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CASE REPORT
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A Rare Case of Lumbar Traumatic Intradiscal Hematoma Followed by Repeatative Occupation Related Minor Trauma

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A case of surgically treated intervertebral disc extrusion with intraoperatively confirmed intradiscal hematoma in a 30-year-old physical trainer is presented. Preoperative magnetic resonance imaging revealed downward migrating disc herniation, without definite suggestive findings of intradiscal hematoma. Intervertebral disc herniation with concomitant intradiscal hematoma is extremely rare, but could occur in patients who have excessive axial stress to the spine occupationally. In our case, the patient was an occupational physical trainer who had repetitive minor trauma to the lumbar spine. Although the patient did not have any clear history of major trauma to the spine, the intraoperative findings revealed intradiscal hematoma, which is very rare. The presence of intradiscal hematoma is to be suspected even when preoperative imaging studies shows indefinite findings of hematoma, considering the change in signal intensity of hematoma by time.

Keywords: Intervertebral disc; Occupational injuries; Magnetic resonance imaging

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INTRODUCTION

Intervertebral disc herniation is a major cause of lumbar spinal root or central thecal sac compression, and it frequently results in neurologic changes such as radiculopathy signs. However, they are rarely associated with intradiscal hematomas, and trauma related disc hemorrhage is even rarer. This is because the mature human intervertebral disc normally contains very few blood vessels within it [1,2].

Due to the extreme rarity of this pathology, only few reports have been published previously. Here we present an extremely rare case of surgically treated lumbar intervertebral disc herniation which was accompanied with intradiscal hematoma as a result of repetitive minor trauma and injury to the spine in a professional physical trainer.

CASE REPORT

A 30-year-old male physical trainer visited our center suffering from progressively worsening back pain, right lateral thigh pain and buttock pain, which had started 6 months ago. On neurologic examination at admission, paresthesia and pain of right L5 dermatome was noted, and grade 4 motor weakness of the right great toe dorsiflexion, right ankle dorsiflexion were found. Straight leg raise limitation was noted and besides those findings, no further neurologic deficits were identified. He did not have a significant history of any major trauma, however occupationally he was exposed to repeated minor injury or traumas on the back by frequently bumping his back on the ground or lifting heavy instruments.

