Case report

Mobile Schwannomas of lumbar spine: A diagnostic dilemma[☆] Ajay Kothari^a, Navdeep Singh^b, Rashid Anjum^{c,*}^a Sancheti Hospital Pune, Maharashtra, India^b SGRRIMS, Uttarakhand, India^c Children's Orthopedic Centre, Mumbai, India

ARTICLE INFO

Article history:

Received 23 February 2017

Received in revised form 21 May 2017

Accepted 3 June 2017

Available online 14 June 2017

Keywords:

Mobile schwannoma

Intradural extramedullary tumour

Migratory tumour

ABSTRACT

Mobile Schwannoma is a very rare entity and is reported sparsely in literature, with most of them occurring in lumbar spine region. We present a case of seventy-year-old male patient who had pain in lower back radiating to ipsilateral thigh. A diagnosis of migratory tumour was made based on findings of plain and contrast MRI preoperatively. We did a two level laminectomy and tumour excision. In this report, we intend to discuss various likely causes of tumour migration and various diagnostic methods to tackle this surgical dilemma, we have also attempted to review the sparse literature available till date on migratory lumbar schwannoma.

© 2017

1. Introduction

Schwannoma is the most common nerve sheath tumour constituting about eighty-five per cent of nerve sheath tumours, combined with neurofibromas these constitute about 30% of all spinal neoplasms.¹ They occur equally among both sexes and are common in fourth to sixth decade. Nerve sheath tumours are dispersed equally along the various spine segments with no clear predilection to any particular region of spine. Migratory schwannomas are thought to be very rare and sparsely documented in available literature, lumbar spine is the most frequent site of mobile schwannomas. However, there are case reports available in literature depicting their occurrence in cervical and thoracic spine. These migratory tumours source diagnostic as well as surgical hurdles, in the worst case scenario the operative finding didn't revealed any tumour at the predetermined level and an extension of laminectomy and durotomy was needed, even that was not successful in all the cases.^{2–5} We present a similar case of migratory lumbar schwannoma in which we had to do an extended laminectomy and durotomy for successful excision of tumour.

2. Case report

A seventy-year-old male, previously healthy, presented to our spine clinic with chief complaint of pain lower back radiating to right buttock since one month. The pain was gradual in onset, constant in duration and radiating to right side buttock more so in evening and night disturbing sleep pattern. The pain was associated with tingling and numbness in the affected region; there were no aggravating or relieving factors. There was no history of any significant trauma in recent past, no history of fever, no symptoms of similar complaint or low back pain in past. A thorough examination of patient revealed diffuse tenderness of lumbar spine, straight leg raising test was normal on both sides. There were no signs of root compression. Examination for sacroiliac joint was within normal limits. Complete neurological examination was performed; patient had grade five power of all lower limb muscles as per MRC grading, reflexes were normal and sensory system was intact. There was no change in symptoms in different postures and on Valsalva manoeuvre. An x-ray was advised which depicted mild degenerative changes in lumbar spine and fuzziness of sacroiliac joint on right side, but none of the finding can explain the severity of symptoms (Fig. 1). Complete blood profile was done including markers of infection and all the parameters were within range. MRI of lumbosacral spine with screening of whole spine was done, MRI revealed an isointense lesion at L2–L3 level suggestive of nerve sheath tumour (Fig. 2a). However, contrast study of lumbosacral spine portrayed the lesion

[☆] Place of Study: Sancheti Institute for Orthopaedics, Pune, Maharashtra, India.

* Corresponding author.

E-mail addresses: drnavdeepraina@yahoo.com (N. Singh), raashidanjum@gmail.com (R. Anjum).

Fig. 1. Pre-operative radiograph of lumbosacral spine anteroposterior and lateral views showing degenerative changes in spine and fuzziness of right sacroiliac joint.

to be at L3–L4 level (Fig. 2b). The lesion appeared to be centrally located on contrast enhanced MR imaging (Fig. 3). The patient was planned for surgery with the presumptive diagnosis of migratory schwannoma. A standard midline approach was used to expose the lamina and posterior elements, laminectomy and durotomy was done at L2–L3 level but we were unable to locate the tumour. Laminectomy and durotomy was extended to involve the next level i.e. L3–L4 and the tumour was successfully excised and sent for histopathological examination, (Fig. 4) wound was closed back in

Fig. 2. (A) on the left a sagittal MR image showing the lesion to be at L2–L3 level. (B) on right a contrast enhanced sagittal MR showing the lesion to be at L3–L4 level.

Fig. 3. Axial cut of contrast MR showing the tumour to be central in location.

layers after achieving haemostasis. The tumour was found to be originating from L3 Nerve Root, complete excision of tumour was done without causing any damage to nerve root. Histopathological examination confirmed the diagnosis of schwannoma (Fig. 5). The patient's symptoms improved significantly, his low back pain, radiating pain and numbness were relieved completely. A post-operative MRI was obtained which revealed complete resection of tumour in comparison to previous study (Fig. 6). A diagnosis of mobile lumbar schwannoma though very rare was made based on MRI and histopathological findings.

