EJGO European Journal of Gynaecological Oncology

Obturator nerve injury during gynecological surgery: our experience

S. Trapasso[1], F. Visconti[1], A. Di Cello[1], M.L. Rocca[1], A. Gallucci[2], F. Zullo[1], R. Venturella[1]

[1]*Department of Obstetrics and Gynecology, "Magna Graecia" University, Catanzaro*
[2]*Medical Direction of Presidio, Puglise − Ciaccio Hospital, Catanzaro (Italy)*

Summary

Intraoperative injury of obturator nerve is a rare complication that may occur in gyno-oncologic procedures when a radical pelvic surgery is performed. In five years 1.584 oncologic patients were admitted to our clinic for surgery for gynecological cancers and the obturator nerve injury was an intra-operative complication occurred in three patients. In two women, a complete lesion of the obturator nerve due to ultrasonic devices was described, in the third case, the injury was caused by the use of electric scissors. In all cases the nerve repair was performed by a gynecologist with a complete and spontaneous resolution of the symptoms within three months after surgery.

Key words: Obturator nerve; Gyno-oncologic procedures; Intraoperative complication; Radical pelvic surgery; Pelvic lymphadenectomy.

Introduction

Obturator neuropathy is an uncommon condition presenting as medial thigh or groin pain, weakness with leg adduction, and sensory loss in the medial thigh of the affected side [1]. Intraoperative injury of obturator nerve can arise from sectioning, stretching, or crushing of the nerve and is a rare complication of gynecological surgery, especially in patients with gynecologic cancers, who undergo radical pelvic surgery [1- 3]. In such cases, pain down the medial thigh, variable gait disturbance, weakness of adduction of the thigh, and inconstant sensory loss over the medial thigh represents the main clinical symptoms secondary to injury [4].

Obturator nerve transection can be repaired immediately using microsurgical techniques through an end-to-end tension free anastomosis [2, 5] or by the interposition of neural autologous grafts, usually performed by a neurosurgeon [2, 3, 6]. In the current study, the authors first report three cases of obturator nerve transection during laparotomic pelvic lymph nodes dissection with immediate repair, performed by a gynecological surgeon and then they performed a systematic search for studies (articles and abstracts), without English language limitation, and collected and analyzed the published articles in literature until June 2016. The authors searched on Medline (through PubMed), with the combination of the following medical subject headings or keywords: "obturator nerve damage", "obturator neuropathy", and "pelvic lymphadenectomy". Additional literature searches were performed using the references from the identified studies.

Case Report

Case 1

A 30-year-old woman was admitted to this Unit of Obstetric and Gynecology, Azienda Ospedaliera Pugliese Ciaccio, Catanzaro, Italy, for abnormal bleeding. An endometrial biopsy was performed and the histological diagnosis was: "mildly differentiated endocervical carcinoma". Pelvic examination did not provide any relevant additional information. According to preoperative diagnostic workup (including a thoracic and abdominal CT), no distant metastasis were identified; furthermore subcentimetric iliac lymph nodes were bilaterally described.

Based on clinical, histological, and instrumental data, a total hysterectomy with bilateral salpingo-oophorectomy (BSO) and bilateral pelvic lymphadenectomy through a laparotomic approach was performed, with a final pathologic finding of endocervical carcinoma Stage IIB. During the left obturator lymphadenectomy, the dissection of strong adhesions between left obturator nerve and lymph nodes was complicated by the nerve transection with ultrasonic device. Immediately, the complete nerve lesion was recognized. After careful analysis of the characteristics of the lesion, the gynecological surgeon proceeded to a microsurgical repair of the nerve injury through prolene 5-0. A tension-free anastomosis was achieved. Gentle traction to the nerve was applied and it was deemed to be intact. The total operative time was about four hours, of which 40 minutes were required for the nerve repair. Early postoperative recovery was uneventful. At the discharge visit, the patient did not exhibit any clinically evident loss of adductor function. Therefore, no further neurologic examination, electromyography or specific physical therapy were advised. The patient had been discharged with medical therapy (cyanocobalamin 5,000 µg on alternate days). Over three months of follow-up, the patient experienced no residual neuropathy or deficit in the left thigh.