The magnetic resonance (MR) image which was ob-

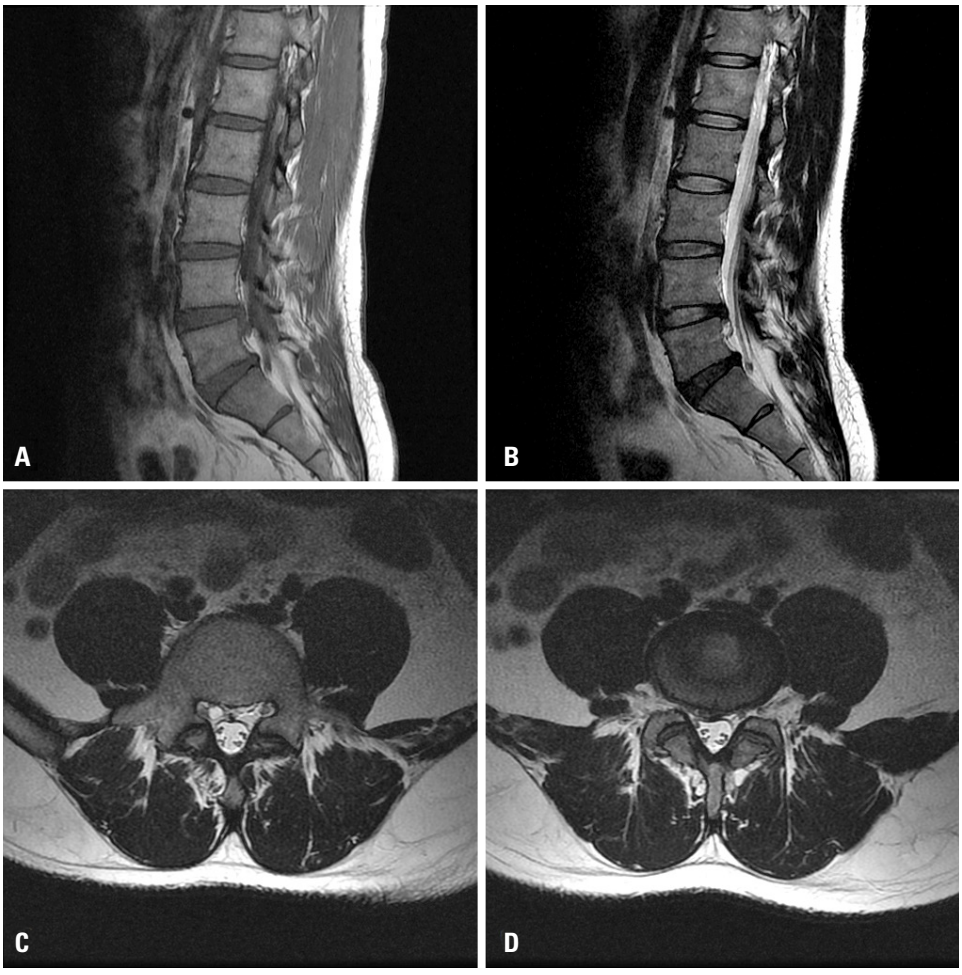

Fig. 1. Pre-operative magnetic resonance images of the presented patient. T1 and T2 weighted saggital images of the presented patient, showing extrusion of the right L4/5 intervertebral disc, migrating downward and compressing the right L5 root (A, B). T2 weighted axial image of the sequestrated disc fragment presenting as high signal intesity, migrated downward and compressing the right L5 root (C). T2 weighted axial image showing low signal intensity lesion within the L4/5 intervertebral disc, which was found out to be hematoma intra-operatively (D).

tained for further evaluation, showed extrusion of the right L4/5 intervertebral disc, migrating downward and compressing the right L5 root. Although the interbody part of disc showed low signal intensity on T2 weighted image (WI) and isosignal intensity on T1WI as usual ruptured discs, the downward migrating part of the intervertebral disc showed high signal intensity on T2WI and isosignal on T1WI (Fig. 1).

As non-surgical treatment failed to relief the patient's symptoms, in order to relief pain and to confirm of the lumbar lesion, the patient underwent a surgery through posterior approach. The inferior portion of the right L4 lamina was drilled out. When the yellow ligament was partially removed and the right L5 root was retracted medially, sequestrated disc fragment compressing the axillar portion of right L5 root was noted. This fragment was thought to be a downward migrated sequestrum which was presented as hyperintensity on T2 weighted MR image. Besides this finding, another lesion which was not definitely recognized at the MR study was found intra-operatively. The lesion was located at the right side of the L4/5 intervertebral disc level, and it was firm in consistency, containing liquified blood within it while the wall of the lesion showed xanthochromic appearance. An intra-operative photograph of the intradiscal hematoma is shown in Fig. 2. While the sequestrated downward migrating disc fragment was compressing the right L5 root from the axillar portion, this intradiscal lesion was slightly compressing the root from the shoulder portion. When the intradiscal lesion was punctured, dark brownish liquified hematoma gushed out through the opening. Both the intradiscal hematoma and the sequestrated disc were totally removed and decompression of the right L5 root was done.

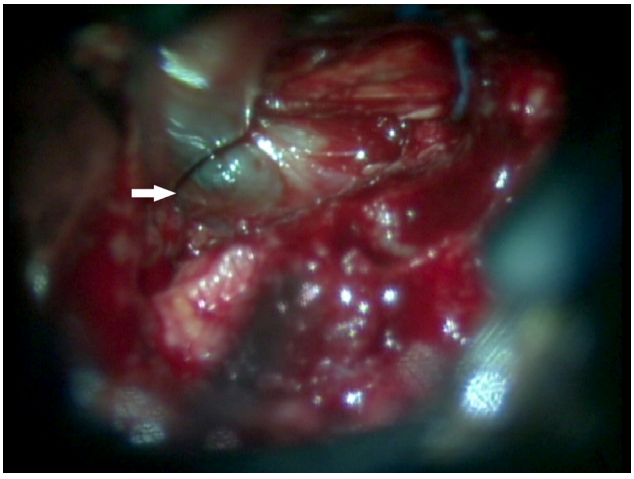

Fig. 2. Intra-operative photograph of the presented case. Intradiscal hematoma at the L4/5 intervertebral body disc level visible after medial retraction of the central thecal sac and the right L5 root, showing xanthochromic appearance and containing altered blood within it (arrow).

After the surgery, remarkable improvement of the consistent radiating right leg pain which suffered him was seen. Motor weakness of the right ankle and great toe did not dramatically disappear, however it was getting better subjectively after the surgery. The weakness improved further at the last follow-up, 2 months after operation. There was no complication related to surgery.

