

Intrapelvic Causes of Sciatica: A Systematic Review

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ABSTRACT

The sciatic nerve is the nerve of the lower limb. It is derived from spinal nerves, fourth Lumbar (L4) to third Sacral (S3). The sciatic nerve innervates the muscles of the posterior thigh and additionally has sensory functions. Sciatica is the given name to the pain sourced by irritation of the sciatic nerve. Sciatica is most commonly induced by compression of a lower lumbar nerve root (L4, L5, or S1). Various intrapelvic pathologies include gynecological, vascular, traumatic, inflammatory, and tumoral disorders that may cause sciatica. Intrapelvic pathologies that mimic disc herniation are quite always ignored. Surgical approach and a functional exploration by laparoscopy or robotic surgery have significantly increased the intrapelvic pathology's awareness, resulting in sciatica. After a detailed assessment of the patient, which causes intrapelvic pathologies, deciding whether surgical or medical therapy is needed, notable results in sciatic pain remission can be done.

INTRODUCTION

The sciatic nerve is the nerve of the lower limb. It is the longest nerve in the body and approximately 2 cm wide. It is derived from spinal nerves L4 to S3. The sciatic nerve innervates the posterior thigh muscles and besides has sensory functions of the skin of the lateral leg, heel and whole foot.

Sciatica is the name given to pain caused by the sciatic nerve's irritation. Sciatica is manifested by searing pain down the leg from the lower back along the sciatic nerve path. Sciatica ordinarily affects only one side of the body and can be a result of an underlying injury. Most frequently, sciatica is due to compression of a lower lumbar nerve root (L4, L5, or S1) that radiates to the knee and is often accompanied by weakness or numbness of the respective myotome or dermatome.

Many intraspinal or extraspinal pathological disturbances along the sciatic nerve can be the reason for sciatica. Extraspinal sciatica is often misdiagnosed because routine diagnostic tests focus on the lumbar spine. Various intrapelvic pathologies include gynecological, vascular, traumatic, inflammatory and tumoral disorders may lead to sciatica. Another source of intrapelvic sciatica reported in the literature is endometriosis. Endometriosis is a common gynecological condition, described as the occurrence of endometriotic tissue (endometrial glands, stroma, or both) outside the uterus. However, endometriosis reports involving the sciatic nerve are mostly from direct extension of deeply infiltrative rectovaginal disease through the lateral pelvic sidewall. Schwannoma is the most prevalent benign nerve sheath tumor that causes sciatica and may be seen as presacral or retroperitoneal tumors in the pelvis.

Sciatica with or without neurologic deficit has a high prevalence in the general population. The classic diagnostic workup focuses on pathologies of the spinal cord. When the absence of spinal pathologies is present, treatment is often very limited. Intrapelvic pathologies that mimic disc herniation are quite always skipped. Surgical approach and a functional exploration by laparoscopy or robotic surgery have significantly increased the intrapelvic pathology's awareness, resulting in sciatic pain.

In the present review, we reviewed the current literature regarding the intrapelvic causes of sciatica in various pathological conditions and discussed its management.

MATERIALS AND METHODS

A systematic literature search was performed in the Pubmed database using medical terms, keywords and their combinations, including "sciatica", "intrapelvic cause", "laparoscopy" and "gynecologic surgery" dating from its inception to Sep 2019. The bibliographies of all publications were searched for relevant references. Extracted data were both clinical outcomes and operative techniques. The following information, including publication date, sample size, patient characteristics, surgical procedures and clinical outcomes, were recorded. Many relevant data were extracted concerning intrapelvic causes of sciatica. A total of 22 articles were found to include intrapelvic causes of sciatica.

RESULTS

Our literature search yielded 22 studies with 120 cases related to intrapelvic causes of sciatica (Table 1).^[1-22] In 1962, 1 case^[22] was published followed by 1 in 1976,^[21] 2 in 1987,^[19,20] 1 in 1994,^[18] 1 in 1995,^[17] 2 in 1996,^[15,16] 5 in 1998,^[14] 5 in 1999,^[11-13] 1 in 2001,^[10] 25 in 2002,^[9] 1 in 2003,^[8] 1 in 2012,^[7] 11 in 2015,^[6] 3 in 2016,^[4,5] 46 in 2017,^[3] 14 to date in 2019,^[1,2] The surgical procedures included 27 laparoscopic decompression of aberrant intrapelvic veins, 53 intrapelvic sciatic nerve (sacral nerve root) endometriosis excisions, one myomectomy, three hysterectomies, two schwannoma resections, one ovarian cystic endometriosis surgery, six endometriotic nodule excisions, 15 pelvic peritoneal pockets excisions, five peritoneal endometriosis excisions. The medical therapy included three gonadotropin-releasing hormone agonist (GnRH-A), leuprolide acetate plus daily transdermal E2 treatment, one depot medroxyprogesterone treatment, one buserelin acetate, one estrogen suppression treatment, and one gentamicin and clindamycin treatment (Table 1). In the present review, we analyzed the current literature related to the intrapelvic causes of sciatica in various pathological conditions and discussed its therapy and management.

