Original Research Paper

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# TO COMPARE MINIMUM ALVEOLAR CONCENTRATION AND BISPECTRAL INDEX FOR DEPTH OF ANESTHESIA ON POSTOPERATIVE PAIN AND ANALGESIC REQUIREMENT IN PATIENTS UNDERGOING LAP DONOR NEPHRECTOMY

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**ABSTRACT** **Introduction:** The objective of this study was to assess the frequency of pain following surgery and the need for analgesic medication in patients receiving general anaesthesia for a Laparoscopic Donor Nephrectomy. **Methods:** A random assignment was used to divide 50 patients undergoing laparoscopic donor nephrectomy into two groups: group I was monitored by MAC, and group II by BIS. In both groups, the anaesthesia procedure was the same. We also compared the VAS score, the amount of rescue analgesic given in the first six, twelve, and twenty-four hours after surgery, the intraoperative hemodynamic indices, and postoperative pain (superficial,deep,shoulder and backaches). **Results:** A statistically significant disparity was seen between group II and group I, as indicated by the median VAS ratings at 1, 6, 12, and 24 hours post-surgery. When we also assessed the four components of pain, we found that those in group I experienced more discomfort overall. During the procedure, Group I used an average of 132±20.82 mcg fentanyl whereas Group II used 112.50 ±19.39 mcg which was statistically significant. Postoperatively, the rescue analgesic consumption was also less in group II. **Conclusion:** This study concludes that patients in whom depth of anaesthesia was maintained using BIS experienced lower incidence of postoperative pain and rescue analgesic requirement. Further, it was observed that intraoperative haemodynamic variations in BIS group were lesser in comparison to patients monitored with MAC.

**KEYWORDS :** Anaesthesia; Bispectral index; Donor Nephrectomy; Laparoscopy; VAS score

## 1. INTRODUCTION

The laparoscopic approach has been accepted the gold standard for kidney retrieval from living donors due to smaller abdominal incision, reduced incidence of post-operative ileus, early mobilisation and decreased morbidity unlike open donor nephrectomy [1]. However, the patients undergoing Laparoscopic nephrectomy may experience moderate to severe intensity of postoperative pain lasting for 24-48 hours. In addition to trochar site pain, stretching of peritoneum and diaphragmatic irritation from residual pneumoperitoneum renal donors experience pain from abdominal incision and backache due to positioning [2]. Studies have suggested that maintaining an adequate depth of anaesthesia may attenuate intensity of postoperative pain. [3]. There are multidimensional pain assessment tools available for quantifying severity of pain. Visual analogue scale, a validated pain rating scale first used by Hayes and Patterson in 1921 [7,8].

In this study, bispectral index (BIS) and minimum alveolar concentration (MAC) were used to monitor the depth of anaesthesia and compare the post-operative pain using analgesic and VAS requirements in both the groups. BIS converts EEG data into a single, dimensionless value between 100 and 0 [9]. A 100 indicates an EEG that is awake, while a 0 indicates total electrical quiet [10]. A BIS index of 40-60 ensures adequate depth and decreased consumption of sedative hypnotic drugs [11].

Anaesthetic agents are titrated according to minimum alveolar concentration (MAC) and haemodynamic response. The MAC is determined by measuring the anaesthetic concentration in the alveoli, which represents the concentration at the level of the central nervous system [12].

This research article aims to examine the minimum alveolar concentration and bispectral index as methods for assessing the depth of anaesthesia in patients undergoing laparoscopic nephrectomy. The study will also investigate the impact of these assessments on postoperative pain and the need for analgesics.

## 2. METHODOLOGY

It was a hospital based prospective, randomized comparative study in a single centre conducted on patients posted for laparoscopic donor nephrectomy under general anaesthesia over a period of 2 years. Study was conducted with the necessary clearance from the institutional ethical committee and review board, as well as the patients' complete written consent. Patients in the age group >18 years, of either gender, ASA1, who have consented for laparoscopic donor nephrectomy were included in the study. Patients who refused to give consent for the study, with anticipated difficult intubation, patients with history of chronic pain and analgesic requirement, and in whom the surgery was converted to open surgery were excluded from the study. Prior to surgery, a computer-generated random number contained in an opaque sealed envelope was used to randomly assign the patients to either group I (monitored by MAC) or group II (monitored by BIS). GROUP I: 25 patients GROUP II: 25 patients.

