Giant sacrolumbar meningioma

Case report

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A case of giant sacral meningioma with presacral and lumbar extension is presented. The difficulties in diagnosis and management are emphasized including the staged multidisciplinary surgical approaches and preoperative tumor embolization.

KEY WORDS  •  spinal neoplasm  •  meningioma  •  sacral tumor  •  embolization

Meningiomas account for 25% of intraspinal neoplasms, with the thoracic area being the most common location (61% to 95% of reported cases).1-8,12,14,16,21,22-24 Meningiomas at the caudal aspect of the spine, however, are exceedingly unusual. To our knowledge, a sacral meningioma without lumbar extension has not previously been reported, although two cases have been documented at the L5-S1 level.4,39 Primary tumors of the sacrum are also rare.3,9,10,16,19,21,24,25,26 This case of a giant sacral meningioma extending into the lumbar subarachnoid and presacral spaces demonstrates the difficulty in diagnosing sacral lesions at an early stage. The value of a multidisciplinary approach to the successful management of this large sacral tumor is emphasized.

Case Report

This 39-year-old woman was first evaluated at the University of Michigan in July, 1987, for low-back and bilateral radicular leg pain. She also described mildly decreased perineal sensation, decreased sensation of bowel movements, and marked limitation of mobility of the lower back. At the time of initial examination, she was unable to lie flat on her back or sit because of severe low-back and radiating bilateral buttock pain. The patient first noticed the pain 9 years prior to our evaluation when it was localized to the coccygeal area. She failed conservative treatment of her coccydynia and in 1979 underwent a coccygectomy, which was complicated by wound infection. The low-back pain was mild but persistent until an exacerbation in 1983 after the patient fell on the seat of an exercise bicycle. After that, she noted a gradual progression of her low-back and bilateral leg pain. Her initial neurosurgical evaluation, in 1987, included a computerized tomography (CT) scan and myelogram and she was subsequently referred to the University of Michigan Medical Center.

Examination. Physical examination revealed a well-developed woman in no acute distress. Her general physical examination was within normal limits. Her gait was slightly broad-based and she had very limited motion of the lumbosacral spine, with 15° of forward flexion, 20° of lateral flexion, and 10° of extension. There was a firm, tender, palpable subcutaneous mass at the lumbosacral junction and a firm presacral mass was detected on rectal examination. Neurological examination revealed normal mental status and cranial nerve function. There was no motor, sensory, or reflex deficit in the upper extremities. Lower extremity examination, which was limited by the patient’s pain, demonstrated minimal diffuse weakness; however, there was significant weakness of the gluteus maximus and medius muscles bilaterally. Reflexes were normal at the knees and ankles bilaterally. Sensory examination was normal except for decreased pinprick sensation in the S3-5 dermatomes bilaterally. Routine laboratory values, chest x-ray film, and electrocardiogram were normal. An electromyogram showed no radioculopathy, plexopathy, or mononeuropathy.
Plain spinal radiographs demonstrated sacral erosion posteriorly (Fig. 1 left). Spinal radiographs obtained at the onset of symptoms in 1979 showed no evidence of coccygeal fracture or bone erosion of the sacrum. The lumbosacral myelogram showed a complete block, suggestive of an intradural mass, at the L-3 level (Fig. 1 right). The initial CT scan demonstrated an intrasacral tumor with erosion of the posterior sacral wall and presacral extension. Pelvic arteriography demonstrated a vascular presacral mass.

Operations. An open biopsy of the posterior subcutaneous mass was performed and the final pathology was consistent with a poorly differentiated meningioma. There was no neurological change after this procedure and 4 weeks later the patient underwent an L2–5 laminectomy with gross total removal of the intradural lumbar component of the tumor. The tumor was easily separated from the nerve roots but was very vascular (1900 cc blood loss). Once again, the pathological diagnosis was meningioma. No mitosis or necrosis was seen (Fig. 2). Postoperatively, the patient had a new left L-4 sensory deficit, decreased rectal tone, and absent ankle reflexes.

Because of the tumor’s size, location, and vascularity, an embolization procedure was attempted prior to extirpation of the sacral and presacral components. The patient underwent embolization of the right L-5 and both internal iliac vessels with coils and Ivalon synthetic polyvinyl formyl alcohol foam sponge* (Fig. 3). The left L-5 and middle sacral arteries could not be catheterized deeply enough to permit safe embolization. The patient experienced severe back and radiating leg pain with increased neurological deficits and fever within 12 hours of the embolization procedure. Steroid therapy provided minimal relief and she required large doses of narcotic analgesics. A CT scan after tumor embolization demonstrated the extent of the intrasacral and pelvic components (Fig. 4 upper and center) and multiple low-density areas of infarction within the tumor (Fig. 4 lower). Increased pain and neurological deficit after embolization were thought to be related to tumor swelling and further nerve root compression as a result of tumor infarction.