Aberrant intrapelvic veins and sciatica

Possover et al.^[6] reported the first case series of pelvic neuralgias by neuro-vascular entrapment treated by lapa-

roscopic decompression. The most common is L5-S1 sciatica. Eleven consecutive patients suffered from non-neurogenic L5/S1-sciatica; only 36% from an S2 complained of sciatica with some pain in pudendal areas (mostly perianal/perineal pain).

After neuropelvic workup, pelvic neuro-Magnetic Resonance Imaging (MRI) and Doppler-sonography pelvic nerves were suspected to be implicated in pain. Laparoscopic exploration revealed compression of the distal portion of the lumbosacral trunk between the linea terminalis and enlarged varicose veins or the sciatic nerve just before its entry through the great sciatic notch. Enlarged varicose veins had typical superior and inferior varicose veins located in the lumbosacral space. Laparoscopic treatment consisted of the separation of the vessels from the nerves and coagulation or transection of them. They found that laparoscopic decompression of aberrant pelvic vessels was a treatment of choice in patients with intrapelvic sciatica. The laparoscopic approach gave the possibility of reduced morbidity and improved results by providing more comprehensive insight into the operating field with a smaller intraoperative injury. Lemos et al.^[1] described their initial experience in 13 women who presented with sciatica in the absence of any apparent spinal or musculoskeletal lesions. Pelvic MRI neurography visualized superior gluteal veins (SGV). Laparoscopy discovered compression of the lumbosacral nerve roots by aberrant SGV. The average time from onset of symptoms to diagnosis was 3.88 ± 3.09 years. All cases that had a variant SGV were ligated laparoscopically. The mean operative time was 144.54 ± 55.10 min. The average preoperative VAS score (9.62 ± 0.77) decreased significantly (2.54 ± 2.88) postoperatively. The laparoscopic approach alleviated symptoms with a statistically significant decrease in VAS pain scores and has a 92.3% success rate. It strongly supports the hypothesis that superior gluteal vein variant entrapment against the LS plexus resulted in the intrapelvic cause of sciatica's clinical presentation. Kale et al.^[2] demonstrated their clinical experience in a 26-year-old patient who had failed medical therapy and presented with persistent sciatica complaints on the right side of her lower limbs for approximately 36 months. The laparoscopic approach gave the possibility of decompression of the vessels' malformed branches entrapping the sacral plexus nerves at three sites: the lumbosacral trunk, sciatic nerve, and pudendal nerve. The laparoscopic approach was completed successfully with a resolution of dyspareunia and sciatica at a 6-months follow-up. They found that laparoscopic management of vascular entrapment of the sacral plexus was a feasible and effective technique in patients with intrapelvic sciatica. Lemos et al.^[9] reported two cases with catamenial sciatica and urinary symptoms who underwent laparoscopic decompression of intrapelvic aberrant dilated veins on the sciatic nerve and sacral nerve roots. Patients with catamenial sciatica showed full recovery with resolution of symptoms. Lemos et al. emphasized that in the presence of sciatic or perineal pain radiating to the lower limbs in the absence of a spinal disorder and lower urinary tract symptoms; the

Table 1. Patient characteristics and diagnostic methods of studies included in this review

Authors	Country	N	Patient characteristics	Diagnostic methods
Lemos et al. 2019 ^[1]	Switzerland	23	All patients had a variant superior gluteal vein syndrome with sciatica.	Based on clinical neuropelvic and urodynamic assessment.
Kale et al. 2019 ^[2]	Turkey	1	A 26-year-old patient presented with complaints of persistent sciatica and pudendal neuralgia.	Neuropelvic examination and MRI.
Possover et al. 2017 ^[3]	Switzerland	46	All patients presented with incapacity for normal gait and foot drop. All patients were suffering from intractable and constant neuropathic sciatic pain with sensorimotor disorders of the affected leg.	Preoperative neuropelvic workup, neurologic history and examination with particular attention to symptoms for lumbosacral radiculopathy.
Tsai et al. 2016 ^[4]	Switzerland	1	A 62-year-old postmenopausal woman complained of left sciatic pain from broad ligament leiomyoma.	Serum level of cancer antigen (CA)-125, computed tomography (CT) scan, a pelvic ultrasound (US).
Lemos et al. 2016 ^[5]	Brazil	2	Two cases had catamenial sciatica and urinary symptoms.	Magnetic Resonance Imaging (MRI) and pelvic ultrasonography with bowel preparation.
Possover et al. 2015 ^[6]	Switzerland	11	Compression of the distal portion of the lumbosacral trunk between the linea terminalis and enlarged varicose veins and/or the sciatic nerve just before its entry through the great sciatic notch. All these patients suffer from non-neurogenic L5/S1-sciatica.	Pelvic neuro MRI, Doppler sonography.
Lemos et al. 2012 ^[7]	Brazil	1	38-year-old woman had a sacral nerve infiltrative endometriosis presenting as perimenstrual right-sided sciatica and bladder atonia.	Neurologic examination, MRI.
Tong et al. 2003 ^[8]	Australia	1	Patient had a history of right-sided sciatica secondary to retroperitoneal pelvic schwannoma.	MRI.
Vilos et al. 2002 ^[9]	England	25	25 women with a history of cyclic (sciatic) leg pain radiating to the leg (right L5, left 9, both L).	Undetermined imaging modalities for neurologic lesions.
Murata et al. 2001 ^[10]	China	1	A 47-year-old woman complained of pain and numbness in the right calf and weakness of the tibialis anterior muscle. An unusual cause of sciatic pain was due to compression of sacral nerve roots by the uterus, which also had a small myoma-like lesion.	MRI, myelography, CT Myelography, electromyography (EMG) (revealed an abnormal voluntary action potential in the ventral roots of L5, S1 and S2).
Fedele et al. 1999 ^[11]	Italy	3	Two patients had a history of catamenial left-sided sciatica, and one patient had a history of right-sided sciatica with pelvic endometriosis.	EMG, pelvic MRI performed in both the menstrual and ovulatory phases.
Siera et al. 1999 ^[12]	Cuba	1	Patients had a history of bilateral cyclic sciatica caused by endometriosis.	The clinical, imaging and electrophysiological findings.
Bodack et al. 1999 ^[13]	USA	1	55-yr-old woman with a history of sciatic pain presented with progressive right buttock and posterolateral right lower limb pain. An MRI of the pelvis revealed a markedly enlarged uterus, with a large pedunculated myoma impinging on the right sciatic foramen.	Lumbosacral and pelvic MRI.