DISCUSSION

The diagnosis of many spinal disorders including lumbar intervertebral disc herniation are commonly based on magnetic resonance imaging (MRI). MRI is able to detect acute, macroscopic injuries of the disc on clinically applicable sequences [3]. The intensity of the herniation is usually similar to that of the parent disc on T1WI, and hypointense relative to cerebrospinal fluid with small herniations, or hyperintense relative to the parent disc with large extrusions and/or free fragments on T2WI [1]. In the present case, high signal intensity which was significantly different with that of the parent disc on T2WI was presented and isosignal intensity compared to the parent disc on T1WI. This lesion was thought to be suggestive of a sequestrated disc fragment, and it was confirmed to be so intra-operatively. However another intradiscal lesion which was found out to be an intradiscal hematoma, was not distinguishable on the MR image. As the MR findings of hematoma could vary over time following the initial injury due to temporal changes in the hematoma [4], the intradiscal hematoma might show signal intensities similar to those of extruded disc on MR images. This indicates that, although extremely rare, even without any definite cystic signal intensities on MR images, concomitant intradiscal hematoma related with repeated minor trauma on the spine could exist. And possibly, considering the image findings of intradiscal hemorrhage in other few previously

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reported cases, the minor trauma related intradiscal hematoma could also present as various cystic signal intensities [1,5,6], unlike our case. So recognition of the trauma related intradiscal hematoma by MRI may be sometimes impossible like that in our case. And even when an abnormal signal were found on the preoperative MR image, preoperative discrimination of intradiscal hematoma from other non-traumatic diseases such as neoplasms, cysts or epidural hematomas could be difficult as these lesions could also be shown as various signal intensities on MRI [7].

The exact mechanism of such an event in our patient is not clear. Lumbar disc herniations without any hematoma are a common manifestation of degenerative disease which occurs more frequently in elderlies than in young people [8]. Our patient did not reveal any degenerative change on the preoperative imaging studies. Besides degenerative herniation, traumatic herniation of the lumbar disc could be considered as a possible reason, as intradiscal hematoma was accompanied. Some authors believe that an acute traumatic episode can lead to displacement of the disc, although this is most likely related to force imparted onto a previously degenerated disc, which has developed a focal annular weakness. Being an occupational physical trainer, even though our patient did not have a history of recent acute high-energy trauma, repeated excess loading and repeated minor trauma on the lumbar spine could have been a possible reason for annular weakness and this could have resulted in disc herniation with concomitant intradiscal hematoma. Although intradiscal hematoma related to repetitive minor trauma is extremely rare, there are few previous published articles introducing such cases in athletes [1,5], suggesting the possibility of relationship with repetitive minor trauma.

As mentioned before, traumatic intradiscal hemorrhage is a very rare entity because mature human intervertebral disc normally contains very few blood vessels within it [1,2]. Theoretically, two possibilities could be considered as the potential bleeding focus of intradiscal hematomas. In each disc, a collagenous annulus fibrosus encloses a central, highly hydrated nucleus pulposus; these structures are separated from the adjacent vertebral bodies by a thin layer of hyaline cartilage, the cartilaginous endplates. Cells of the outer annulus fibrosus are supplied by capillaries from blood vessels in the surrounding soft tissues that penetrate a few millimeters into the disc [9]. That means, unlike the completely avascular nucleus polposus, the annulus fibrosus contains a few blood vessels inside it. Therefore, considering the structure of the intervertebral disc, adjacent vertebral body endplate injuries by repeated trauma could be a possible cause, and tearing of the blood vessels in the annulus fibrosus could be another. Morgan and Saifuddin [10] reported that subacute intradiscal hematoma could be associated with vertebral fractures. However in our case, the endplates of adjacent vertebral bodies presented clear margins and regular signal intensities on MRI, suggesting that the possibility of endplate injury as the bleeding source would be low. Therefore, tearing of the annulus fibrosus vessels probably due to excessive loading and repeated minor trauma on the intervertebral disc as a physical trainer would be a more reasonable possible bleeding source in our case.

Lumbar intervertebral disc herniation with concomitant intradiscal hematoma is extremely rare, but could occur in patients who may have excessive axial stress and minor trauma to the spine, such as physical trainers or athletes. In certain patients, the possibility of rare traumatic intradiscal hematoma should also be considered, even when they do not present or present as unusual intradiscal cyst signals on MR images due to various signal intensities of hematoma by time.

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