Three days postembolization, the patient underwent a combined posterior transsacral (neurosurgical) and lateral transabdominal (general surgical) approach in the right lateral decubitus position. Cystometric and anal sphincter monitoring was utilized during surgery. The initial approach was posterior and the dura was noted to be disrupted (anteriorly and posteriorly) at the S-1 level and below. Nearly all of the posterior wall of the sacrum was eroded. The left S-2 and S-3 foramina were enlarged and the anterior wall of the sacrum on the right was destroyed at this level with tumor extending into the pelvis. A gross total excision of the intrasacral portion was accomplished through this approach. All of the right sacral nerves and the left S-1 and S-2 nerves were preserved. The general surgeons then entered the pelvis through an incision in the left lower quadrant, and a transperitoneal approach to the retrorectal space revealed the presacral component. Dissection of the last fragments of tumor off of the sacral nerves exiting the anterior foramina was performed by the neurosurgeons. The patient was then returned to the prone position and a fascia lata graft was used to close the dura. The graft was sewn to the dural margins laterally and to the dura covering the root sleeve at S-3 on the right and S-2 on the left. Decompression of the sacral nerves and a gross total excision of the giant meningioma was accomplished through this combined anterior and posterior approach.

* Ivalon sponge manufactured by Unipoint Industries, High Point, North Carolina.
Giant sacroccular meningioma

**Postoperative Course.** After surgery, the patient had complete relief of her back and radiating leg pain. She had normal right lower-extremity strength except for 4/5 strength of the right dorsal and plantar foot flexor muscles. In the left lower extremity, she had no dorsiflexion and only trace plantar flexion in addition to 3/5 hamstring and 3-/5 gluteus medius and maximus muscle function. Sensory examination showed normal sensation to the S-1 level and diffuse hypalgesia from S-3 to S-5 on the right. Sensation from L-5 to S-5 on the left was decreased. The patient underwent an intensive course of physical therapy, and 11/2 years postoperatively she has no back or leg pain, is able to walk, and has had return of bladder and sexual function. She is still unable to dorsiflex the left foot. A postoperative CT scan in May, 1988, showed no tumor recurrence. An asymptomatic persistent fluid collection, suggesting a meningocele in the floor of the pelvis, is being monitored conservatively.

**Discussion**

The clinical course of this patient emphasizes the problem of diagnosing a sacral tumor at an early stage. Sacral tumors are rare. In addition, the capacity of the sacral spinal canal to accommodate a slow-growing tumor may result in the absence of localizing symptoms and cause a delay in diagnosis. Symptoms of low-back and/or radicular pain are often misdiagnosed as evidence of intervertebral disc disease.\(^{10,13,17}\) In our series of nine patients with sacral tumors, sphincter and sacral sensory disturbances were important clinical findings in association with low-back and radicular pain.\(^{10}\) A palpable rectal mass was noted in 67% of these patients.\(^{10}\)

Standard sacral radiographs are often difficult to interpret due to poor quality or overlying bowel gas or fecal material. Early bone erosion changes may be missed.\(^{17,27}\) The CT scan is an excellent diagnostic tool but the standard scan to rule out disc herniation often ends at the S-1 level, thus potentially missing a lower sacral tumor.

The choice of surgical approach is determined by the type of lesion, the age and physical condition of the
condition, neurological status, and prognosis based on consideration given to the patient's age, general physical

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In summary, this giant sacral tumor with presacral extension was diagnosed at a late stage due to nonspecific symptoms and signs. Important to the diagnosis was a careful history and physical examination with attention to the sacral sensory and rectal examination findings. The CT scan was the diagnostic procedure of choice but angiography and myelography added important information in the management of this patient. Sacral tumors of this size often require a multidirectional approach and combined surgical specialty management. These cases should be individualized, with consideration given to the patient's age, general physical condition, neurological status, and prognosis based on a pathological diagnosis.

References

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patient, and the amount of sacral destruction. The surgical approach to large sacral and presacral tumors has evolved from an exclusively posterior approach to one that involves anterior, posterior, or combined operations.1,2,15,18,26 The posterior approach, popularized by MacCarty, et al.,18 is limited due to poor control of sacral arteries and presacral veins. Due to the lumbar, sacral, and presacral extent of this tumor in addition to its vascularity, we utilized a staged multidisciplinary surgical approach. After removal of the lumbar component and confirmation of the diagnosis of meningioma, it was decided to reduce the vascularity with embolization prior to combined anterior and posterior approaches to the sacral component. After embolization, the significant increase in low-back pain and the new neurological deficit were attributed to infarction of the tumor with edema, causing compression of the nerve roots. After this experience, we would encourage surgeons to operate within 12 to 18 hours after embolization to avoid further neurological deterioration. This patient did not require a fusion procedure as the sacroiliac joints were not significantly involved on either side. Diffuse destruction of the sacrum by tumor or a radical sacral resection may require a stabilization procedure. Abernathey, et al.,1 recommended evaluation of sacroiliac joint stability 9 to 12 weeks after tumor resection.

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