Table 1. Patient characteristics and diagnostic methods of studies included in this review (*continue*)

Authors	Country	N	Patient characteristics	Diagnostic methods
Zager et al. 1998 ^[14]	USA	5	Patients had a history of catamenial mononeuropathy with left-sided sciatica involving the left sciatic and femoral nerves and multiple lumbosacral nerve roots.	Pelvic CT, MRI, and EMG.
Ortolan et al. 1996 ^[15]	Argentina	1	Patient had a history of right sciatica with large sacral schwannomas with anterior cortex erosion and intrapelvic extension.	Myelogram, radiologic films, CT, 3D CT, MRI, Radionuclide bone scan, CT-guided puncture biopsy.
Dhote et al. 1996 ^[16]	France	1	Patient had a history of right-sided sciatica associated with her menses secondary to right ovarian cystic endometriosis that compressed the right sciatic nerve.	Physical examination, including neurologic and spine evaluation, radiographs, CT and pelvic MRI.
Khodairy et al. 1995 ^[17]	Switzerland	1	A 38-year-old woman complained of right-sided sciatic pain from an enlarged, retroverted adenomyotic uterus.	MRI and echography.
Takata et al. 1994 ^[18]	Japan	1	Patient had a history of right-sided peculiar sciatica associated with her menses secondary to intrapelvic endometrioma.	Neurologic examination, CT, CA-125 levels.
Bergqvist et al. 1987 ^[19]	Sweden	1	Patient had a history of right-sided sciatica secondary to endometriosis in the uterosacral ligament compressing of the sciatic nerve.	The neurologic, orthopedic, gynecologic examination, aspiration biopsy.
Andrews et al. 1987 ^[20]	USA	1	Patient had an intrapelvic tuba ovarian abscess presenting as sciatica.	Neurologic examination, CT, gynecologic examination, cervical cultures.
Björnsson et al. 1976 ^[21]	England	1	A 27-year-old woman with right-sided cyclic sciatica and stiffness of the right hip joint.	Orthopedic examination and an exploratory laparotomy.
Head et al. 1962 ^[22]	USA	1	Patient had a history of right-sided sciatica secondary to intrapelvic sciatic endometriosis.	Physical examination, EMG, myelographic examination.

radiologist should concern specific MRI sequences of the intrapelvic portion of the sacral plexus, and a team should be prepared to expose and decompress the sacral nerves.

Sciatic nerve and/or sacral nerve root endometriosis

Possover et al.^[3] reported neurologic follow-up of patients after extensive laparoscopic resection of deep infiltrating endometriosis of the intrapelvic part of the sciatic nerve. In this study, 46 patients underwent an extensive resection of the sciatic nerve (more than 30% of the nerve) and were followed for at least five years. All patients presented preoperatively with incapacity for normal gait, drop foot and intractable and constant neuropathic sciatic pain with sensorimotor disorders of the affected leg. The most frequent resected portion of the sciatic nerve was the cranial part that corresponds to the roots of the nerve L5, S1 (\pm S2), while the middle portion and the caudal portion of the sciatic nerve were less involved.