### 2.1. Anaesthesia technique

The day before surgery, a detailed history and examination was done. Demographic information, including age, gender, comorbidities, ASA status, history of chronic pain, use of chronic analgesics and laboratory values were recorded. Patients were kept fasting for eight hours. The night before the procedure, patients received oral pantoprazole 40 mg and alprazolam 0.25 mg. On the day of surgery, an injection of pantoprazole 40 mg was administered. Patients approval for participation in study was recorded on consent forms.

### 2.2. Pre-induction

After confirming adequate fasting, pre-anaesthesia work-up and consent checking, patient was taken inside operation theatre. A large bore iv cannula was secured, Intravenous fluids were initiated and all patients received a 4mg injection of ondansetron. The standard monitors NIBP (non-invasive blood pressure), 5 lead ECG (electrocardiogram), and pulse oximetry were attached. Within group II, three BIS electrodes were positioned subsequent to cleansing the forehead with alcohol and drying it using gauze. The initial electrode was positioned at the midpoint of the forehead, 1.5 inches above the nasal bridge. The third electrode was placed on the temple, midway between the hairline and the outer corner of the eye, and the second electrode was placed exactly above the eyebrow. For electrode implantation in our investigation, the right side of the forehead was used.

One Baseline readings of BIS index, systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate, SpO2 were recorded.

### 2.3. Induction

After 3 minutes of pre-oxygenation using 100% oxygen, anaesthesia was induced with injection propofol (2 mg/kg), injection fentanyl (2 mcg/kg) and injection atracurium (0.5 mg/kg). After adequate relaxation, trachea was intubated with a cuffed endotracheal tube of internal diameter of 7.5 mm for females and 8.5 mm for males using direct laryngoscopy. Anaesthesia was maintained using oxygen, air in ratio of 1:1 and sevoflurane.

BIS index, heart rate, mean arterial blood pressure, non-invasive blood pressure, end tidal concentration (EtCO2), and oxygen saturation (SpO2) were measured after induction of anaesthesia, post endotracheal intubation at 1 minute, 3 and 20 minutes after CO2 insufflation, 3 minutes after abdominal incision, 3 minutes after abdominal desufflation, and after extubation, In group I, the hemodynamic responses to the various steps of anaesthesia and surgery were monitored and sevoflurane was titrated to achieve a MAC of 0.8-1.2. In group II, the patients were monitored using BIS and sevoflurane titrated to maintain the BIS value between 40-60 and the

changes in the hemodynamic parameters in response to various steps of anaesthesia and surgery were monitored.

Patients were sent to a post-anesthesia care unit (PACU) after being extubated, and a visual analogue scale(VAS) and four sites of pain were used to assess postoperative pain (superficial abdominal pain, deep abdominal pain, shoulder pain, backache), postoperative nausea vomiting(PONV) and amount of analgesia required in postoperative period in 1, 6, 12, 24 hours were compared between two groups. In PACU pain relief was obtained with inj. Fentanyl 20 mcg iv in incremental doses as a rescue analgesic titrated to achieve a pain score of less than 4. The patient received inj tramadol 50 mg i.v. every eight hours and inj paracetamol 1 gm i.v. every six hours in the ward. If VAS score comes out to be more than 4, injection tramadol 50 mg i.v. was given to the patients as a rescue analgesic. The mean dose of fentanyl given in the immediate postoperative period and tramadol given in the ward as rescue analgesics were compared in both the groups.

### 2.4. Statistical analysis

Statistical analysis was used to do the IBM SPSS version 20 . A frequency table, a basic bar chart, a multiple bar chart, a pie chart, and a Chi-square test analysis of the association between the variables are all included in the research.

The standard deviation and mean, which are measures of central tendency and variability, were used to estimate all quantitative variables. An independent t-test and the paired t-test for the paired samples were used to compare the means of the two groups. The median was compared using non-parametric inference methods such as the Mann-Whitney U Test for two groups and the paired Wilcoxon signed rank test for paired samples. The statistical tests were conducted using the two-tailed threshold of significance, with p-values of ≤0.05 and ≤0.01.

