



Anesthesia Management of a Patient with Lumbar Spinal Stenosis and Tracheal Stenting

CASE REPORT

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ABSTRACT

Tracheal stenosis may occur after congenital problems and long-term endotracheal tube compression. Spinal stenosis is one of the 3 most common reasons in patients undergoing surgery due to low back and leg pain. Both general and regional anesthesia are used for lumbar surgery. A 56-year-old woman was admitted to our hospital with low back pain and leg paresthesia. A permanent tracheal stent was placed 11 years ago due to tracheal stenosis developed after tracheostomy performed for anaphylaxis and respiratory depression. Herein, a case of regional anesthesia technique applied during spinal stenosis surgery is presented.

Key words: Spinal anesthesia, spinal stenosis, tracheal stenosis

INTRODUCTION

Tracheal stenosis is rare but substantially affects quality of life. Congenital problems may occur after tracheal injury depending on long-term endotracheal tube compression, tracheal tumor, and compression of the trachea by tumor. Although the frequency of tracheal stenosis is not clear, the incidence of postintubation tracheal stenosis is 4.9/1,000,000 (1). Stenosis generally occurs due to compression of the trachea by intubation tube cuff at the level of stoma (2).

Airway management and anesthesia application differ according to surgery type and degree and localization of tracheal stenosis since tracheal stenosis affects anesthesia application (3, 4). In accordance to the American Society of Anesthesiologists, tracheal stenosis leads to difficult airway management (5).

Spinal stenosis is one of the 3 most common reasons in patients undergoing surgery due to low back and leg pain (6). Despite various treatment options, studies have demonstrated that surgery is a better approach to remove symptoms in spinal stenosis (7). Both general and regional anesthesia are used for lumbar disc surgery. Spinal anesthesia has some advantages such as decreasing blood loss and preventing injuries related to nerve compression (8).

In the present case report, anesthesia approach was discussed in a case of spinal stenosis who had tracheal stenosis for 5 years and was planned to undergo surgery in the classical prone position.

CASE REPORT

A 56-year old female patient with a weight of 70 kg and a height of 1.64 cm was planned to undergo a surgery due to lumbar stenosis.

According to her medical history, she was admitted to a health center 11 years ago with complaints of low back pain and leg paraesthesia. Her physical findings suggested lumbar disc hernia and accordingly she was planned to undergo contrast tomography. However, she developed anaphylaxis to contrast material during the tomography, and then she was immediately intubated and followed-up in the intensive care unit (ICU). Tracheostomy was performed in the ICU, where she was hospitalized for 7 days. On her follow-ups, a tracheal stenosis was detected and a T-stent was inserted before discharge. She lived for 5 years with this T-stent and then a permanent tracheal stent was placed.

On physical examination of the patient who was admitted to our clinic with an increase in low back pain and leg paraesthesia, a 1/5 loss of strength in her right distal extremity and bilateral pain originating from hips that was more remarkable in the right side were observed. There was no pathological reflex and her Lasègue test was negative. Her MRI revealed L1-L2 left lateral disc, L2-L3 right paravertebral narrowing, and L4-L5 stenosis. The patients was planned to undergo surgical operation.

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Informed consent of the patient was obtained before the operation. In order to determine the level and degree of tracheal stenosis, the patient was consulted with a chest surgeon. On her bronchoscopy, a metallic stent (stent diameter, 15 cm) placed into the trachea, which was started from 4 cm distal to the level of vocal cords and continued to the carina, was viewed. Moreover, diameter of the trachea was 10 mm, which was narrower than the normal, at proximal to the level of stent localization. Her airway examination revealed a mallampati score of 2, no limitation on jaw and neck movements, and normal thyromental distance. She had inspiratory and expiratory stridor. On her respiratory function test, FEV1 was 1.54 L and FEV1/FVC was 64%.

Her blood gas values were normal (pH=7.38, pO₂=105 mmHg, pCO₂=30 mmHg, HCO₃=19, BE=3). Regional anesthesia was decided to be a more appropriate approach by considering possible intubation difficulties and intubation-related complications (such as displacement of stent distally or proximally, obstruction of airway or hemorrhage in the trachea by stent, and inability to place endotracheal intubation tube) in case of general anesthesia application. Thus, spinal anesthesia was planned.

After standard monitorization, the patient was placed in the sitting position after establishment of vascular access with an 18G cannula. The back of the patient was cleaned with povidone-iodine, and then a 22G Quincke spinal needle was inserted into the intrathecal space at the level of L3-L4 by overcoming the resistance force of ligamentum flavum. After checking the cerebrospinal fluid flow, a 3 mL 0.5% heavy bupivacaine (Marcaine, Astrazeneca, Eczacıbaşı Sağlık Ürünleri Sanayi, Lüleburgaz, Turkey) was injected. Sensory block was achieved at the T8 level, which was two dermatomes above the surgical level and the patient was placed in the prone position after waiting for 10 min. The narrow canal was expanded by discectomy at the L1 level on the left side, partial hemilaminectomy at the L3 level on the right side, and partial hemilaminectomy and decompression at the L4 level on the right side. The operation was completed within 2.5 h without the need for an additional sedation or intraoperative extradural local anesthetic application. During the operation, no hypoxia, hypotension, bradycardia or tachycardia was observed (Table 1).