Significant functional recovery and pain scores occurred in most patients after 2,5 to 3 years, while normal gait

function was obtained 4 to 5 years after the procedure. Possover et al.^[3] demonstrated that laparoscopic neurosurgery for treating deep infiltrating endometriosis of the sciatic nerve might be reserved only for experienced surgeons in laparoscopic retroperitoneal pelvic surgery. When full resection of endometriosis, including nerve resection, was completed, sciatic nerve functions recover, and normal gait could take at least three years with intensive physiotherapy. Lemos et al.^[7] reported perimenstrual urinary retention and intense right-sided sciatica in a 38-year-old woman patient. MRI showed only posterior cul de sac obliteration, but neurologic examination suggested compression of sacral dermatomes. Laparoscopic exploration of the sacral nerve roots demonstrated vascular compression of the lumbosacral trunk and endometriosis entrapping the S2 to S4 sacral nerve roots, endometrioma inside S3. The endometriosis was removed from the sacral nerve roots and detached from the sacral bone. The regular urinary function was restored on post-operative day 2, and the pain was resolved after a period of post-decompression. Zager et al.^[14] described catamenial mononeuropathy and radiculopathy in five patients

Table 2. Surgical procedures and clinical outcomes of studies included in this review

Authors	Surgical procedures	Clinical outcomes
Lemos et al. 2019 ^[1]	All cases had a variant superior gluteal vein that was ligated intraoperatively.	Laparoscopic decompression by aberrant superior gluteal vein ligation resulted in symptomatic improvement.
Kale et al. 2019 ^[2]	Laparoscopic decompression of intrapelvic aberrant dilated veins at three sites: the lumbosacral trunk, sciatic nerve, and pudendal nerve. The aberrant dilated veins were gently dissected from nerves and then coagulated and cut with the LigaSure sealing device.	At a 6-month follow-up, she reported complete resolution of sciatica.
Possover et al. 2017 ^[3]	All procedures were performed laparoscopically. The most frequent resected portion of the sciatic nerve (n=38) was the cranial part that corresponds to the roots of the nerve L5, S1 (\pm S2). The middle portion (n=6) and the caudal portion (n=2) of the sciatic nerve were less involved.	After laparoscopic intrapelvic sciatic nerve endometriosis resection was completed, sciatic nerve motoric functions recovery took at least three years, and intensive physiotherapy was needed to recover a normal gait.
Tsai et al. 2016 ^[4]	The patient underwent laparoscopic broad ligament myomectomy. The tumor was diagnosed as a large 93×58×40 mm leiomyoma with no significant surrounding non-neoplastic tissue.	After the operation, left sciatic pain disappeared.
Lemos et al. 2016 ^[5]	Two laparoscopic decompressions of intrapelvic aberrant dilated veins on the sciatic nerve and one on the sacral nerve roots.	After surgery, the patient with the sciatic entrapment showed full recovery of sciatica and partial recovery of the myofascial pain. The patient with sacral nerve root entrapment showed full recovery with resolution of symptoms.
Possover et al. 2015 ^[6]	All cases had atypical superior and inferior gluteal varicose veins that were separated, coagulated and transected.	Laparoscopic decompression by atypical superior and inferior gluteal varicose veins resulted in symptomatic improvement.
Lemos et al. 2012 ^[7]	Laparoscopic exploration of the sacral nerve roots demonstrated vascular compression of the lumbosacral trunk and endometriosis, entrapping the S2 to S4 sacral nerve roots, and an endometrioma inside S3. The endometriosis was removed from the sacral nerve roots and detached from the sacral bone.	After surgery, the normal urinary function was restored on postoperative day 2, and pain resolved after a period of post-decompression.
Tong et al. 2003 ^[8]	Laparotomy via Pfannenstiel incision was performed. At surgery, the 2.9× 2.2cm presacral schwannoma corresponding to the first sacral nerve was found deep in the pelvis adjacent to the right sciatic notch. It was excised completely.	The patient had an uneventful postoperative recovery with no neurological complications via laparotomy route with complete resolution of symptoms after 6 months of surgery.
Vilos et al. 2002 ^[9]	All of these patients ultimately required laparoscopic procedures. Findings at laparoscopy included pelvic peritoneal pockets in 15 patients, peritoneal endometriosis in 5 and endometriosis nodules (1–4 cm) in 5. All these lesions were located in the posterolateral pelvic peritoneum and were excised.	After laparoscopic excision, sciatic symptoms were eliminated in 19, markedly improved in 4, remained the same in two, and recurred in three patients after two years.
Murata et al. 2001 ^[10]	The patient underwent an abdominal hysterectomy operation. The uterus was mildly adherent to the sacrum with a marked indentation on its posterolateral surface.	After the operation, the sciatic pain disappeared, with a gradual return of motor function. No recurrence was apparent on review at 16 months.
Fedele et al. 1999 ^[11]	No surgical approach.	These patients underwent monthly administration of the GnRH-a leuprolide acetate plus daily transdermal E2 (25 mg). After medical treatment, pain symptoms relieved, and motor functions improved.

