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CASE REPORT

Spinal Neurofibroma Masquerading as a Herniated Disc

A case report

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ورم ليفي عصبي شوكي يتنكر على شكل انزلاق غضروفي

تقرير حالة

طارق لمكي و ماريو اميراتي

الملخص: نقدم هنا تقرير الحالة الوحيدة في الأدبيات الطبية الانجليزية لورم ليفي عصبي شوكي في العمود الفقري شُخصّت خطأً على أنها انزلاق غضروفي باستخدام التصوير بالرنين المغناطيسي.كانت أعراض هذه الحالة والنتائج الإشعاعية نموذجية لتشخيص انزلاق غضروفي. وأثناء العملية الجراحية لوحظ خلل في كم جذر العصب العجزي الأول، وظهر بعد الاستكشاف وجود ورم ليفي عصبي شوكي، تم استئصاله بالكامل، مما أدى إلى تحسن في أعراض المريض. حاليا، هناك اعتماد كبير على التصوير بالرنين المغناطيسي كأداة حساسة للغاية ومحددة تستخدم في تشخيص فتق الغضاريف القطنية. وإن كانت هناك تقارير متفرقة من عدم دقة التشخيص باستخدام التصوير بالرنين المغناطيسي، لكن لا توجد تقارير عن تشخيص خاطئ للأورام الليفية العصبية في العمود الفقري على أنها انزلاق غضروفي. على الرغم من التطور الكبير في التصوير الإشعاعي التشخيصي لا تزال المفاجآت الجراحية تحدث. في نهاية المطاف، لا يزال من الضروري اتخاذ القرارات أثناء العملية الجراحية.

مفتاح الكلمات: انزلاق غضروفي، إساءة تشخيص، المسح الضوئي بالرنين المغناطيسي، ورم ليفي عصبي، تقرير حالة، الولايات المتحدة الأمريكية.

ABSTRACT: We present the only case in English medical literature of a spinal neurofibroma misdiagnosed as a herniated disc using magnetic resonance imaging (MRI). This case presented with typical symptoms and radiological findings of a herniated disc. Intraoperatively, an abnormality was noted at the S1 nerve root sleeve. Further exploration revealed a spinal neurofibroma which was completely resected, resulting in an improvement in the patient's symptoms. Currently, there is heavy reliance on MRI as a highly sensitive and specific tool used in the diagnosis of herniated lumbar discs. Although there have been occasional reports of misdiagnoses using MRI, there are no reported cases of a spinal neurofibroma being misdiagnosed as a herniated lumbar disc. Despite great advances in radiological diagnostic imaging, surgical surprises do still occur. Ultimately, instinct is still essential in intraoperative surgical decisions.

Keywords: Herniated disc; Misdiagnosis; MRI scan; Neurofibroma; Case report; USA.

Magnetic resonance imaging (MRI) is widely considered to be both very sensitive and specific in diagnosing herniated discs.[1] However, there have been occasional reports of false positive MRIs *vis-à-vis* herniated discs. We report a case where a lumbar spinal neurofibroma was misdiagnosed as a herniated lumbar disc with a review of the pertinent literature. We present the only case in the English literature of such a misdiagnosis using MRI. As such, we highlight the fact that even in such a mundane neurosurgical procedure as a lumbar microdiscectomy, intradural exploration may be necessary when the intraoperative findings do not match the neuroradiological ones.

Case Report

A 44-year-old man presented with a 1-month history of acute onset back pain associated with S1

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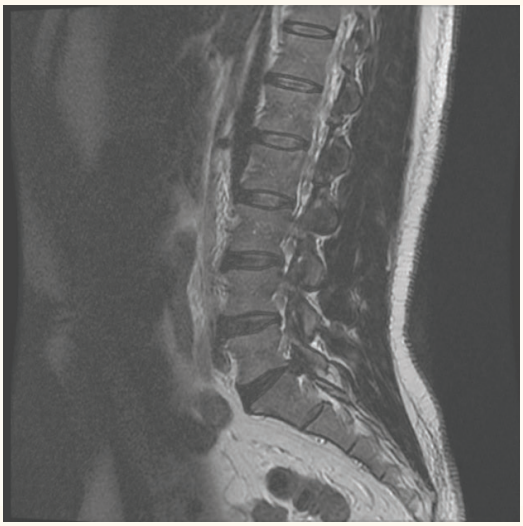

Figure 1: The pre-operative magnetic resonance imaging scan is a T2 weighted sagittal image showing what appears to be an extruded disc at L5S1.