Case 2

A postmenopausal woman aged 70 years was admitted to Pugliese-Ciaccio Hospital, Catanzaro, Italy referring vaginal

Revised manuscript accepted for publication November 20, 2017

7847050 Canada Inc.
www.irog.net

bleeding for six months. An operative hysteroscopy with endometrial biopsy was performed; the histologic finding was: "mildly differentiated serous papillary carcinoma of the endometrium". At preoperative CT-scan, no secondary lesions or enlarged retroperitoneal lymph nodes were detected. After informed consent, a total laparotomic hysterectomy with BSO, peritoneal washing, pelvic and obturator bilateral lymphadenectomy, lomboaortic lymphadenectomy, appendectomy, and omentectomy were carried out. The final pathologic finding confirmed the result of the endometrial biopsy, Stage IIIC.

After completion of the procedure on the left side, anatomical landmarks were checked and a transection of obturator nerve due to ultrasonic device was identified; thus the gynecological surgeon remedied to complication by orienting the nerve distal edge and closer to the proximal portion with prolene 5.0. A gentle traction on the nerve confirmed its integrity. Total operative time was 5.5 hours, of which 30 minutes were required for the nerve repair. Postoperatively, the patient reported slight numbness in the middle thigh and weakness on adduction. The patient was discharged with medical therapy (cyanocobalamin 5,000 µg on alternate days). At three months of follow-up the patient reported an improvement of the symptomatology, both in terms of functional and strength skills.

Case 3

A 76-year-old woman was admitted to this clinic for postmenopausal bleeding. An endometrial thickness of 12 mm was measured on transvaginal ultrasonography. An endometrial biopsy was performed, and the result was "poorly differentiated endometrioid endometrial carcinoma". Preoperative workup, including CT of the thorax and abdomen, showed no evidence of secondary lesions or enlarged retroperitoneal lymph nodes. Written informed consent for total hysterectomy, BSO, pelvic, and para-aortic lymphadenectomy was obtained. A laparotomic approach was used. The final pathologic finding was a poorly differentiated endometrioid endometrial carcinoma, Stage IIIA. During the right pelvic lymphadenectomy, an obturator nerve transection with electric scissors occurred. Careful inspection revealed that the nerve was partially transected without any fraying of the edges

Again, the gynecologic surgeon carried out the nerve repair through prolene 5-0. Total operative time was about five hours, of which 30 minutes were required for the nerve repair. Post-operatively, the patient exhibited a loss of adductor function, pelvic and groin pain. The patient was discharged with medical therapy (cyanocobalamin 5,000 µg on alternate days). At a follow-up examination three months postoperatively, the patient reported a decrease in pelvic and groin pain and demonstrated no deficit in the right thigh.

Discussion

The obturator nerve injury is not a frequent complication of gynecological surgeries, however it can occur during pelvic lymphadenectomy irrespective of surgical approach (laparotomy, laparoscopy, and robotic-assisted laparoscopy) [3, 4, 7].

Obturator nerve injuries are strictly related to its pelvic position and close proximity to obturator lymph nodes. Specifically, the nerve is usually considered a landmark of obturator fossa; it traverses the retroperitoneal space laterocaudally into the small pelvic region, passing through the obturator canal. Since the obturator nerve main function is to innervate all the adductors muscles of the thigh and the skin of upper medial part of the thigh [3], its lesion determines medial thigh or groin pain, weakness with leg adduction, and sensory loss in the medial thigh of the affected side.

In literature, few published reports about obturator nerve injury during gynecological surgery and its immediate anatomy restoration are available. According to the authors' search, a total of 12 abstracts were identified and 11 full text articles were reviewed.

In 1993, Vasilev *et al.* [8] first described a successful laparotomic repair of an obturator nerve injury that was inadvertently provoked in a 43-year-old patient undergoing radical hysterectomy with bilateral pelvic lymph node dissection for Stage Ib cervical carcinoma. According to the authors, the patient recovered uneventfully with very minimal gait disturbance which resolved completely with physical therapy.