Table 2. Surgical procedures and clinical outcomes of studies included in this review (*continue*)

Authors	Surgical procedures	Clinical outcomes
Siera et al. 1999 ^[12]	No surgical approach.	The patient underwent depot medroxyprogesterone treatment. After medical treatment, pain symptoms disappeared.
Bodack et al. 1999 ^[13]	The patient underwent a subtotal abdominal hysterectomy.	After the operation, pain symptoms disappeared.
Zager et al. 1998 ^[14]	Each of these patients ultimately required laparoscopic surgical procedures. Pathological examination proved the tumor to be an endometrial tissue deposit involving the sciatic nerve, femoral nerve and sacral nerve roots.	After the surgery, pain and sensory symptoms responded well to therapy.
Ortolan et al. 1996 ^[15]	Surgery was performed through a posterior midline incision. The tumor as a brown lobular soft mass was eroded in the posterior aspect of S1, S2 and L5. After unroofing the sacrum and performing L5 right laminectomy, the complete posterior tumoral mass was removed completely.	Posterior midline incision and excision of giant schwannoma on the sacrum resulted in symptomatic improvement after 17 months of surgery.
Dhote et al. 1996 ^[16]	Surgical exploration of the retroperitoneal space confirmed the presence of a right ovarian endometriotic cyst that was compressing the right sciatic nerve. It was excised completely. The rest of the pelvis was normal.	After surgery, gonadotropin-releasing hormone therapy was begun and continued for 6 months. The patient was examined 1 year after the operation, and it was confirmed that she remained active, free of pain and experienced menses without sciatica.
Khodairy et al. 1995 ^[17]	The patient underwent a total abdominal hysterectomy. Histopathology confirmed adenomyosis of the uterus.	Six months after the operation, the patient was symptom-free.
Takata et al. 1994 ^[18]	No surgical approach.	The patient underwent hormonal therapy by nose dropping of buserelin acetate, completely relieved of right sciatic pain.
Bergqvist et al. 1987 ^[19]	From an incision parallel to the inguinal ligament, an extraperitoneal approach was used. The endometriotic lesion was excised without opening the vagina.	The patient had an uneventful postoperative recovery.
Andrews et al. 1987 ^[20]	No surgical approach.	The patient underwent a 3-week course of intravenous antibiotics (gentamicin and clindamycin) with marked improvement of right sciatic pain.
Björnsson et al. 1976 ^[21]	Exploratory laparotomy revealed pelvic endometriosis.	On estrogen suppression therapy, the patient has been symptom-free for eleven months.
Head et al. 1962 ^[22]	Laparotomy via Pfannenstiel incision was performed at the surgery. As much endometriosis could be safely excised on the first sacral nerve without rendering further permanent damage to the sciatic nerve.	The patient had an uneventful postoperative recovery five months of surgery.

whose symptoms included pain, weakness and sensory deficit.

Postoperatively pain and sensory symptoms responded dramatically well to therapy. Zager et al.^[14] stated that early recognition and treatment of this disorder was essential to minimize the severity of nerve damage caused by the recurrent cycles of hemorrhage and fibrosis that are characteristics of endometriosis. Fedele et al.^[11] assessed GnRH-A therapy's efficacy and diagnostic value in cases of hidden sciatic nerve endometriosis in three patients and proved by clinical response to GnRH-A treatment with a

relief of pain symptoms and improvement in motor function. Fedele et al.^[11] concluded that sciatic nerve endometriosis should always be considered in women with catamenial sciatica. A prompt medical treatment institution to suppress gonadal activity permits confirmation of the diagnosis, prevents disease progression, and avoids inappropriate neurosurgical procedures that may cause permanent lesions. Sierra et al.^[12] described bilateral intrapelvic cyclic sciatica due to the implantation of endometrial tissue in the sciatic nerve in the sciatic notch region. The patient was being treated with depot medroxyprogesterone, and

her pain disappeared. The use of depot medroxyprogesterone seemed to be a satisfactory treatment in some patients for the implantation of endometrial tissue in the sciatic nerve. Head et al.^[22] reported a woman complained of pain resembling sciatica, which recurred over more than four years in a certain time-relation to the menstrual cycle. Electromyography revealed denervation of muscles supplied by nerve roots L5 and S1. An exploratory operation revealed small dark nodules adhering to the intrapelvic part of the sciatic nerve. Excision of the nodules and subsequent irradiation were followed by the complete disappearance of the leg's cyclic pain.

Pelvic endometriosis and/or endometrioma

Vilos et al.^[9] determined laparoscopic findings, management, histopathology and outcomes in 25 women with cyclic leg pain and found endometriotic nodules in five, peritoneal pockets and, or peritoneal endometriosis in 19, and inflammatory peritoneum in one woman. Associated pelvic endometriosis was identified and confirmed in 17 women (68%). They hypothesized that cyclic leg pain was associated with pelvic peritoneal pockets, endometriosis nodules, or surface endometriosis of the posterolateral pelvic peritoneum. This was more likely referred to pain originating from the pelvic peritoneum than direct irritation of the lumbosacral plexus of the sciatic nerve. Dhôte et al.^[16] reported a case of cyclic sciatica secondary to ovarian endometrioma at the right sciatic notch. Surgical exploration of the pelvic retroperitoneal space confirmed the right ovarian endometrioma was compressing the right sciatic nerve. One year after the operation and GnRH-A therapy, the patient remained free of sciatica. Takata et al.^[18] reported a case of endometrioma in the pelvic cavity with periodic sciatalgia associated with menses. Computed tomography indicated an oval-shaped mass compressing the right sciatic nerve. Right-sided sciatic pain was wholly relieved after buserelin acetate treatment. Takata et al.^[18] emphasized the importance of suspecting lesions when sciatica presents are closely related to menses. Bergqvist et al.^[19] founded endometriosis in the uterosacral ligament compressing of the sciatic nerve treated via an extraperitoneal approach keeping the pelvic organs intact. The pain disappeared utterly immediately postoperatively, and she has been without complaints after the operation. Björnson et al.^[21] reported a 27-year-old woman with right-sided cyclic sciatica due to pelvic endometriosis. She had been symptom-free for eleven months after estrogen suppression therapy.

