

# Evaluation of anesthesia management in laparoscopic radical prostatectomy surgeries: A retrospective clinical study

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## Abstract

**Aim:** Laparoscopic radical prostatectomy (LRP) provides effectively results on surgical, oncological and functional in patients with localized prostate cancer. LRP that has a rapid recovery, returning to normal life activities in a short time affects the quality of life positively. Furthermore mandatory of general anesthesia and specific patient position, long operation time and increased intra-abdominal pressure caused by the pneumoperitoneum leads the anesthesia management difficult. In this retrospective study, our purpose was to present the anesthesia method applied in LRP.

**Material and Methods:** The patients, who underwent LRP between January 2016 and December 2018, were included in the study. The data were collected from patient files and anesthesia records. The ages, ASA, the agents used for induction and maintain anesthesia, duration of operation, amount of bleeding, postoperative analgesic application, IV infusion fluids, and invasive interventions provided on the patients were recorded.

**Results:** The analyses of results of 27 patents were made in the present study. The average age of the patients who underwent LRP operation was  $63.78 \pm 6.17$ . Five (18.5%) of them were ASA I; 14(51.9%) were ASA II, 8 (29.6%) were ASA III. Propofol or thiopental was used in anesthesia induction. Anesthesia was ensured with sevoflurane or desflurane. In the invasive interventions, central venous catheter, intra-arterial catheterization and lumbar epidural catheter were used. IV fluid infusion management was carried out with crystalloids or crystalloid and colloid combination. The postoperative analgesic management of a total of 19 (70.4%) patients was ensured epidural patient-controlled analgesics with morphine. 8 patients (29.6%) also were ensured with IV patient controlled analgesia with morphine.

**Conclusion:** During laparoscopic prostatectomy detailed hemodynamic and perioperative monitoring should be ensured in anesthesia management since the surgical intervention has high risk.

**Keywords:** Anesthesia Management; Laparoscopic Radical Prostatectomy; Retrospective analysis.

## INTRODUCTION

Radical prostatectomy is the standard treatment method of localized prostate cancer; and may be applied with open, laparoscopic or robotic approach (1).

Laparoscopic surgery has been preferred in recent years because it has several advantages like smaller incision area, less deterioration in pulmonary functions and low postoperative pain, and early mobilization, which shorten the hospitalization times of patients (2,3).

In cases that have localized prostate cancer, Laparoscopic Radical Prostatectomy (LRP) affects oncologic and

functional results positively. In addition, the recovery time being fast and patients' returning to their normal lives in a short time are among other benefits (4,5). Radical Prostatectomy is carried out laparoscopically in an increasing number of centers in our country (6).

In Laparoscopic Radical Prostatectomy, in addition to the difficulty of the surgical technique, anesthesia management is also challenging. Anesthesia management is complex and has several challenges like compulsory general anesthesia, the necessity of specific patient position, long operation time, and increased intra-abdominal pressure caused by the pneumoperitoneum.

**Received:** 10.02.2019 **Accepted:** 15.02.2019 **Available online:** 18.02.2019

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In the present study, the purpose was to present the anesthesia management applied by us during LRP surgery together with the up-to-date literature data.

## MATERIAL and METHODS

The patients who had undergone LRP between January 2016 and December 2018 were included in the present study after the approval was received from the Inonu University Health Sciences Non-Interventional Clinical Research Ethics Committee (Ethics Committee protocol code: 2019/01-12). The data of the patients were collected from the patient files and anesthesia records. All the patients undergoing LRP were given general anesthesia. No premedication was administered. In the operating room patients were monitored and basal hemodynamic values were recorded. In all patients, anesthesia was standardized with fentanyl, propofol or thiopental, and rocuronium was administered and tracheal intubation was performed. Anesthesia was maintained sevoflurane or desflurane in oxygen-air mixture. Non-dominant radial artery invasive arterial blood pressure monitoring and arterial blood gas analysis was provided. The body temperature of all patients were monitored with oropharyngeal way to maintain normo-thermia during surgery. An internal jugular venous catheter was inserted to monitor central venous pressure in all patients. Compression stockings are dressed to patients to reduce the risk of deep vein thrombosis. All patients were placed with orogastric or nasogastric tube. Patients are placed in supine position, both arms are placed in adduction, and approximately 20-30 degrees in Trendelenburg position is used along the surgery. Pneumoperitoneum was created with 12-14 mmHg pressurized carbon dioxide insufflation in all operations. The postoperative pain management was carried out with epidural or IV patient-controlled analgesia by using morphine. The ages, ASA (American Society of Anesthesiologists) classifications, the agents used for induction and maintain anesthesia, duration of operation, amount of bleeding, postoperative analgesic application, IV infusion fluids, and invasive interventions provided on the patients were recorded.