3. Discussion

In 1974, Tomimatsu et al. was the first to describe a case of mobile schwannoma of cervical spine with a discrepancy of two levels caudally.¹⁹ Wartzman and Botrel were the first to describe

Fig. 4. Completely excised tumour sent for histopathological examination.

Fig. 5. Microscopic appearance of schwannoma depicting classical findings (Antony A and B pattern).

mobile tumour of cauda equina where the tumour being ependymoma of filum terminale and its mobility was by virtue of laxity of filum terminale in 1963.⁶ In the presence of lumbar canal stenosis, the redundancy of the cauda equina nerve roots can be observed thereby allowing the movement of the intradural space occupying lesion.^{7–9,19} Migratory intradural extra medullary tumours of spine are very rare with reported cases in literature showing schwannoma to be the most common tumour although

there have been two published reports, one for the neurenteric cyst and one for the ependymoma. Denes et al. described migratory schwannoma as an ‘elusive’ tumour. He published two cases in which the first operation failed to find the original tumour; several preventive measures were suggested, such as pre-operative repeated MRI or myelography, intra-operative myelography, ultrasonography or even MRI to avoid such a scenario.¹⁰ The reported prevalence of mobile schwannoma in lumbar area is (65%), cervical (5%), cervicothoracic (5%), thoracic (10%) cord region and thoracolumbar junction (15%). The migration includes Rostral (60%) or caudal (30%) and to-and-from (10%). Migration distance was most commonly within one level vertebral distance (80%). Maximum of five level vertebral distance was also reported at thoracic cord lesion.⁴ There was tumour migration even up to cervical C2-3 cord level by two level vertebral distance.¹¹ The migration of tumour in our case was for one level only. These migratory tumours may show variability of symptoms and signs, thereby complicating the clinical picture.^{14,18}

Tumour movement could be attributed to positional adjustments or any procedure which increases intra-abdominal, intrathecal or intra-thoracic pressure.^{3–5,12,13} The usage of contrast medium can increase the tumour mobility^{4,20} and even muscular relaxation during anaesthesia and Valsalva manoeuvres can cause tumour to be mobile.^{13–16} In lumbar canal, due to absence of cord below L1 and longer length of the lumbar nerve roots, the tumour may derive its increased mobility.^{5,11} Various methodologies have been devised to tackle this problem to avoid excessive and unnecessary laminectomies and proper tumour visualization and excision which include peri-operative imaging techniques,¹⁴ intraoperative ultrasonography,¹³ as per the facilities available in the institute. Because the one being in cauda equina presents as variability of symptoms and might make clinical picture look like of a malingerer.^{15–17} However, intraoperative ultrasonography is not readily available in most of institutions in developing countries and intraoperative myelography though used in past is known to cause tumour migration by itself.²⁰ We didn't have the facility of intra operative USG in our institute. A summary of available cases of schwannoma reported in literature is presented in tabulated form (Table 1).

4. Conclusion

Mobile schwannoma, though are rarely reported in the literature, but its existence should be known to the operating surgeon to avoid unnecessary surgical dissection, thereby increasing morbidity and complication rate and thus various measures to counter these complications like adopting peri-operative imaging

Fig. 6. Post-operative MR image showing complete excision of tumour.

Table 1

Mobile Schwannoma of spine; published cases in literature.

S. No	Author	Location	Discrepancy	Migration
1.	Tomimatsu et al. ²¹	Cervical	2 vertebrae	Caudal
2.	Hollin et al. ¹⁹	Cauda equina	3 vertebrae	Rostral
3.	Husag et al. ¹⁵	Cauda equina	7 cm	Caudal
4.	Pau et al. ⁹	Cauda equina	2 vertebrae	Caudal
5.	Tavy et al. ²⁰	Cauda equina	3 vertebrae	Caudal
6.	Isu et al. ¹⁴	Thoracolumbar	1 vertebrae	Caudal
		Lumbar	1 vertebrae	Caudal
		Lumbar	1/2 vertebrae	Caudal
7.	Satoh et al. ¹⁷	Thoraco-lumbar	1 vertebrae	Rostral
8.	Namura et al. ¹²	Thoracic	3 vertebrae	Caudal
9.	Varughese and Mazagri ³	Lumbar	1 vertebrae	Rostral
		Lumbar	1 vertebrae	Rostral
10.	Iizuka et al. ²²	Cervico thoracic	1 vertebrae	Caudal
11.	Friedman et al. ¹³	Lumbar	1 vertebrae	Rostral
		Lumbar	1/2 vertebrae	Rostral
		Lumbar	1/2 vertebrae	Rostral
12.	Marin-Sanabria et al. ⁴	Lumbar	2.2 cm	Rostral
		Lumbar	2 vertebrae	Caudal
13.	Kim et al. ⁵	Lumbar	1 vertebrae	Rostral
		Thoracic	1/2 vertebrae	Rostral
		Lumbar	1 vertebrae	Rostral
14.	Khan et al. ²	Thoracic	3 vertebrae	Rostral
15.	Terada et al. ¹¹	Cervical	1 vertebrae	Caudal
16.	Toscano et al. ¹⁸	Thoracolumbar	1 vertebrae	Caudal
17.	Kothari et al. (present study)	Lumbar	1 vertebrae	Caudal

