CASE REPORT

Rare cause of paraparesis: bilateral obturator neuropathy after hysterosalpingectomy

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SUMMARY

Bilateral obturator nerve injury during pelvic surgery is an infrequent cause of lower limb paraparesis. We report the case of a 45-year-old woman with a large uterine leiomyoma who underwent simple total hysterectomy and bilateral salpingectomy. At 24 h after the surgery, the patient noticed loss of muscle strength when adducting both legs. She had no problem with other movements and no sensory or sphincter abnormalities. Neurological examination confirmed that there was loss of strength only in the adductor muscles, with preserved sensory function and reflexes, suggesting bilateral obturator nerve involvement. Pelvic MRI showed a small postsurgical haematoma in the Douglas recess, but far from the obturator nerves. 2 weeks later, electromyography showed positive sharp waves and low motor unit recruitment in the adductor magnus muscles, confirming acute, bilateral obturator nerve neuropathy. The few cases of bilateral obturator neuropathy that have been reported were mostly related to abdominopelvic interventions.

BACKGROUND

Lower limb paraparesis is a disabling consequence of injuries involving the central nervous system (spinal cord or, rarely, the cerebral cortex) or the peripheral nervous system. During abdominopelvic surgery, the possibility of lower limb plexopathy or neuropathy exists because of the close connections between the plexus, nerves and abdominopelvic structures. Obturator nerve involvement is infrequent and bilateral obturator nerve injury has been described only rarely.^{1–4}

Certain factors can play an important role in causing neuropathy, such as comorbidities, the type of surgery, surgical equipment, lithotomy position, previous intrathecal anaesthesia or a predisposition to neuropathy.⁵ We present this case to emphasise the need for awareness of this potentially disabling complication that can arise during pelvic procedures. We also review the anatomical pathway of the obturator nerve and clinical considerations regarding its injury.

CASE PRESENTATION

A 45-year-old woman presented with a symptomatic 8×7 cm subserosal intramural uterine leiomyoma of the posterior wall. The patient described excessive haemorrhage during menstruation and dysfunctional bleeding between periods. No compressive symptoms were reported (neither abdominal pain nor urination/defecation dysfunction).

She was placed in a supine decubitus position, and underwent standard laparotomy for total simple hysterectomy and bilateral salpingectomy. Intravenous general anaesthesia was administered, and access to the pelvic cavity was through a Pfannenstiel incision. There were no problems reported during the 2 h procedure or through the immediate postoperative period.

When the patient attempted to stand for the first time 24 h postoperatively, she noticed loss of strength when adducting both legs, and could not walk without help. General examination was unremarkable. The neurological examination, however, showed selective paresis during adduction of both legs with sparing of remaining movements. There were no sensory, sphincter or reflex abnormalities. Bilateral flexor cutaneopoplantar reflexes were present.

INVESTIGATIONS

Lower limb paraparesis immediately after abdominopelvic surgery obliges the clinician to look for complications related to the procedure. MRI of the abdominopelvic region showed the obturator nerve along both pathways, ruling out intrinsic or extrinsic nerve pathology. However, a small haematoma was seen in the Douglas recess far from the obturator nerves (figure 1). Routine blood tests were normal. Electromyography 2 weeks later showed positive sharp waves and reduced motor unit recruitment pattern in the adductor magnus muscles, confirming acute bilateral obturator nerve axonotmesis.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis included bilateral obturator neuropathy, bilateral upper lumbar plexopathy, bilateral lumbar radiculopathy (L2–L4) and spinal cord injury. In this case, selective adductor muscle dysfunction had occurred, so the probability of a spinal cord injury or lumbar radiculopathy was low. Therefore, we considered the most likely cause was partial bilateral lumbar plexopathy or partial bilateral obturator nerve neuropathy related to the surgical procedure. Bilateral lumbar plexopathy usually shows additional muscle and sensory involvement, whereas obturator nerve pathology manifests as a loss of sensory reaction in a circumscribed area of the medial thigh (anterior division) and selective motor dysfunction in adductor muscles (anterior and posterior branches). Hence, we thought that a single motor disorder caused by

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Figure 1 Postoperative axial pelvic T2-weighted MRI. (A) Locations of both obturator nerves (small arrows) and the internal obturator muscle (wide arrow) are shown. (B) Higher slice displays the location of the Douglas recess haematoma and postoperative structural changes in the soft tissues (asterisk) (courtesy of Dr Carlos Holguera).

a selective injury in the posterior branches of both obturator nerves was possible.

TREATMENT

The patient underwent a directed physical therapy programme for 6 months.

OUTCOME AND FOLLOW-UP

The patient improved slightly prior to discharge, and was able to walk independently, though with some difficulty. At 4 months after discharge, the patient had improved substantially and was able to walk autonomously. At 6 months, she had recovered almost total strength in both adductor muscles.

DISCUSSION

To the best of our knowledge, there are only a few case reports describing bilateral obturator neuropathy. Most of the cases were related to pelvic procedures similar to the case described here, and some were in connection with the patient being in the lithotomy position during surgery.^{1–4}

Awareness of the anatomic pathway and critical sites of entrapment is crucial for preventing injuries during abdominopelvic surgery, and for understanding clinical symptomatology in patients with suspected obturator neuropathy.