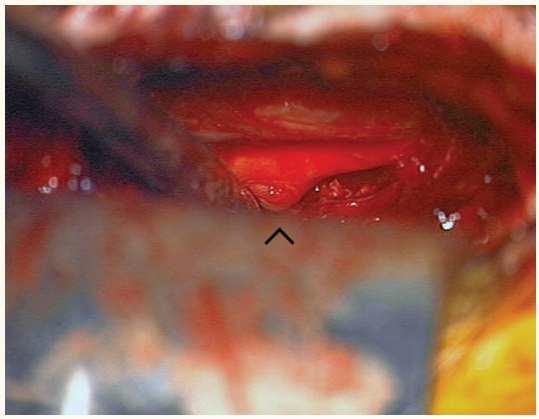

Figure 2: Pictured is the intra-operative image after foraminotomy. It shows a bulge at the S1 nerve root. This bulge, combined with the finding of a disc herniation disproportionate to the clinical findings, raised suspicion and prompted further investigation.

radiculopathy on the right that was progressively worsening and not responding to conservative treatment.

He had had several episodes of sciatica during the past 10–15 years. He reported that the pain had increased acutely in severity. The pain involved the posterior right buttock, the posterolateral thigh, posterior calf, and the outer aspect and ball of the right foot. A neurological examination was positive for a 4/5 weakness in the right S1 innervated muscles (gastrocnemius and soleus, flexors of toes). He also had an absent ankle reflex on the right. His straight leg raising test was positive at 45° on the right side.

An MRI of the lumbosacral spine was obtained and reported as showing an obvious extruded disc at L5/S1 [Figure 1]. He had neither a family history of neurofibromatosis nor a significant history of tumours. He had no café au lait spots, freckling, or cutaneous neurofibromas anywhere on the body. The conclusion was that he had an S1 radiculopathy caused by an extruded disc at L5/S1. Considering that he was not responding to conservative treatment, a microdiscectomy at L5/S1 was performed.

A routine L5/S1 lumbar microdiscectomy approach was executed. Using the operating microscope, the thecal sac and the S1 nerve root were identified. Both of them were observed to be under substantial pressure, as expected. There was an obvious defect in the posterior longitudinal ligament and a very small disc fragment was identified and removed. The intervertebral disc space was further opened and the remaining portion of the disc was removed. With this removal, it was felt that the amount of disc did not seem commensurate with the appearance suggested by the MRI. We proceeded to do a complete foraminotomy over the S1 nerve root where an obvious abnormality on the lateral aspect of the S1 nerve root was found [Figures 2 & 3].

We cautiously used intraoperative direct nerve root stimulation up to 4 milliamps and could not obtain any stimulation on the lateral aspect of the nerve. In contrast, there was clear cut stimulation along the medial aspect where the deformity lay. We then proceeded to open the dura in order to ascertain the nature of the pathology. We came across a mass that was intermingled with the rootlets. Under high magnification and frequent electrical stimulation, it was possible to remove this mass completely. A frozen section was consistent with schwannoma. After the tumour had been completely removed, the exposed rootlets were covered with a small fat graft pre-soaked in methylprednisolone sodium succinate solution. The wound was then closed in the routine fashion.

Postoperatively, the patient experienced immediate relief of the right leg pain. He also exhibited increased right leg strength and reappearance of the ankle reflex. At a 3-month follow-up, the right leg strength was found to be 5/5 and he had already resumed duties at work although

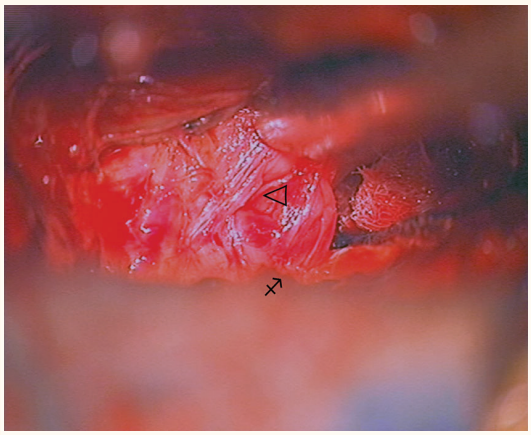

Figure 3: Once the nerve root sleeve was opened, a neurofibroma was exposed. Pictured are the S1 nerve fibres (triangular arrow) and the neurofibroma (lined arrow). Methodical dissection was needed to separate the tumour from the fibres.