DISCUSSION

Spinal anesthesia is technique reducing intraoperative blood loss, providing peroperative hemodynamic stability, and decreasing postoperative pain. It also decreases postoperative nausea, vomiting and thromboembolic complications. Particularly, it prevents neurologic damage due to the prone position during general anesthesia. Spinal anesthesia is a useful option for lumbar spinal surgery by taking postoperative pain control and other benefits into consideration as well as it is preferred more day by day (9).

Problems related to intubation and extubation can occur in patients with tracheal stent. Small tracheal diameter makes ventilation impossible by causing tracheal edema during intubation or in any stage of induction. Thus, deep hypoxia and respiratory depression may occur (10). In the present case, we preferred spinal anesthesia by considering that tracheal stent might displace during intubation and lead to obstruction of airway by distal displacement and thus cause hemorrhage in the trachea, serious edema and ventilation difficulty.

Table 1. Respiratory and circulatory parameters during the procedure

	Systolic blood pressure (mmHg)	Average Blood Pressure (mmHg)	Heart rate (beats /min)	SpO ₂ (%)
Before spinal anesthesia	133	107	80	97
After spinal anesthesia	135	101	79	97
5 th Minute	132	98	79	96
10 th Minute	129	98	78	96
30 th Minute	128	96	76	97
60 th Minute	130	101	78	97
90 th Minute	128	95	76	98
120 th Minute	130	95	79	98
150 th Minute	131	96	75	97

Papadopoulos et al. (11) compared general and regional anesthesia in their study conducted on 43 patients who were planned to undergo lumbar microdiscectomy. They reported that nausea and vomiting was less in the epidural anesthesia group than in the general anesthesia group and that epidural anesthesia was a good alternative to general anesthesia. In the present case no nausea and vomiting was observed in the postoperative period, as well. Sadrolsadat et al. (12) compared spinal and general anesthesia in lumbar disc surgery and indicated that blood loss was less in the spinal anesthesia group and that risks and complications were higher in the general anesthesia group. The present case experienced a blood loss of approximately 800 mL. However, no blood replacement was performed on the patient and hemodynamic stability was provided by crystalloid and colloid infusion. While the knee-chest position was used during the operation in the study by Sadrolsadat et al. (12), we preferred classical prone position according to patient's and surgeon's requests. Hemorrhage was a little higher than we expected. This could be attributed to the position of the patient; however, further comprehensive studies conducted on higher number of patients are required to make a conclusion on this issue as only one patient is presented herein. Nevertheless, another study conducted in healthy volunteers has reported an increase in venous bleeding tendency in the knee-chest position (13).

The position that flattens the lumbar lordosis and minimizes the abdominal and intrathoracic pressures is the most ideal position in spinal surgery (14). For this purpose, the prone and knee-chest positions are mostly used. Yılmaz et al. (8) compared variations in lung and hemodynamic parameters caused by the prone and knee-chest positions in 45 patients planned to undergo lumbar microdiscectomy. They observed that no need for blood transfusion and neurological deficit at the postoperative 6th h in both groups. Moreover, they reported that although FEV1, FVC, and FEF25 were decreased in both groups, the decrease in FVC and FEF25 were higher in the knee-chest position than in the prone position. They also demonstrated that systolic and diastolic blood pressures were decreased and heart rate was increased according to the baseline in both groups. In the present case, no neurological damage, respira-

tory distress, and pulmonary problems were observed. This could be attributed to motor blockade being not above the T8 level and pulmonary muscles not being affected.

Demirel et al (15) demonstrated that epidural anesthesia provided better hemodynamic stability compared to general anesthesia particularly at the L4-L5 and L5-S1 levels. In the present case, atropine or ephedrine administration was not needed as any spinal anesthesia-related hemodynamic complications such as hypotension or bradycardia was observed in the perioperative period.

In lumbar disc and laminectomy surgeries, it has been demonstrated that spinal anesthesia is superior to general anesthesia as it reduces duration of anesthesia and operation and postoperative pain, particularly in 2-hour operations (16). Moreover, the limited duration in spinal anesthesia may limit the duration of operation. Additional local anesthetic agent administration may be required for intradural and epidural areas to complete the surgery. This may be a disadvantage for spinal anesthesia. However, spinal anesthesia is an advantageous technique when performed by skilled and experienced surgeons (8). In the present case, the duration of surgery was 150 min and the patient required no sedation or additional analgesic during the operation. No additional intradural or subdural local anesthetic injection was needed. The patient did not require any analgesic during the first 5 h in the postoperative period. Analgesia in the following period was provided using oral nonsteroidal anti-inflammatory drugs and the patient was mobilized early.