## 3. RESULTS

| Table 1: Age, WT, HT distribution in group I and group II | | | |
|---|---|---|---|
| GROUP | | Mean±SD | p-value |
| AGE (years) | Group-I | 48.00±8.64 | 0.055 |
| | Group-II | 43.44±7.76 | |
| HT(CM) | Group-I | 158.62±8.07 | 0.284 |
| | Group-II | 160.90±6.73 | |
| WT(KG) | Group-I | 74.44±8.61 | 0.063 |
| | Group-II | 69.76±8.75 | |

Table 1 shows that Group I's mean age was 48.64 years, whereas Group II's mean age was 43.44 7.76 years. Group I's mean height was (158.62 8.07) cm, whereas Group II's mean height was (160.90 6.73) cm. Group I's mean weight was (74.44 8.61) kg, whereas group II's mean weight was (69.76 8.75) kg. When the unpaired t test was used, there was no significant difference found between the two groups for age, height, or weight.

| Table 2: Variation of HR, MAP, SBP, DBP, SpO2, EtCO2 at sequential time intervals between group I and group I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Group | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 |
| HR(Heart rate) | | | | | | | | | |
| G1 | 81.84±7.79 | 74.96±7.67 | 80.32 ±10.63 | 80.44 ±7.31 | 76.08 ±8.22 | 73.84 ±9.33 | 79.56 ±11.26 | 78.72 ±10.54 | 87.24 ±10.21 |
| G2 | 78.36±7.76 | 74.36±7.65 | 83.12 ±10.69 | 80.12 ±10.43 | 76.60 ±8.95 | 78.96 ±6.70 | 82.08 ±8.31 | 80.36 ±6.92 | 87.12 ±11.56 |
| sig | .120 | .783 | .358 | .901 | .831 | .031* | .373 | .519 | .969 |
| SBP(Systolic blood pressure) | | | | | | | | | |
| G1 | 128.84 ±14.18 | 117.44 ± 12. 81 | 129.60 ± 16. 24 | 133.80 ±15.77 | 124.00 ±14.88 | 131.60 ±17.75 | 129.24 ±17.51 | 132.36 ±16.86 | 140.84 ±13.13 |
| G2 | 125.80±8.14 | 101.84±9.76 | 130.04± 13.22 | 121.16± 12.85 | 120.48± 14.53 | 122.24± 11.60 | 121.24±9.97 | 121.84±10.47 | 132.00±12.36 |
| Sig | .357 | .0001** | .917 | .003** | .402 | .032* | .053 | .011* | .018* |
| DBP (Diastolic blood pressure) | | | | | | | | | |
| G1 | 74.92±7.84 | 71.60±9.51 | 77.44±10.79 | 80.60±10.99 | 75.36±9.30 | 80.76±10.47 | 83.04±14.85 | 85.56±13.62 | 84.72±8.58 |
| G2 | 76.56±5.37 | 61.60±6.83 | 79.12±8.82 | 73.28±9.88 | 73.72±11.26 | 7.10±2.483 | 7.01±2.143 | 78.40±8.98 | 80.36±10.11 |
| Sig | .393 | .0001** | .549 | .017* | .577 | .017* | .037* | .033* | .107 |
| MAP (Mean arterial pressure) | | | | | | | | | |
| G1 | 88.16±9.43 | 84.24±8.74 | 91.28±11.60 | 93.92±9.66 | 88.88±9.43 | 93.24±10.91 | 94.16±10.02 | 98.08±12.75 | 98.12±8.92 |
| G2 | 88.28±5.43 | 74.68±7.88 | 92.92±981 | 85.04±10.69 | 85.00±11.18 | 85.88±6.51 | 87.52±6.10 | 88.96±8.82 | 92.24±10.62 |
| Sig | .956 | .0001** | .592 | .003** | .191 | .006** | .007** | .005** | .039* |
| SpO2(Oxygen saturation) | | | | | | | | | |
| G1 | 100.00 ±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 |
| G2 | 100.00±0.00 | 100.00±0.00 | 99.92±.28 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 | 100.00±0.00 |
| Sig | | | .155 | | | | | | |
| EtCO2 (End-tidal carbon dioxide) | | | | | | | | | |
| G1 | | 29.16±3.58 | 29.96±2.94 | 30.12±3.07 | 30.12±2.93 | 28.88±2.74 | 29.24±3.15 | 29.52±2.84 | 29.20±3.68 |
| G2 | ± | 27.29±3.71 | 30.84±2.95 | 31.76±3.52 | 31.76±3.17 | 30.36±2.97 | 30.80±2.43 | 30.72±3.26 | 31.20±3.38 |
| Sig | | .079 | .296 | .085 | .063 | .073 | .056 | .172 | .051 |

