD encompass of a group of disorders categorized by damage to kidneys or detection of decrease in the function of the kidney for more than 90 days. Many anaesthetists prefer GA as it gives rapid induction, better control over airways and ventilation, less hypotension, and cardiovascular stability. But this procedure has its own disadvantages like cardiac complications, need for supplementing analgesia in the post-operative period, higher incidence of side-

effects like nausea and vomiting. Hence, anaesthetists are now a days preferring regional anaesthesia as it has advantages of retaining of conscious state and its relatively simple and cost effective technique with less surgical bleeding and fewer side effects.<sup>[1,7-9]</sup>

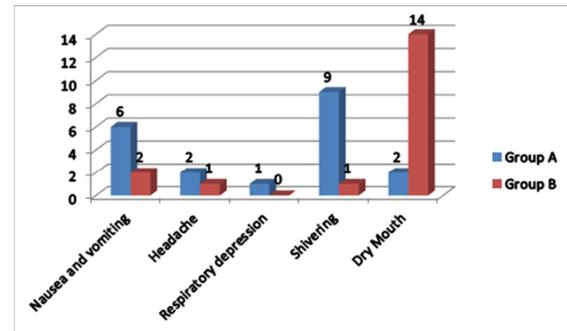


Figure 4: Side effects of patients in both groups.

Kazimirov et al observed that epidural anaesthesia was safer than GA in patients with deranged renal functions.<sup>[10]</sup> Bajwa et al expressed similar concerns in patients undergoing surgery for renal trauma.<sup>[11]</sup> Sener et al and Hadimioglu et al have compared combined spinal-epidural anaesthesia and GA for donor nephrectomies and renal transplantation and reported that RA can be safely and effectively used for these procedures.<sup>[12,13]</sup> They suggested that disadvantages with the combined approach is the haemodynamic instability and unpredictable sensory blockade levels. Hence, we carried out a comparative study evaluating the epidural and general anaesthetic techniques in patients undergoing renal surgeries.

Firstly we evaluated the demographic profile of patients in both groups and found that they were nearly similar, which provided us a neutral ground for comparing the effectiveness of two completely diverse techniques. We also found that the haemodynamic parameters were also comparable in both groups. The purpose of adding of dexmedetomidine to ropivacaine is for effective neuraxial anaesthesia with good operating conditions and patient comfort during the surgical procedure. We also found comparable surgical conditions and patient satisfaction in both groups. This was similar to the findings of Haberal et al.<sup>[14]</sup>

Tangpaitoon et al compared the efficacy and safety of EA with GA in patients who underwent Percutaneous nephrolithotomy and observed that patient satisfaction was more in the EA group, and there were less early postoperative pain and less adverse effects with the same efficacy and safety compared with GA.<sup>[15]</sup>

We found that the side-effect profile in both the groups was markedly different as a 9 patients complained of shivering and 6 patients complained of nausea in group A in the post-operative period, whereas 14 patients in group B complained of dry mouth, which was statistically significant when

compared with group A. The observation of dry mouth might be due to drying up of secretions as a typical side-effect of  $\alpha$ -2 agonists, dexmedetomidine and clonidine. The lower incidence of shivering in Group B patients might be due to the anti-shivering properties of dexmedetomidine as was shown by Bajwa et al.<sup>[16]</sup>

## CONCLUSION

We compared epidural and general anaesthetic techniques in patients undergoing renal surgeries and found that epidural anaesthesia with ropivacaine and dexmedetomidine can be used with adequate safety. Further studies in this field of anaesthesia are required for better exploration of the effectiveness and safety of various anaesthetic techniques.

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