In 2009, Ghaemmaghami *et al.* [3] described a nerve irregular transection with a 3-cm defect during a laparotomic pelvic lymphadenectomy in a woman aged 46 years with cervical cancer. In order to restore nerve anatomy, a neurosurgeons had been immediately consulted, who decided for a nerve sural grafting, performed by himself through 8-0 nylon.

The laparoscopic repair of obturator nerve was also described by Ricciardi *et al.*, Rothmund *et al.*, and Weidong *et al.* in 2012, 2011, and 2015, respectively [1, 4, 9]; in all these cases, after injury identification, the correction of nerve defect had been performed by an experienced neurosurgeons and nerve anatomy had been restore by using five 6/0 brained polyester. Postoperatively, the patients did not exhibit any clinically apparent loss of adductor function or any other neurologic deficiency.

In 2014 Song *et al.* [10] reported the successful laparoscopic repair of an obturator nerve injury caused by an electrosurgical instrument during laparoscopic pelvic lymphadenectomy in a patient aged 44 years affected by cervical cancer. In this case, the repair was performed in laparoscopy by gynecologists.

In 2014, Dias *et al.* [2] published a case report describing an obturator nerve transection during laparoscopy; again, a neurosurgeon was immediately involved. Laparoscopy was interrupted and nerve reconstruction had been performed with open surgery through the interposition of three sural nerve grafts. At six-months' follow-up, a complete recovery of the adduction of the right leg had been described.

Finally, in 2015 Gocmen *et al.* [7] described the first case of successful robotic-assisted laparoscopic repair of an incomplete obturator nerve transection. Obturator nerve edges were oriented and reapproximated by an end-to-end technique with two 6/0 polypropylene sutures. The complete resolution of symptoms was noted.

Based on literature data, damage of obturator nerve can occur during gynecological procedures, irrespective of surgical approach, and may occur by sharp instruments, electrocoagulation or ultrasound devices. The prognosis depends on nature and severity of the injury; however, a complete resolution of the symptoms within one year after injury has usually been described [1- 3, 7, 9].

Several surgical procedures of nerve reconstruction are available [8, 11]. Obturator nerve transection can be managed by immediate repair using microsurgical techniques through end-to-end tension-free anastomosis and it is currently considered the most efficient method to restore anatomy and function of the structure. When the loss of neural substance led to the impossibility of a tension-free reattachment of the ends, the interposition of neural autologous grafts (sural nerve graft interposition) was necessary [2, 3, 6].

Between 2010 and 2015, 1,584 oncologic patients were admitted to this clinic for surgery for gynecological cancers. In 951 (60.1%) patients, a laparotomic approach was used, while in 633 (39.9%) women, a laparoscopic approach was performed. Through a retrospective analysis of the clinical charts, the obturator nerve injury was an intraoperative complication occurring in three (0.2%) patients. In all these cases, intraoperative type of injury, modality of repair, and postoperative follow-up at three months were noted.

According to clinical chart review and analysis, all nerve injuries occurred during laparotomic procedures for pelvic lymphadenectomy. In two women, a complete lesion of the obturator nerve due to ultrasonic devices was described; in these patients, the surgeon detected lesions at the end of the procedure. In the third case, the partial nerve injury was caused by the use of electrical scissors and immediately recognized; the neuromuscular reaction, induced by the bipolar current diffusion through the anatomical structures, allowed the surgeon to recognize the lesion and to avoid the complete resection of the nerve by interrupting the procedure. In all three cases, an expert gynecological surgeon repaired the nerve lesions by using 5-0 prolene; the operating time was increased by about 30 minutes. Thereafter, patients began treatment with cyanocobalamin 5,000 µg on alternate days; at three-months' follow-up, a full functional recovery of the affected limb was observed.

In the present retrospective analysis, obturator nerve injury represents an uncommon complication of gynecological surgeries that occur most likely during laparotomic approach. According to the present authors' experience, they can speculate that this probably depends on the increased use of ultrasonic device observed during open surgery, that is a risk factor for nerve injury, while the better magnification of the surgical field offered by laparoscopy prevents the occurrence of this complication.