The primary outcome of the present study was that investigated anesthesia management. Secondary outcome were that examined patients characters, perioperative and postoperative anesthesia management.

### Biostatistical Analysis

The qualitative data were expressed as mean with standard deviation, and quantitative data were summarized as frequency with percentage for overall variables. IBM SPSS Statistics version 25.0 for windows was used for statistical analysis.

## RESULTS

A total of thirty patients were evaluated in the present study. Three patients were excluded from the study because of the missing data in their records. The analyses of 27 patients were made. Five (18.5%) of the patients who

underwent LRP were ASA I; 14 (51.9%) were ASAII, and 8 (29.6%) were ASA III (Table 1.).

**Table 1. Patient's characteristics and dates**

Patients characteristics		
Age (year)		63.8±6.2
ASA n (%)	I	5 (18.5)
	II	14 (51.9)
	III	8 (29.6)
Inhalation agents n (%)	Sevoflurane	18 (66.7)
	Desflurane	9 (33.3)
Induction agents n (%)	Propofol	20 (74.1)
	Thiopentone	7 (25.9)
Analgesia n (%)	Epidural Morphine	19 (70.4)
	IV Morphine	8 (29.6)
Fluid infusion n (%)	% 0.9 NaCl	14 (51.9)
	% 0.9 NaCl- Colloid	13 (48.1)
Surgical time (min)		326±91
Blood loss (mL)		243±112

### ASA: American Society of Anesthesiologists

The average age of the patients was 63.78±6.17 years. Propofol was used in 20 (74.1%) patients, and thiopental was used in 7 (25.9) patients in anesthesia induction. Rocuronium was preferred as the myorelaxant in all patients. Anesthesia maintenance was ensured with sevoflurane in 18 (66.7%) patients, and with desflurane in 9 (33.3%) patients. Central venous catheter was inserted into the jugular vein in a total of 15 (55.6%) patients. The arterial blood pressure monitorization of all the patients was carried out with invasive artery monitoring. The IV fluid infusion management was carried out with 0.9% NaCl in 14 (51.9%) patients, and with 0.9% NaCl and colloid in 13 (48.1%) patients. None of the patients needed blood. A total of 19 (70.4%) patients received lumbar epidural catheter insertion; and 2-3 mg morphine was administered intraoperatively through the epidural catheter after diluting with normal saline as 10 cc. In postoperative analgesia, epidural patient-controlled analgesia was carried out with morphine. The postoperative analgesia of 4 patients (14.8%) who did not accept lumbar epidural catheter application, and 4 patients (14.8%) whose lumbar epidural catheter attachment failed, was ensured with IV patient-controlled analgesia by using morphine. The mean surgery time was 325.93±91.07 minutes; the amount of bleeding was recorded as 242.59±111.54 mL. After the surgery, all the patients were extubated and were taken into Intensive Care Unit.

## DISCUSSION

Despite the high surgical success rates of open surgical interventions, the incisional morbidity rates, increased intraoperative blood losses, and long-lasting recovery times have brought minimal invasive techniques into the agenda (7). Nowadays, LRP is considered to have some advantages over open surgery; and it is applied as a

technique that is preferred more in certain centers (6).

Laparoscopic Radical Prostatectomy surgeries are carried out under general anesthesia. Patients are placed in supine position, and approximately 20-30 degrees in Trendelenburg Position; and both arms are placed in adduction. It is performed in line with the Heilbronn Technique with trans-peritoneal approach (6,8,9).