techniques and intraoperative sonography can be utilized for overall better surgical outcomes.

Conflict of interest

The authors have none to declare.

References

- Seppala MT, Haltia MJ, Sankila RJ, Jaaskelainen JE, Heiskanen O. Long term outcome after removal of spinal schwannoma; a clinicopathological study of 187 cases. *J Neurosurg.* 1995;83:621–626.
- Khan RA, Rahman A, Bhandhari PB, et al. Double migration of a schwannoma of thoracic spine. *BMJ Case Rep.* 2013;(January)10.1136/bcr-2012-008182.
- Varughese G, Mazagri R. Mobile tumours in the lumbar canal: a diagnostic problem. *Can J Surg.* 1997;40:59–62.
- Marin-Sanabria EA, Sih IM, Tan KK, et al. Mobile cauda equine schwannomas. *Singapore Med J.* 2007;48:53–56.
- Kim S-B, Kim H-S, Jang J-S, et al. mobility of intradural extramedullary schwannoma at spine: report of 3 cases with literature review. *J Korean Neurosurg Soc.* 2010;47:64–67.
- Wortzman G, Botterell EH. A mobile ependymoma of filum terminal. *J Neurosurg.* 1963;20:164–166.
- Ehni G, Moiel R, Bragg T. The redundant or knotted nerve root: a clue to spondylotic cauda equine radiculopathy. *J Neurosurg.* 1970;32:252–254.
- Varughese G. extradural extrusion of roots of the cauda equina. *Surg Neurol.* 1976;5:161–163.
- Pau A, Orunesu G, Sehrbunt Viale E, Turtas S, Zirattu G. Mobile neurinoma of cauda equine. Case Report. *Acta Neurochir (Wien).* 1982;60:115–117.
- Dennes L, Koster PA, Hekster RE. Elusive tumor of the cauda equina. Case report. *J Neurosurg.* 1987;66:131–133.
- Terada Y, Toda H, Yokote A, et al. A mobile schwannoma of the cervical spinal cord: case report and review of literature. *Neurosurgery.* 2016;78:156–159.
- Namura S, Hanakita J, Hideyuki Suwa, et al. Thoracic mobile neurinoma. *J Neurosurg.* 1993;79:277–279.
- Friedman JA, Wetgen NM, Atkinson D, et al. Utility of intraoperative ultrasound for tumours of cauda equine. *Spine.* 2003;28:288–290.
- Isu T, Iwasaki, Akino et al M. Mobile schwannoma of the cauda equine diagnosed by magnetic resonance imaging. *Neurosurgery.* 1989;25:968–997.
- Husag L, Schubiger O, Probst C. (Neurinoma of the cauda equine) Schweiz Arch Neurol. *Neurochir Psychiat.* 1980;127:205–211 [German].
- Murai H, Arai M, Satoh K, et al. (Mobile spinal neurenteric cyst) A case report. *Seikei Geka.* 1991;42:1746–1749 [Japanese].
- Satoh T, Kageyama T, Kamata I, Date I. Mobile neurinoma of the cauda equina; a case report. *No Shinkei Geka.* 1991;19(19):891–896 [Japanese].
- Toscano DT, Felbaum DR, Ryan JE, et al. Mobile schwannoma of the lumbar spine: a case report and review of the literature. *Cureus.* 2016;8(7):e71510.7759/cureus.715.
- Hollin SA, Drapkin AJ, Wancier J, Huang YP. Mobile schwannoma of the cauda equina. Case report. *J Neurosurg.* 1978;48:135–137.
- Tavy DL, Kuiters RR, Koster PA, Hekster RE. Elusive tumor of the cauda equina. Case report. *J Neurosurg.* 1987;66:131–133.
- Tomimatsu T, Yanamura I, Kawaguchi N, Fujii K, Isobe Y. A mobile tumor of the cervical spinal cord. A case report. *Kantoh Seisaisi.* 1974;5:213–218.
- Iizuka H, Iida T, Akai T. Mobile neurinoma of the cervicothoracic junction. *Surg Neurol.* 1998;50:492–493.