Ultrasonic devices, indeed, usually produce high frequency mechanical vibrations and do not reach high temperature, so that their use is related to fewer thermal injuries than electrocautery. This technical aspect, however, has as a consequence that even when the device is used in close proximity of a neural structure, no neuromuscular stimulation is obtained, no "alarm bell" for the surgeon is provided, and an increased risk of nerve injury can be determined. Conversely, the electrical scissors, when working near the obturator nerve, induce contracture of the limb through their polarizing effect, and this represents a direct clinical sign of contact between surgical instrument and the neural structure.

At the time of the injury, the obturator nerve should be immediately repaired and epineural end-to-end tension-free coaptation is considered the most efficient method. In the present three patients, an expert gynecologist had quickly repaired obturator nerve injury during the laparotomic procedure with 5.0 prolene sutures, without requiring a neurosurgical intraoperative evaluation.

In conclusion, nerve repair is possible by a gynecologist with specific surgical skills. Prognosis of obturator nerve transection depends on nature and severity of the injury. However, patients with immediate repaired nerve transection and supported by medical therapy (cyanocobalamin 5,000 µg on alternate days) usually develop complete and spontaneous resolution of the symptoms within three months after surgery.

References

[1] Ricciardi E., Jakimovska M., Maniglio P., Schimberni M., Frega A., Kobal B., Moscarini M.: "Laparoscopic injury of the obturator nerve during fertility-sparing procedure for cervical cancer". *World J. Surg. Oncol.*, 2012, *30*, 177

[2] Dias A.R. Jr., Silva E Silva A., Carvalho J.P., Baracat E.C., Favero G.: "Correction of iatrogenic injury of the obturator nerve during pelvic laparoscopic lymphadenectomy by the use of sural nerve grafts". *Gynecol. Oncol. Rep.*, 2014, *6*, 16.

[3] Ghaemmaghami F., Behnamfar F., Saberi H.: "Immediate grafting of transected obturator nerve during radical hysterectomy". *J. Surg.*, 2009, *7*, 168.

[4] Rothmund R., Huebner M., Kraemer B., Liske B., Wallwiener D., Taran F.A.: "Laparoscopic transection and immediate repair of obturator nerve during pelvic lymphadenectomy". *Minim. Invasive Gynecol.*, 2011, *18*, 807.

[5] Kavoussi L.R., Sosa E., Chandhoke P., Chodak G., Clayman R.V., Hadley H.R., Loughlin K.R., *et al.*: "Complications of laparoscopic pelvic lymph node dissection". *J. Urol.*, 1993, *149*, 322.

[6] Benes J.: "Immediate grafting of the damaged obturator nerve by gynaecological surgery". *Acta Neurochir. (Wien)*, 1999, *141*, 435.

[7] Göçmen A., Şanlıkan F.: "Immediate repair of an incompletely transected obturator nerve during robotic-assisted pelvic lymphadenectomy". *J. Minim. Invasive Gynecol.*, 2015, *22*, 302.

[8] Vasilev S.A.: "Obturator nerve injury: a review of management options". *Gynecol. Oncol.*, 1994, *53*, 152.

[9] Weidong Z., Wenjing J., Chengqun H., Yuan T., Jiafei W.: "Laparoscopic repair of obturator nerve transection during pelvic lymphadenectomy". *Int. J. Gynecol. Obstet.*, 2015, *129*, 267.

[10] Song M.J., Lee C.W., Yoon J.H., Hur S.Y.: "Transection of the obturator nerve by an electrosurgical instrument and its immediate repair during laparoscopic pelvic lymphadenectomy: a case report".

Eur. J. Gynaecol. Oncol., 2014, *35*, 167.
[11] Kitagawa R., Kim D., Reid N., Kline D.: "Surgical management of obturator nerve lesions". *Neurosurgery*, 2009, *65*, A24.

Corresponding Author:
F. VISCONTI, M.D.
University Magna Graecia of Catanzaro
Viale Pio X, Ospedale Pugliese Ciaccio
88100 Catanzaro (Italy)
e-mail: fed.visconti@gmail.com