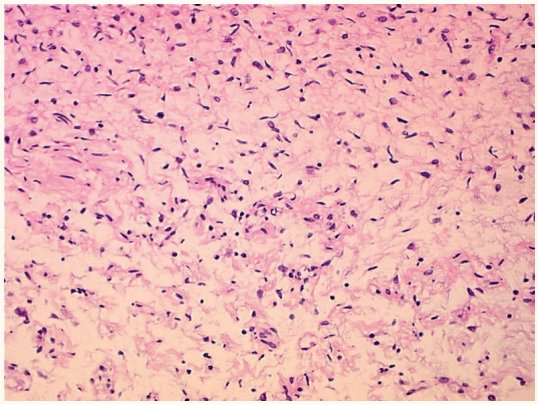

Figure 4: This shows the tissue under 200x magnification after undergoing s-100 protein stain showing characteristic neurofibroma properties.

there was some residual intermittent paresthesia in the 4th and 5th toes. A postoperative MRI of the whole neuraxis showed complete removal of the L5/S1 abnormality and an absence of other lesions. At the one-year post-operative visit, the patient explained that his symptoms had significantly improved. However, he did complain of mild to moderate pain on exertion, felt in the lower back region, and continued intermittent paresthesias in the 4th and 5th toes. The 16-month post-operative MRI showed no recurrence of the tumour. The final pathology report was consistent with neurofibroma. [Figure 4]. This conclusion was based on the visualisation of small fragments of myelinated nerve that were focally expanded with the proliferation of spindle elements.

Discussion

Lumbar MRI is widely considered sensitive and specific in diagnosing a herniated nucleus pulposus (HNP).[1-8] In a recent retrospective study of about 2,000 patients, three unexpected histopathological findings were reported during a routine operation on what was believed to be a herniated lumbar disc.[3] One patient had a metastatic carcinoma involving a prolapsed disc while another patient had an L5/S1 herniated disc associated with lymphoma in the same location. The third case described a cavernous haemangioma within the disc material. The decision to operate on the lymphoma patient was based on an MRI, while the other two patients underwent surgery based on the findings of the computed tomography (CT) scan.[3] This finding of about 1:1,000 unexpected important pathologies occurred during routine discectomy procedures.[3]

Our finding is more intriguing because of the natural history of events. Our case began as a routine discectomy but then evolved to a tumour excision. This gross, intraoperative revelation of a MRI-based misdiagnosis is rare indeed with a herniated nucleus pulposus. While there have been isolated reports of other tumours being misdiagnosed as HNP, there has been no report in the MRI era of a spinal neurofibroma being misdiagnosed as a herniated disc.[3,4,6] To our knowledge, this is the first case that was misdiagnosed despite the use of MRI. Isolated lumbar spinal neurofibromas are extremely rare and very few cases have been reported to date.

The key to avoid missing an associated lesion is to match the neuroradiological findings to what is seen during surgery. Whenever there is a significant mismatch, consideration must be given to other lesions mimicking HNP, and necessary intraoperative adjustments must be made. At this juncture, the surgeon has several options. In our case, a clear abnormality appeared intraoperatively within the neural sleeve. This prompted further surgical investigation. Had this not been so obvious, the other option would have been to conclude the surgery and follow up with an immediate MRI scan, utilising contrast and thinner slices to achieve a more detailed study.

Conclusion

In conclusion, despite great advances in radiological

diagnostic imaging, surgical surprises do still occur. This should be considered when approaching even the most routine cases. For us, a sporadic neurofibroma of the S1 dorsal root sleeve masqueraded as a herniated intervertebral disc. This is a very rare occurrence and this case is, to our knowledge, the first such case reported in the MRI era in English medical literature. This reinforces the idea that a surgeon should 'follow his (or her) gut' and investigate for more complex pathology when intraoperative findings do not seem to match the neuroradiological ones. This is yet a new twist on the old adage "Treat the patient not the images."

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