Pelvic schwannoma

Tong et al.^[8] reported right-sided sciatica secondary to retroperitoneal pelvic schwannoma. Surgical excision of presacral schwannoma corresponded to the first sacral nerve relieving symptoms without neurological complications. They stated that pelvic schwannoma is a rare cause of sciatica, which has an excellent prognosis after surgical resection. Ortolan et al.^[15] reported large sacral schwan-

nomas with anterior cortex erosion associated with an intrapelvic extension. Surgery was performed after unroofing the sacrum and performing laminectomy. Symptomatic improvement after 17 months of surgery was achieved. Ortolan et al.^[15] stated that based on the experiences of the few cases that had been reported, the management of pelvic schwannoma appeared to grant favorable results despite frequent recurrence complications.

Gynecologic pathologies

Tsai et al.^[4] reported a postmenopausal woman with sciatica from broad ligament leiomyoma. The patient underwent laparoscopic myomectomy; the 93×58×40 mm leiomyoma originated from the uterus's left broad ligament. On pathologic examination of the specimen, the tumor was diagnosed as a leiomyoma. After the operation, the left sciatic pain disappeared. Murata et al.^[10] described a 47-year-old woman with sciatic neuropathy caused by compression of the uterus's sacral plexus, which also had a small myoma-like lesion. The patient underwent an abdominal hysterectomy operation. After the operation, the sciatic pain disappeared, with a gradual return of motor function. Bodack et al.^[13] reported sciatic neuropathies secondary to the uterine fibroid. The patient underwent a subtotal abdominal hysterectomy, with a resolution of sciatica pain. Khodairy et al.^[17] reported a 38-year old woman who complained of right-sided sciatic pain from an enlarged retroverted adenomyotic uterus. The patient underwent a total abdominal hysterectomy. Histopathology confirmed adenomyosis of the uterus. Six months after the operation, the patient was symptom-free. Andrews et al.^[20] reported tuba ovarian abscess presenting as sciatic pain. The patient underwent a 3-week course of intravenous antibiotics (gentamicin and clindamycin) with marked improvement of her right sciatic pain. All these authors,^[4,10,13,17] stated that sciatica might be the main presenting feature of adenomyosis, myoma uteri, and tuba ovarian abscess.

DISCUSSION

This systematic review aims to evaluate intrapelvic pathologic conditions along the sciatic nerve that may cause sciatica. Some intraspinal or extraspinal pathologies may also induce sciatica. Extraspinal sciatic nerve entrapment presents with radicular pain of the lower back radiating to the buttock, worsening with sitting, resulting in paresthesia of the affected leg.^[1-3] Intrapelvic lesions lying within the deep gluteal space can be a reason for sciatica, as well.^[2,6,7] Detection of the intrapelvic sciatic nerve entrapment level is essential for managing sciatica pain. Intrapelvic sciatic nerve entrapment diagnosis begins with a detailed physical and neuropelvic examination, including dermatomal mapping of pain and paresthesia and assessing reflexes. A neurological examination and neuro MRI may be necessary to exclude lumbar disc diseases. Intrapelvic neurovascular compression in symptomatic patients is likely under-diagnosed. According to data, sciatic pain related to aberrant

intrapelvic vein treated by laparoscopic decompression was identified in 27 patients.^[1,2,5,6] Therefore, dilatation of these vessels may entrap the sciatic nerve against the pelvic sidewalls and result in sciatica. The most common area reported is at L5-S1/2 nerve root compression at the greater sciatic notch.^[6] Laparoscopic decompression is a therapeutic choice based on the separation of the irritating vessel from the nerves. This is a safe method with high success rates, and the results are directly correlated with the detailed preoperative neurolpelvological examination.^[1,2,6,7]

Endometriosis infiltrating the sacral nerves or sciatic nerve is a rare pathology—the first description of this entity was present in 1955.^[3,7] Awareness of pelvic sciatic nerve endometriosis has increased over the last few years. Sciatic endometriosis is uncommon but should always be kept in mind, especially sciatic pain that worsens during the menstrual period in the absence of spinal conditions. The vital clinical symptoms in intrapelvic sciatic nerve endometriosis are sciatica, buttock and hip pain, voiding dysfunction of the bladder and urinary urgency.^[3,7,14,22] Laparoscopic surgery is a surgical choice for treating sciatic or sacral nerve root endometriosis. However, when full resection of sciatic or sacral nerve roots endometriosis is completed, sciatic nerve function recovery may take at least three years, and intensive physiotherapy is needed to recover a normal gait.^[3,7,14,22] The use of depot medroxyprogesterone or GnRH-A leuprolide acetate plus daily transdermal E2 (25 mg) therapy appears to be a satisfactory treatment in some patients with sciatic endometriosis.^[11,12]