Table 2 shows the HR changes were significant at T6 (3 min after $CO_2$ insufflation) between group I with 73.84±9.33 and group II with 78.96±6.70 with statistically significant p value=0.03. It was discovered that at T2, T4, T6, T8, and T9 intervals, group I had a higher mean SBP than group II. A significance level of $p < 0.05$ is applied. Particularly at the T2, T4, T6, T7, T8, and T9 intervals, group I's mean DBP was greater than group II's. There is an applied significance threshold of $p < 0.05$. Group I's mean MAP was higher than Group II's at T2, T4, T6, T7, T8, and T9. A cutoff point of $p < 0.05$ is used for significance. The SpO2 values in the two groups did not differ statistically significantly, according to an unpaired t test. There was no statistically significant difference in EtCO2 between groups I and II.

Table 3 shows At 1 hour SUP, DAP and shoulder pain were noticed in group II. On contrary, only superficial and deep abdominal pain were found in group I. 32% of the patients remained pain free in group II.

DAP was found to be statistically significant with p value < 0.05. At 6 hours, pain was observed at all four sites in both the groups. However in group II, incidence of pain was found in less number of patients as compared to group I. Out of all DAP was found to be statistically significant. In group II, 56% of patients remained pain free whereas in group I only 8% were pain free which was found to be statistically significant. At 12 hours, SUP, DAP and shoulder pain and backache were observed in group I, whereas in group II only backache and shoulder pain were found. The results were statistically significant in context of DAP with p value < 0.05. Another statistically significant finding was that 92% of patients in group II reported not having any discomfort. At 24hrs, only backache was found in group I monitored under MAC. However, it was not statistically significant.

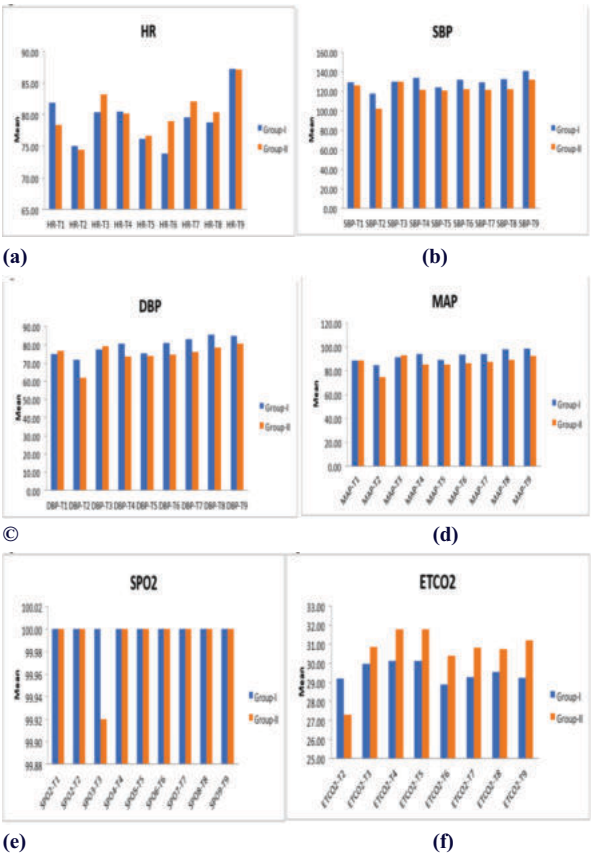


**Figure 1:** Variation of study groups as per changes various parameters like (a) HR, (b) SBP, (c) DBP, (d) MAP, (e) SpO2, (f) $EtCO_2$.