Obturator nerves are formed within the psoas major muscle by the anterior divisions of the anterior primary rami of L2–L4 spinal roots. They emerge from the medial border of the psoas major and pass into the lesser pelvis, where they are located inferior to the pelvic brim.⁶

Anatomic variability regarding the point of division of the anterior and posterior branches of the obturator nerve has been

described. The sites of the division have been reported to be intrapelvic in 23.22%, within the obturator canal in 51.78% and in the thigh in 25%.^{6–7} On its way through the obturator canal, the obturator nerve can pass as a single trunk, or it may be divided. This is a critical site of entrapment during complicated labour.^{6–8}

In one study, the posterior branch of the obturator nerve was found to be smaller than the anterior branch, and innervated the adductor magnus and adductor brevis muscles with variable frequency (60%). Interestingly, the adductor longus and adductor brevis muscles had double innervation by both the anterior (7.14%) and posterior (70.3%) obturator branches. The anterior branch carried motor fibres to the adductor longus, adductor brevis and gracilis muscles in most cases, and cutaneous sensory branches to the medial side of the thigh.⁷

Exiting the canal, the two branches of the obturator nerve run against the musculotendinous aponeurotic arch. In particular, the posterior branch of the nerve is in immediate contact with the arch, suggesting a point of susceptibility to compression.⁶ Clinically, in the case of bifurcation prior to the obturator canal, it is reasonable that either the anterior or posterior obturator branch might be individually involved in pathological processes.

In our case, we strongly consider that injury to the posterior branch was responsible for the patient's symptomatology. The reasoning was that the sensory branches, which run in the anterior branch, were spared. We also suggest intrapelvic bifurcation as a feasible explanation (figure 2).

Regarding the surgical technique, the metal separators and prolonged surgery could be the harming elements. Although it is aesthetically preferable, the Pfannenstiel incision (rather than

Figure 2 Animation of the intrapelvic portion of the obturator nerve. A lateral graphic of the pelvic nerve structures, with branching of the obturator nerve before it reaches the obturator canal. The purple circle indicates the suspected site of injury (drawing based on H Rouvière and A Delmas, 2002).¹¹

medial laparotomy) makes exposure to the uterus more laborious, especially in this case, in which the patient had a large uterine leiomyoma. Hence, the most possible explanation for the mechanism is that the posterior branches of the obturator nerve, before entering the obturator canal, might have been under pressure of the metal separators while exposing the uterus.

A delayed neurological symptomatology could point to complications occurring during or after the surgery. In our case, the patient was at rest for 24 h without getting up, because of wound pain, only noticing loss of strength in her first attempt to stand up 1 day later. In consequence, we strongly suggest it happened during the surgical procedure and remained unperceived immediately after.

The treatment and prognosis of nerve injuries depend on the severity of the injury. These injuries are categorised as neuropraxia (simple nerve contusion), implying good recovery within 6 weeks; axonotmesis (distal axon Wallerian degeneration, with preservation of supporting structure), with functional recovery at 6–12 months; or neurotmesis, in which the nerve is completely split. Rehabilitation is the main treatment for each of these injuries, but only with neurotmesis is early microsurgical repair needed.^{9 10}

Because of this case and all the aforementioned possibilities, during pelvic surgical procedures we highlight we highlight the possibility of variable intrapelvic bifurcation of the obturator

nerve. We should take into consideration that its presence could be unnoticed and lead to the injury of one of its branches. It is important to consider medial infraumbilical laparotomy as the elective incision for patients in whom the size of the uterus could interfere with the exposure required during the surgery. This approach would minimise the pressure applied to the pelvic wall and the possibility of nerve injury.

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REFERENCES

- 1 Bischoff C, Schönle PW. Obturator nerve injuries during intra-abdominal surgery. *Clin Neurol Neurosurg* 1991;93:73–6.
- 2 Hakiwa S, Hoshi T, Tanaka M, et al. Case of bilateral obturator neuropathy after caesarean section. *Masui* 2011;60:721–3.
- 3 Sanderson DJ, Ghomi A. Bilateral obturator neuropathy after transobturator vaginal sling: a case report. *Female Pelvic Med Reconstr Surg* 2015;21:e21–2.
- 4 Pellegrino MJ, Johnson EW. Bilateral obturator nerve injuries during urologic surgery. *Arch Phys Med Rehabil* 1988;69:46–7.
- 5 Warner MA, Warner DO, Harper CM, et al. Lower extremity neuropathies associated with lithotomy positions. *Anesthesiology* 2000;93:938–42.
- 6 Kumka M. Critical sites of entrapment of the posterior division of the obturator nerve: anatomical considerations. *J Can Chiropr Assoc* 2010;54:33–42.
- 7 Anagnostopoulou S, Kostopanagiotou G, Paraskeuopoulos T, et al. Anatomic variations of the obturator nerve in the inguinal region: implications in conventional and ultrasound regional anesthesia techniques. *Reg Anesth Pain Med* 2009;34:33–9.
- 8 Haas DM, Meadows RS, Cottrell R, et al. Postpartum obturator neurapraxia. A case report. *J Reprod Med* 2003;48:469–70.
- 9 Seddon HJ. Three types of nerve injury. *Brain* 1943;66:237–42.
- 10 Vasilev SA. Obturator nerve injury: a review of management options. *Gynecol Oncol* 1994;53:152–5.
- 11 Rouvière H, Delmas A. Anatomía Humana. Descriptiva, Topográfica y Funcional. Barcelona: Masson; 2002.

Learning points

- Bilateral obturator neuropathy should be suspected in selective motor dysfunction of bilateral adductor muscles after pelvic procedures, particularly the posterior branch.
- An intrapelvic obturator nerve branch could be unperceived and injured during pelvic procedures.
- Medial infraumbilical laparotomy could be the elective incision when the uterus size interferes with the exposure needed for the surgery to minimise pressure on the pelvic wall.

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