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ORIGINAL ARTICLE

Effect of obturator nerve block during transurethral resection of lateral bladder wall tumors on the presence of detrusor muscle in tumor specimens and recurrence of the disease



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Abstract We investigated the effect of spinal anesthesia combined with obturator nerve block (ONB) during the transurethral resection of lateral bladder wall tumors (TUR-BT) on the presence of detrusor muscle tissue in tumor specimens and on tumor recurrence. TUR-BT was performed on 96 patients with a lateral bladder wall tumor under spinal anesthesia in our clinic between January 2011 and December 2015. The patients were divided into two groups: 49 patients only received spinal anesthesia and 47 patients received spinal anesthesia combined with ONB. The groups were retrospectively compared in terms of adductor muscle contraction, bladder perforation, complete tumor resection, presence of muscle tissue in the pathology material, and recurrence rate during follow-up. The obturator reflex was significantly observed in the non-ONB group ($p < 0.05$). In the ONB group, the percentages of complete resection and detrusor muscle tissue were significantly higher ($p = 0.003$ and $p = 0.001$, respectively). The postoperative recurrence rate was found to be significantly higher in the non-ONB group than in the ONB group ($p = 0.025$). Spinal anesthesia combined with ONB

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during TUR-BT prevent obturator reflex and facilitate complete resection including detrusor muscle tissue, independent from the size or number of tumors, thus reducing the recurrence of the disease.

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Introduction

In the United States (US), every year, ~54,000 new cases of bladder tumor are diagnosed making it the fourth most common cause of malignancy and the eighth most common cause of cancer-related mortality in men [1]. Superficial bladder cancer (mucosal or submucosal with limited tumor involvement, pTa and pT1) constitutes almost 75% of all bladder tumor cases. Transurethral resection of lateral bladder wall tumors (TUR-BT) is a gold-standard method for the diagnosis, treatment, and staging of noninvasive bladder cancer [2].

Tumor recurrence following TUR-BT is common. During the first control cystoscopy in the 3rd month after the operation, tumor is detected in 30% of the patients, and within the first year, tumor recurrence is seen in nearly half of the patients [3,4]. The presence of detrusor muscle in the pathology specimen is an indication of complete resection [5]; however, several studies have reported that in 10–50% of all cases, detrusor muscle tissue is not present in the TUR-BT specimen [6,7]. The obturator nerve L2–L4 originates from the lumbar plexus and passes through the obturator foramen to stimulate the adductor muscles of the thigh. During this course, the obturator nerve comes to close proximity to the bladder neck, inferolateral bladder wall, and prostatic urethra. This proximity can have undesirable outcomes during TUR-BT such as involuntary leg movements due to the stimulation of the obturator nerve, incomplete resection, bladder perforation, and extravascular dissemination of the tumor [8].

Adductor muscle spasms have been reported to develop in 20–53% of cases after undergoing TUR-BT [9,10]. To prevent such unfavorable complications, several methods have been proposed including the application of muscle relaxants under general anesthesia, less filling of the bladder, reducing the electrical current, using a 90° classic loop, using bipolar plasmakinetic energy and performing tumor resection by removing small pieces [11,12]. However, since none of these techniques was found to be effective in preventing the stimulation of the obturator nerve, most researchers [10,12,13] suggest using the obturator nerve block (ONB) technique developed in 1965 by Prentiss et al [13] to effectively prevent the muscle spasms during TUR-BT.

In this study, we investigated the effect of ONB combined with spinal anesthesia applied during TUR-BT on the presence of detrusor muscle tissue in the tumor specimen and tumor recurrence.

Methods

Following the approval of the Ethics Committee of the hospital (Erzincan University Mengucek Gazi Research and

Training Hospital, Erzincan, Turkey), 185 patients with primary bladder cancer that had undergone TUR-BT under spinal anesthesia between January 2011 and December 2015 were retrospectively evaluated in accordance with the principles of the Helsinki Declaration. Of these patients, 96 were included in the study based on the location of their tumor being on the lateral bladder wall according to the reports of preoperative ultrasonography or computer tomography. The exclusion criteria were the presence of abnormal coagulation profile, damage to the obturator nerve, neurological disorders affecting the central nervous system, and history of allergy to local anesthetic agents.

The patients were divided into two groups: 49 patients only received spinal anesthesia and 47 patients received spinal anesthesia combined with ONB. The same urology team performed the surgery and the same anesthesia team performed ONB in both groups. All the patients were classified under the same risk group according to the classification of the European Organization for Research and Treatment of Cancer (EORTC). The groups were retrospectively compared in terms of adductor muscle contraction, bladder perforation, complete tumor resection, presence of muscle tissue in the pathology material, and recurrence rate. In addition, during the follow-up period, the recurrence rate and disease-free survival during the follow-up period were compared between the groups.

In the operating room, each patient was monitored and then spinal anesthesia was performed in a sitting position at L3–L4 or L4–L5 interspaces by injecting 10–15 mg of hyperbaric bupivacaine with a 25 G Quincke needle. The patients were placed in the supine position, prepared for surgery by confirming that the sensation of warmth on T10 had disappeared, and then placed in the lithotomy position. In the ONB group patients, the anteromedial side of the femur was visualized under sterile conditions using a two-dimensional 38 mm, 6–13-MHz ultrasound machine with a linear probe (SonoSite M-Turbo; SonoSite, Bothell, WA, USA). The high-frequency ultrasound probe was placed proximal to the adductor longus muscle to identify the adductor longus, brevis, and magnus muscles. Once the obturator nerve was embedded in the pectineus, adductor longus and adductor brevis muscles were visible, and the location of the nerve was confirmed by adjusting the current of the stimulator to 1.5–2 mA and the duration to 0.1 milliseconds. Under ultrasound vision, a 50-mm insulated needle was inserted parallel to the long axis of the probe and guided to the anterior branch of the obturator nerve. Once contraction was observed in the adductor muscle groups at 0.3–0.5 mA and the aspiration was negative, 1% lidocaine, maximum 10 mL, was injected to block the nerve. Ten minutes after this procedure, the surgery was started.

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