| Table 3: Comparison of group I and group II's pain at various locations at various interval hours | | | | | | |
|---|---|---|---|---|---|---|
| | | Group-I | | Group-II | | p-value |
| Sites Of Pain At 1Hour | SUP | 8 | 32.0% | 8 | 32.0% | 1.000 |
| | DAP | 16 | 64.0% | 9 | 36.0% | .039* |
| | SHOULDER | 1 | 4.0% | 0 | 0.0% | .307 |
| | BACKACHE | 0 | 0.0% | 0 | 0.0% | |
| | NO | 0 | 0.0% | 8 | 32.0% | .001* |
| Sites Of Pain At 6 Hour | SUP | 5 | 20.0% | 3 | 12.0% | .438 |
| | DAP | 12 | 48.0% | 3 | 12.0% | .003* |
| | SHOULDER | 4 | 16.0% | 1 | 4.0% | .149 |
| | BACKACHE | 2 | 8.0% | 4 | 16.0% | .380 |
| | NO | 2 | 8.0% | 14 | 56.0% | .0001* |
| Sites Of Pain At 12 Hour | SUP | 1 | 4.0% | 0 | 0.0% | .307 |
| | DAP | 5 | 20.0% | 0 | 0.0% | .012* |
| | SHOULDER | 2 | 8.0% | 0 | 0.0% | .380 |
| | BACKACHE | 5 | 20.0% | 2 | 8.0% | .214 |
| | NO | 6 | 24.0% | 23 | 92.0% | .0001* |
| Sites Of PainAt 24 Hour | SUP | 0 | 0.0% | 0 | 0.0% | |
| | DAP | 0 | 0.0% | 0 | 0.0% | |
| | SHOULDER | 0 | 0.0% | 0 | 0.0% | |
| | BACKACHE | 1 | 4.0% | 0 | 0.0% | .307 |
| | NO | 24 | 96.0% | 25 | 100.0% | .307 |

Table 4 shows In group I median VAS score observed at 1, 6, 12 and 24 hours was 7, 5, 4, 2 and in group II, it was 4, 2, 2, 0 respectively. It was found to be statistically significant as VAS score was more in group I.

| Table 4: Comparison of VAS score between group I and II at various intervals Analysis. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Post op pain | GROUP | | | | | | P -value |
| | Group-I | | | Group-II | | | |
| | Median | Quartile-I | Quartile-II | Median | Quartile-I | Quartile-II | |
| 1 hours | 7.00 | 6.00 | 7.00 | 4.00 | 2.00 | 6.00 | .0001* |
| 6 hours | 5.00 | 4.00 | 6.00 | 4.00 | 2.00 | 4.00 | .0001* |
| 12 hours | 4.00 | 2.00 | 5.00 | 2.00 | 2.00 | 2.00 | .0001* |
| 24 hours | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | .0001* |

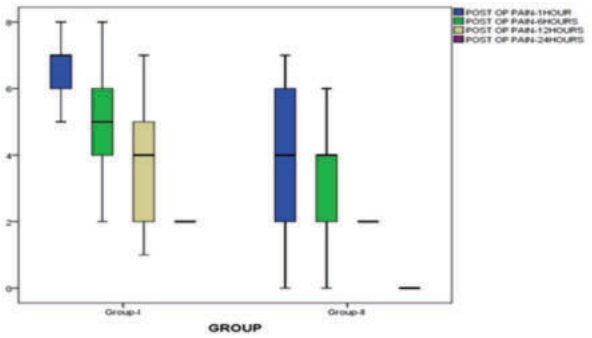


**Figure2 :** Comparison of VAS score between group I and II.

| Table 5: Comparison of mean rescue analgesic consumption at various intervals | | | |
|---|---|---|---|
| Rescue analgesic consumption | Group-I | Group-II | p-value |
| | Mean±SD | Mean±SD | |
| INTRAOP | 132.00±20.82 | 112.50±19.39 | .001* |
| 1 hours | 46.40±18.00 | 35.29±18.07 | .057 |
| 6 hours | 50.00±0.00 | 50.00 | - |
| 12 hours | 50.00±0.00 | 50.00±0.00 | - |

Table 5 displays the During the operation, Group I had a larger intraoperative mean value of total analgesic intake (132 20.82 mcg) than Group II (112.5±19.39 mcg). At p = 0.001, it was statistically significant. The average amount of analgesic consumed at one hour was (46.4±18) mcg, which was more than group II's intake of 35.29±18.07 mcg. However, it was not statistically significant.