Major laparoscopic surgeries like LRP require multiple-puncture areas, significant organ manipulation, steep slope and volumetric pneumoperitoneum. These processes make spontaneous breathing of patients difficult; and consequently, they cannot be managed by regional anesthesia (10). In laparoscopic surgery, general anesthesia, which involves a balanced anesthetic technique, is recommended. It was reported in previous studies that intravenous induction agents like thiopental sodium, propofol and etomidate, and inhalation agents like nitrous oxide (N<sub>2</sub>O), sevoflurane, isoflurane and desflurane, and some myorelaxants like succinylcholine, mivacurium, atracurium and vecuronium were used in this respect. The agents with shorter effects like sevoflurane, desflurane and propofol are preferred more. The fact that propofol has advantages like having less nausea and vomiting after surgery has made it more preferable (10).

General anesthesia was applied to all our patients in the present study. Propofol was employed in 20 (74.1%) patients in anesthesia induction in line with the literature data. In anesthesia maintenance, sevoflurane was preferred in 18 (66.7%) patients, and desflurane in 9 (33.3%) patients. In all patients, rocuronium was employed as muscle relaxant.

Applying nitrous oxide increases the pressure and/or volume of the gases at a significant level in various body cavities. This increases the volume and intraluminal pressure of the gastrointestinal tract and causes complications of postoperative vomiting by leading to bowel distention during surgery (11). For this reason, no nitrous oxide was used in our patients.

Compared to the open procedure, although the severity of the postoperative pain is less in laparoscopic surgeries at a significant level, the long-term pain continues (10,12). Postoperative pain management in laparoscopic surgery is generally ensured by using local anesthesia, non-steroidal anti-inflammatory drugs and opioid analgesics (10). It is reported that the analgesic and anesthetic agent need is even decreased with the combined application of epidural and general anesthesia. In this way, intraoperative hemodynamic stability may be established better, and the metabolic, endocrine and immunological responses to surgery may be suppressed. The control of these responses is important to reduce postoperative morbidity and mortality. Recovery is faster with the epidural and general anesthesia combination, better quality analgesia is ensured during the postoperative period, and patients may be mobilized earlier (13). For this reason, by considering that adding epidural anesthesia to general anesthesia

would be beneficial, lumbar epidural catheter was inserted before general anesthesia to 19 (70.4%) patients, who accepted epidural anesthesia. Both intraoperative and postoperative analgesia were ensured.

The advantages of applying epidural morphine in ensuring adequate analgesia with low-doses, less side effects, and long-term analgesia are the preference reasons in postoperative analgesia. Similar to the literature, in the present study of ours, patient-controlled analgesia with epidural morphine was used for postoperative analgesia.

Most blood losses in radical prostatectomy stem from dorsal vein and venous sinuses. The pneumoperitoneum that is created in LRP reduces blood loss with its buffer effect on the veins and venous sinuses. Since blood, urine and washing liquids mix, there are difficulties in calculating blood losses in radical prostatectomy operations (14). Erdođru et al. reported the average blood loss in LRP patients as 440 ml (6). In our study, average blood loss was calculated to be approximately 242.59 mL. No blood transfusion was made to any patient.

Facial, pharyngeal and laryngeal edema may occur due to the Trendelenburg Position that is applied during laparoscopic radical prostatectomy. The IV amount given and the pneumoperitoneum causing reduction in the venous return may lead to laryngeal edema when combined with long-term Trendelenburg Position. This complication may be reduced by reducing the fluid given IV, and by limiting the upside-down position (15-17). Since the intravascular half-life of the crystalloids is short, it may easily cause edema in the face, eyes and upper airways with the additional effect of gravitation when given in excessive amounts. Using crystalloid and colloid together is recommended (2, 3). In our study, crystalloid was used in 14 (51.9%) patients; and crystalloid and colloid combination was used in 13 (48.1%) patients, which is in line with previous studies. No significant periorbital or laryngeal edema was observed in any of our patients.

There was a few limitation in the present study. First, the number of samples was less, and the second was lacking of data records. A prospective study might have given a better result.

## CONCLUSION

As a conclusion, it is important to know the pathophysiological changes in the patient, to take precautions against the problems, and to diagnose the complications early in laparoscopic prostatectomy. In this patient group, since surgical intervention has high morbidity and mortality risk, detailed hemodynamic monitoring and close perioperative follow-up must be carried out in anesthesia management.

*Competing interests: The authors declare that they have no competing interest.*

*Financial Disclosure: There are no financial supports*

*Ethical approval: Non-Interventional Clinical Research Ethics Committee (Ethics Committee protocol code: 2019/01-12).*

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