CONCLUSION

In the present case, who was at risk for endotracheal intubation for the application of general anesthesia due to tracheal stent previously placed for tracheal stenosis treatment, spinal anesthesia was successfully performed in spinal stenosis surgery. Spinal anesthesia provides adequate anesthesia and analgesia in lumbar spinal surgery and is a good alternative to general anesthesia.

Informed Consent: Written informed consent was obtained from patients who participated in this case.

Peer-review: Externally peer-reviewed.

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REFERENCES

- Nouraei SA, Ma E, Patel A, Howard DJ, Sandhu GS. Estimating the population incidence of adult post-intubation laryngotracheal stenosis. *Clin Otolaryngol* 2007; 32(5): 411-2. [\[CrossRef\]](#)
- Nouraei SA, Giussani DA, Sandhu GS, Ferguson C, Patel A. Physiological comparison of spontaneous and positive-pressure ventilation in laryngotracheal stenosis. *Br J Anaesth* 2008; 101(3): 419-23. [\[CrossRef\]](#)
- Cook TM, Sellar C, Gupta K, Thornton M, O'Sullivan E. Non-conventional uses of the Aintree Intubating Catheter in management of the difficult airway. *Anaesthesia* 2007; 62(2): 169-74. [\[CrossRef\]](#)
- Asai T, Shingu K. Airway management of a patient with tracheal stenosis for surgery in the prone position. *Can Anaesth* 2004; 51(7):733-6. [\[CrossRef\]](#)
- American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology* 2003; 98(5): 1269-77. [\[CrossRef\]](#)
- Cummins J, Lurie JD, Tosteson TD, Abdu WA, Birkmeyer NJ, Herkowitz H, et al. Descriptive epidemiology and prior healthcare utilization of patients in the spine Patient Outcomes Research Trial's (SPORT) three observational stenosis and degenerative spondilolisthesis. *Spine (Phila Pa 1967)* 2006; 31(7): 806-14. [\[CrossRef\]](#)
- Manchikanti L, Cash KA, McManus CD, Pampati V, Singh V, Benyamin R. The preliminary results of a comparative effectiveness evaluation of adhesiolysis and caudal epidural injections in managing chronic low back pain secondary to spinal stenosis: a randomized, equivalence controlled trial. *Pain Physician* 2009; 12(6): 341-54.
- Yılmaz C, Buyrukcu SO, Cansever T, Gülsen S, Altınörs N, Caner H. Lumbar microdiscectomy with spinal anesthesia: comparison of prone and knee-chest positions in means of hemodynamic and respiratory function. *Spine* 2010; 35(11): 1176-84.
- Jellis WS, Shea JF. Spinal anesthesia for spinal surgery. *Best Pract Res Anaesthesiol* 2003; 17(3): 323-34. [\[CrossRef\]](#)
- İsono S, Kitamura Y, Asai T, Cook TM. Case scenario: Perioperative airway Management of a patient with tracheal stenosis. *Anesthesiology* 2010; 112(4): 970-8. [\[CrossRef\]](#)
- Papadopoulos EC, Girardi FP, Sama A, Pappou IP, Urban MK, Cammisa FP. Lumbar microdiscectomy under epidural anesthesia: a comparative study. *Spine J* 2006; 6(5): 561-4. [\[CrossRef\]](#)
- Sadrolsadat SH, Mahdavi AR, Moharari RS, Khajavi MR, Khashayar P, Najafi A, et al. A prospective randomized trial comparing the technique of spinal and general anesthesia for lumbar disk surgery: a study of 100 cases. *Surg Neurol* 2009; 71(1): 60-5. [\[CrossRef\]](#)
- Laakso E, Ahavou J, Rosenberg PH. Blood flow in the lower extremities in knee-chest position ultrasonographic study in unanesthetized volunteers. *Anesthesia* 1996; 51(12): 1113-6. [\[CrossRef\]](#)
- Böstman O, Hyrkäs J, Hirvensalo E, Kallio E. Blood loss, operating time, and positioning of the patient in lumbar disc surgery. *Spine (Phila Pa 1976)* 1990; 15(5): 360-3. [\[CrossRef\]](#)
- Demirel CK, Kalaycı M, Özkoçak I, Altunkaya H, Özer Y. A prospective randomized study comparing perioperative outcome variables after epidural or general anesthesia for lumbar disk surgery. *J Neurosurg Anesthesiol* 2003; 15(3): 185-92. [\[CrossRef\]](#)
- Jellish WS, Thalji Z, Stevenson K, Shea J. A prospective randomized study comparing short and intermediate term perioperative outcome variables after spinal or general anesthesia for lumbar disk and laminectomy surgery. *Anesth Analg* 1996; 83: 559-64. [\[CrossRef\]](#)