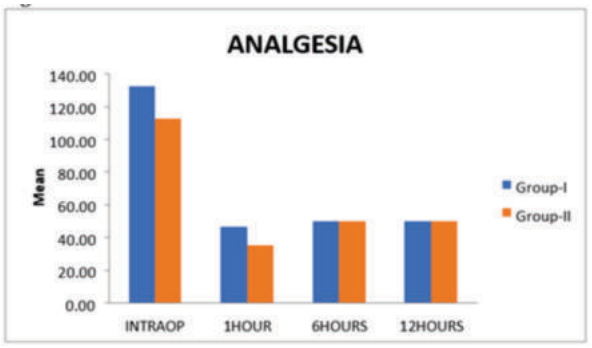


**Figure 3.** shows Comparison of mean rescue analgesic

| Table 6: Comparison of PONV between group I and group II at different hours. | | | | | | |
|---|---|---|---|---|---|---|
| | | Group | | | | p-value |
| | | Group-I | | Group-II | | |
| Post op Nausea Vomiting-1hours | Nausea | 2 | 8.0% | 1 | 4.0% | 0.492 |
| | Vomiting | 1 | 4.0% | 0 | 0.0% | |
| | No | 22 | 88.0% | 24 | 96.0% | |
| 6hours | Nausea | 1 | 4.0% | 1 | 4.0% | 0.6 |
| | Vomiting | 0 | 0.0% | 1 | 4.0% | |
| | No | 24 | 96.0% | 23 | 92.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12hours | Nausea | 1 | 4.0% | 1 | 4.1% | 0.613 |
| | Vomiting | 1 | 4.0% | 0 | 0.0% | |
| | No | 23 | 92.0% | 23 | 95.0% | |
| 24hours | No | 25 | 100.0% | 25 | 100.0% | |

Table 6 shows the incidence of post op nausea and vomiting were 8% and 4% respectively. However , incidence of vomiting was found to be in 4% of group I only. Both were not statistically significant at different hour. Patients remained free of PONV at 24 hours

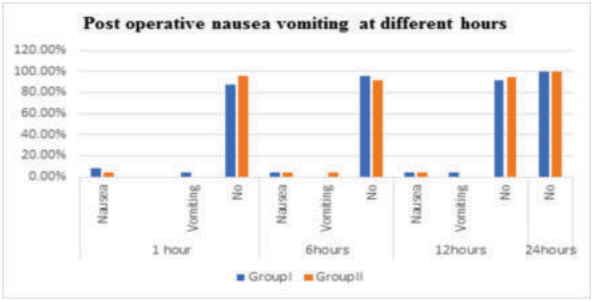


**Figure 4.** shows comparison of PONV.

## 4. DISCUSSION

Poorly managed postoperative pain can have detrimental physiological and psychological effects, which could raise morbidity and death rates. There are several tools and approaches suggested for monitoring the depth of anaesthesia. One statistical predictor has been the BIS monitor, which is obtained from EEG data. MAC is another such method implemented for providing adequate depth of anaesthesia. The aim of our study was to evaluate postoperative pain using VAS and four sites of pain (superficial abdominal pain, deep abdominal pain, shoulder pain, backache), PONV and amount of analgesia requirement between the two groups of patients undergoing laparoscopic donor nephrectomy.

Our study included 50 patients divided into two groups of 25 each (group I and group II) and age, gender, weight, height were comparable between both the groups. Intraoperatively, haemodynamic parameters like HR, MAP, SBP, DBP, SpO2, EtCO2 were observed in both the groups at different time intervals. Post operatively, four components of pain, VAS score, consumption of rescue analgesics and incidence of PONV were studied at different intervals. All patients were observed for pain from 1 hour to 24 hours postoperatively using VAS. We also observed pain at four different sites namely - deep abdominal pain, superficial abdominal pain, shoulder pain and back ache. Port insertion, superficial abdominal incision are potential components leading to superficial abdominal pain. While abdominal CO2 insufflation can cause peritoneal stretching and diaphragmatic irritation leading to deep abdominal pain, retained CO2 after desufflation and lateral decubitus positioning can cause shoulder pain and backache.