Schwannomas (neurilemmomas) are benign neural sheath tumors. Pelvic schwannomas are exceptional and correspond to less than 1% of all benign schwannomas. Pelvic schwannomas often present with non-specific symptoms, leading to misdiagnosis and prolonged morbidity due to diagnosis delay. Most pelvic schwannomas are located in the presacral space presenting as a pelvic mass.^[8,15] Pelvic schwannoma cases are manifested with sciatica pain radiating down the hips, leg, and calf muscle to the foot. With MRI, the preoperative diagnosis of pelvic schwannomas is possible. Surgical resection of pelvic schwannomas is a curative treatment. Pelvic schwannomas theoretically are resectable with ease and can be “shelled out” of the capsule. Pelvic schwannomas have an excellent prognosis after surgical resection.^[8,15]

Endometriosis is characterized by endometrial-like tissue outside the uterus. Cyclic leg pain or sciatica pain symptoms are related to peritoneal pelvic endometriosis, endometriotic nodules, endometriotic cysts and uterosacral endometriosis. The pain associated with these lesions is more probably to originate from the pelvic peritoneum and the lumbosacral plexus's direct irritation. Surgical excision of endometriotic lesions frequently alleviates sciatica symptoms.^[9,16,19,21] Buserelin acetate therapy or estrogen suppression therapy seems to be a gratifying treatment in some patients with sciatic endometriosis.^[18,21]

A minority of sciatica cases connected to gynecological diseases have been reported. Leiomyomas, adenomyosis

and tuba ovarian abscess are associated with sciatica-like symptoms. Leiomyomas are the most common female benign genital neoplasm of the uterus, affecting 30% of women of reproductive age. An unexpected cause of sciatica pain may be compression of sacral nerve roots by the uterine fibroids, uterine adenomyosis and tuba ovarian abscess. Surgical interventions, such as myomectomy, adenomyomectomy, hysterectomy, tuba ovarian abscess drainage or medical treatment of tuba ovarian abscess, may relieve intrapelvic sciatica symptoms.^[4,10,13,17,20]

CONCLUSION

Depending on current reports, we knew that intrapelvic cause of sciatica, such as aberrant intrapelvic veins, sciatic nerve or sacral nerve root endometriosis, pelvic endometriosis or endometrioma, pelvic schwannoma, and gynecologic pathologies could be the etiology. The symptoms; suggesting an intrapelvic cause of sciatica are perineal pain or pain radiating to the lower limbs in the non-existence of spinal disorders. After a detailed assessment of the patient, surgery or medical therapy can be administered with excellent sciatica pain remission results.

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Concept: A.K., G.B., B.K.; Design: A.K., T.A.U., G.Y., N.D.U.; Supervision: A.K., T.U.; Materials: A.K., G.B., E.C.G., E.M.; Data: E.M., G.Y., G.B., E.C.G.; Analysis: N.D.U., G.B., A.K., G.Y.; Literature search: N.D.U., E.M., G.Y., B.K.; Writing: A.K., G.B., E.C.G., E.M.; Critical revision: A.K., T.A.U., B.K.

Conflict of Interest

None declared.

REFERENCES

1. Lemos N, Cancelliere L, Adrienne LKL, Marques RM, Gustavo LF, Sermer C, et al. Superior gluteal vein syndrome: an intrapelvic cause of sciatica. *J Hip Preserv Surg* 2019;6:104–8. [\[CrossRef\]](#)
2. Kale A, Basol G, Usta T, Cam I. Vascular entrapment of both the sciatic and pudendal nerves causing persistent sciatica and pudendal neuralgia. *J Minim Invasive Gynecol* 2019;26:360–1. [\[CrossRef\]](#)
3. Possover M. Five-year follow-up after laparoscopic large nerve resection for deep infiltrating sciatic nerve endometriosis. *J Minim Invasive Gynecol* 2017;24:822–6. [\[CrossRef\]](#)
4. Tsai YM. A postmenopausal woman with sciatica from broad ligament leiomyoma: a case report. *J Med Case Rep* 2016;10:304. [\[CrossRef\]](#)
5. Lemos N, Marques RM, Kamergorodsky G, Ploger C, Schor E, Girão MJBC. Vascular entrapment of the sciatic plexus causing catamenial sciatica and urinary symptoms. *Int Urogynecol J* 2016;27:317–9.
6. Possover M, Forman A. Pelvic neuralgias by neurovascular entrapment: Anatomical findings in a series of 97 consecutive patients treated by laparoscopic nerve decompression. *Pain Physician* 2015;18:1139–43. [\[CrossRef\]](#)
7. Lemos N, Kamergorodsky G, Ploger C, Castro R, Schor E, Girão M. Sacral nerve infiltrative endometriosis presenting as perimenstrual right-sided sciatica and bladder atonia: case report and description of