In our study, deep abdominal discomfort was more common in group I patients at 1, 6, and 12 hours postoperatively than in group II patients. A statistically significant difference was shown by p value< 0.05. The BIS guided monitoring has led to better association in maintaining adequate anaesthetic depth resulting in lesser pain and thereby improving post operative recovery [16]. Our study was comparable with the study by Mac Ergun et al. The authors enrolled 20 patients undergoing laparoscopic donor nephrectomy and observed that the superficial and deep abdominal pain component was significantly higher than referred shoulder pain component upto 48 hours.

The patients in group II required less analgesic during surgery, a reduction that was statistically significant (p value < 0.05*). Although not statistically significant, group II's rescue analgesic intake was lower than group I's at 1, 6, and 12 hours after surgery. However, there was no consumption of rescue analgesics in both the groups at 24 hours. BIS processes raw EEG and frontal EMG signals to produce a quantitative index reflective of nociceptive stimuli during general anaesthesia [17]. A better correlation with recognizing intensity of intraoperative pain could be achieved thus facilitating prompt management and titrated drug doses leading to lesser analgesic requirements. Similar results were published in a study conducted by Seyed et al comparing low BIS and high BIS as depth of anaesthesia and its effect on postoperative pain in laparoscopic cholecystectomy. The authors observed that there was a lesser need for additional analgesics if BIS values were maintained between 35-44 [18].

In our study, we used a visual analogue scale (VAS) to measure pain. The scale ranged from 0 to 10, with 0 indicating no pain, 1-3 indicating mild pain, 4-6 indicating moderate pain, and 7-10 indicating severe pain. A total of 11 points were available on the VAS. One, six, twelve, and twenty-four hours following surgery, the pain score was measured using a VAS. Patients in group I reported a median VAS score of 7, which indicates severe pain, after an hour of surgery, whereas participants in group II reported a median score of 4, which indicates relatively minor discomfort. The median VAS score six hours after the surgery was similar in both groups, indicating moderate discomfort. However, pain assessment after 12 hours post procedure demonstrated subjects of group I still experiencing moderate pain while pain was alleviated to mild intensity in group II. 24 hours after surgery, subjects in group II remained pain free whereas subjects in group I complained of mild persisting pain. Analysis of our data amounted to statistically significant results suggestive of better post operative recovery from pain in subjects of group II.

Our study's findings were interpreted to show that patients who had their depth of anaesthesia tracked using BIS had less severe pain and better pain management[16]. It is possible that the noxious impulses were partially aborted by maintaining a deeper plane of anaesthesia with BIS. However, the results of the study conducted by Law et al were contradictory to our study where the authors concluded that increasing the anaesthetic depth was not a clinically useful strategy for reducing postoperative pain [19]. This might be explained on the basis that their study was related to larger sample size, different types of surgeries were included with different pain scores.

Our results revealed statistically significant values suggesting lesser hemodynamic variations experienced in subjects of group II during induction, 1 minute after skin incision, post pneumoperitoneum, abdominal desufflation and post extubation. Similar findings were reported in a research by NeeruSahni et al., where group L-BIS experienced low MAP during the procedure. However, the authors compared Low-BIS and High-BIS which is contrary to our study. The HR measured subsequent to the creation of pneumoperitoneum was similarly greater in group I than in group II, and this difference was determined to be statistically significant [6].

The incidence of PONV did not significantly differ between the two groups. Preoperative administration of ondansetron and inj. pantoprazole may have reduced the incidence of PONV in both groups. Similar results were obtained in a study by Oliveira et al., which discovered that patients' PONV decreased by 12% when they were tracked using the bispectral index [20].

## CONCLUSION

After carefully analyzing and interpreting our findings, we have concluded that, when compared to MAC, using BIS as a monitor of anaesthetic depth during laparoscopic donor nephrectomy patients is associated with better intraoperative hemodynamic stability, less postoperative pain, and a reduction in the need for rescue analgesics.

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