- surgical technique. *J Minim Invasive Gynecol* 2012;19:396–400.
8. Tong RS, Collier N, Kaye AH. Chronic sciatica secondary to retroperitoneal pelvic schwannoma. *J Clin Neurosci* 2003;10:108–11. [CrossRef]
 9. Vilos GA, Vilos AW, Haeb JJ. Laparoscopic findings, management, histopathology, and outcome of 25 women with cyclic leg pain. *J Am Assoc Gynecol Laparosc* 2002;9:145–51. [CrossRef]
 10. Murata Y, Takahashi K, Murakami M, Moriya H. An unusual cause of sciatic pain. *J Bone Joint Surg Br* 2001;83:112–3. [CrossRef]
 11. Fedele L, Bianchi S, Raffaelli R, Zanonato G, Zanette G. Phantom endometriosis of the sciatic nerve. *Fertil Steril* 1999;72:727–9. [CrossRef]
 12. Calzada-Sierra DJ, Hernández EF, Prieto RV, Fernández LG, Santana de la Fé A. Bilateral cyclic sciatica caused by endometriosis. Apropos of a case. *Rev Neurol* 1999;29:34–6. [CrossRef]
 13. Bodack MP, Cole JC, Nagler W. Sciatic neuropathy secondary to a uterine fibroid: a case report. *Am J Phys Med Rehabil* 1999;78:157–9.
 14. Zager EL, Pfeifer SM, Brown MJ, Torosian MH, Hackney DB. Catecholamine neuropathy and radiculopathy: a treatable neuropathic disorder. *J Neurosurg* 1998;88:827–30. [CrossRef]
 15. Ortolan EG, Sola CA, Gruenberg MF, Vazquez FC. Giant sacral schwannoma. A case report. *Spine (Phila Pa 1976)* 1996;21:522–6.
 16. Dhôte R, Tudoret L, Bachmeyer C, Legmann P, Christoforov B. Cyclic sciatica. A manifestation of compression of the sciatic nerve by endometriosis. A case report. *Spine (Phila Pa 1976)* 1996;21:2277–9.
 17. Khodairy AT, Gerber BE, Praz G. Adenomyosis-- an unusual cause of sciatic pain. *Eur Spine J* 1995;4:317–9. [CrossRef]
 18. Takata K, Takahashi K. Cyclic Sciatica: A case report. *Spine (Phila Pa 1976)* 1994;19:89–90. [CrossRef]
 19. Bergqvist A, Bergqvist D, Lindholm K, Linell F. Endometriosis in the uterosacral ligament giving orthopedic symptoms through compression of the sciatic nerve and surgically treated via an extraperitoneal approach keeping the pelvic organs intact. *Acta Obstet Gynecol Scand* 1987;66:93–4. [CrossRef]
 20. Andrews DW, Friedman NB, Heier L, Erickson A, Lavigne MH. Tuboovarian abscess presenting as sciatic pain: case report. *Neurosurgery* 1987;21:100–3. [CrossRef]
 21. Björnsoon OG. Cyclic sciatica of endometriosis. Case report. *Acta Chir Scand* 1976;142:415–6.
 22. Head HB, Welch JS, Mussey E, Espinosa RE. Cyclic sciatica. Report of case with introduction of a new surgical sign. *JAMA* 1962;180:521–4. [CrossRef]

Siyataljinin İntrapelvik Nedenleri: Sistemik Bir Derleme

Siyatik sinir, alt ekstremitenin bir siniridir. Spinal sinirlerden; dördüncü Lomber'den (L4) üçüncü Sakral'a (S3) kadar olan sinir köklerinin birleşmesi ile oluşur. Siyatik sinir, arka uyluk kaslarını innerve eder ve ek olarak duyuşal fonksiyonu vardır. Siyatik sinir, siyatik sinirin irritasyonundan kaynaklanan ağrıya verilen isimdir. Siyatik sinir en yaygın olarak alt lomber sinir köklerinin (L4, L5 veya S1) sıkışması ile indüklenir. Jinekolojik, vasküler, travmatik, enflamatuvar ve tümöral bozukluklar gibi çeşitli intrapelvik patolojiler siyatik sinire neden olabilir. Disk herniasyonunu taklit eden intrapelvik patolojiler çoğunlukla göz ardı edilir. Cerrahi yaklaşım ve laparoskopi veya robotik cerrahi ile fonksiyonel keşif, siyatik sinire neden olabilen intrapelvik patolojilerin farkındalığını önemli ölçüde arttırmıştır. Hastanın intrapelvik patolojilere açısından detaylı incelenmesinin ardından cerrahi veya medikal tedavi gerekliliğine karar verilir; siyatik ağrı remisyonunda kayda değer sonuçlar alınabilir.

Anahtar Sözcükler: Aberran damar; endometriozis; jinekolojik operasyon; pelvik ağrı; siyatik sinir; siyatik sinir; vasküler kompresyon.