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CASE REPORT

Serious Neurological Complication Resulting from Inadvertent Intradiscal Injection During Fluoroscopically Guided Interlaminar Epidural Steroid Injection

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Abstract We describe the case of a 30-year-old patient who was referred for lumbar epidural corticosteroid injection due to right L5 radiculopathy. Two months earlier, MRI demonstrated a right large paracentral L4–L5 disk extrusion causing disabling L5 radiculopathy. The L4–L5 level was selected for interlaminar injection, using fluoroscopic guidance. During injection, the patient developed severe pain in both lower extremities. Thus, the procedure was immediately terminated. Paraplegia occurred within several minutes. Urgent lumbar spine CT and MRI demonstrated contrast material in a massive extruded disk fragment and substantial increase in size of the disk extrusion compared to pre-injection MRI. Emergency surgery was performed for lumbar decompression and discectomy. Although rare, serious neurological complication can result from inadvertent intradiscal injection of contrast material during lumbar epidural injection. This case illustrates the importance of recognizing the possibility of dynamic change in the size of an extruded disk fragment when the MRI precedes injection by a substantial time interval.
Level of Evidence IV, Case Series.

Keywords Spinal injection steroids · Spinal nerve roots · Spinal cord compression · Intervertebral disk displacement

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Abbreviations

MRI	Magnetic resonance imaging
Cc	Cube centimeters
VAS	Visual analogue scale
CT	Computerized tomography

Introduction

Spinal infiltrations under radiological guidance are common pain management procedures using corticosteroids and local anesthetics. Particulate corticosteroids have been linked to catastrophic complications, including blindness, paralysis and death. We report for the first time a serious neurological complication resulting from inadvertent intradiscal injection during fluoroscopically guided interlaminar epidural steroid injection.

Material and Method

A 30-year-old patient had been referred to us due to a disabling right L5 radiculopathy with VAS estimated at 8/10. Two months prior to the procedure, MRI showed right paracentral L4–L5 disk extrusion causing subarticular zone stenosis and only mild central canal stenosis (Fig. 1). Clinically, the patient had no motor deficit or abnormal tendon reflexes. After failure of conservative treatment, epidural infiltration of corticosteroids was requested [1, 2]. Written informed consent was obtained. Our consent form

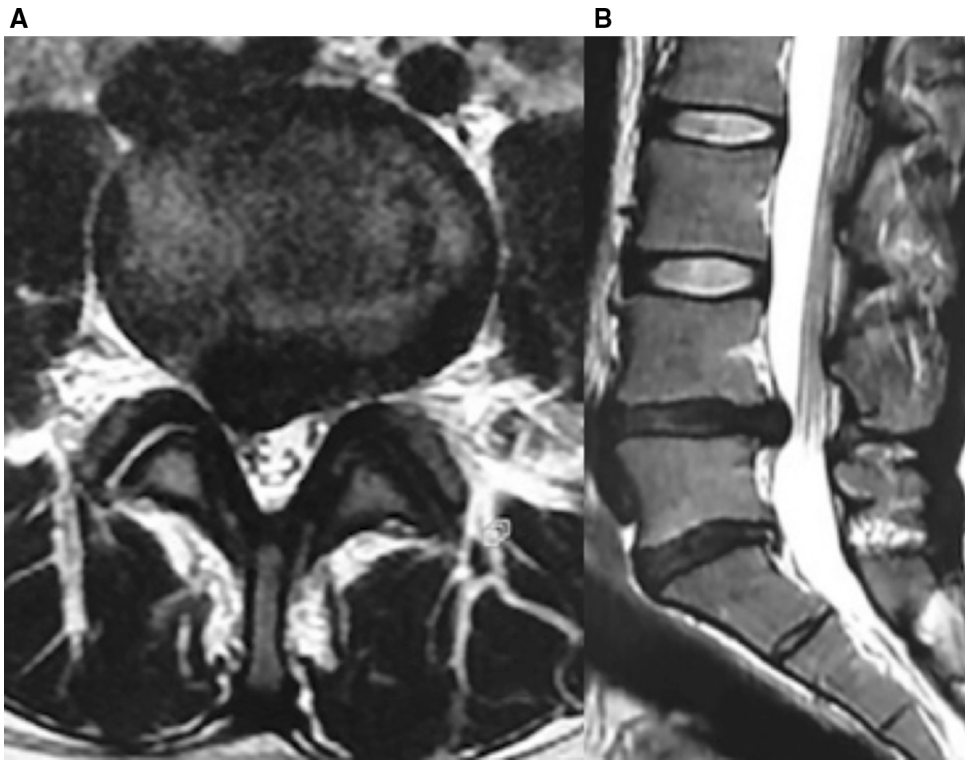

Fig. 1 Axial (**A**) and sagittal (**B**) Pre-infiltration imaging (MRI) dated 2 months before the infiltration showed an L4–L5 nonexcluded posterior disk herniation

includes the risk of paraplegia despite weak evidence in the literature [3].

The epidural injection was performed by a senior radiologist (20 years of interventional experience) in the outpatient section of our Interventional Radiology Department. The patient was positioned prone.

Using fluoroscopic guidance, sterile technique and local lidocaine anesthesia, a 22G needle was passed percutaneously from the right and positioned at the posterior aspect of the epidural space. Using loss of resistance technique, iodinated contrast material was injected to confirm the correct epidural location.

Results

From the early beginning of the iodine contrast injection, a violent pain appeared and radiated into the legs. The contrast injection was immediately stopped after 0.5 cc.

Lower extremity pain and paresthesia occurred within several seconds followed quickly by cauda equina syndrome and paraplegia.

No epidurogram was visualized after the injection. The control fluoroscopy seemed to show accumulated contrast in the mild spinal canal (Fig. 2). Immediate noncontrast CT scan demonstrated injected contrast material localized in a massive L4–L5 disk extrusion (Fig. 3). Urgent MRI showed severe canal stenosis due to massive disk extrusion

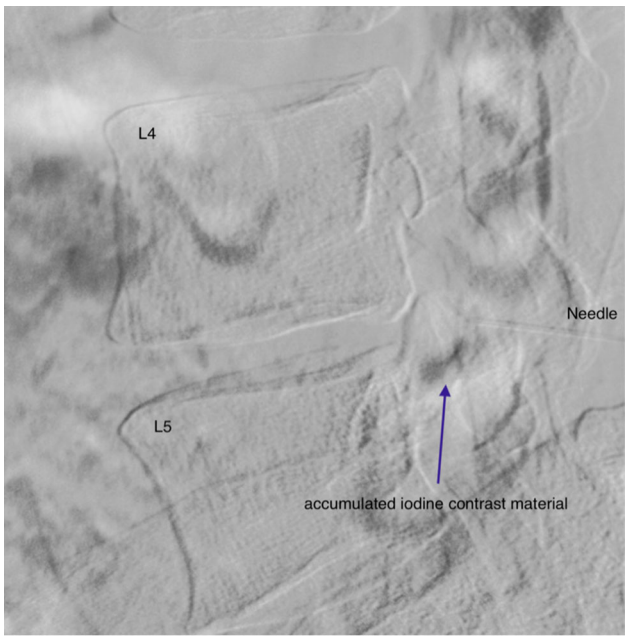

Fig. 2 Digitally subtracted fluoroscopic guidance control showing the 22G needle placed in the spinal canal through an interlamar path. Accumulated iodine contrast material can be seen in mild canal position near the needle tip, without any associated epidurogram

and excluded and formally dismissed other diagnostics such as epidural hematoma or cord infarct (Fig. 4A). Emergent surgical management was performed for decompression and extraction of the disk herniation. A

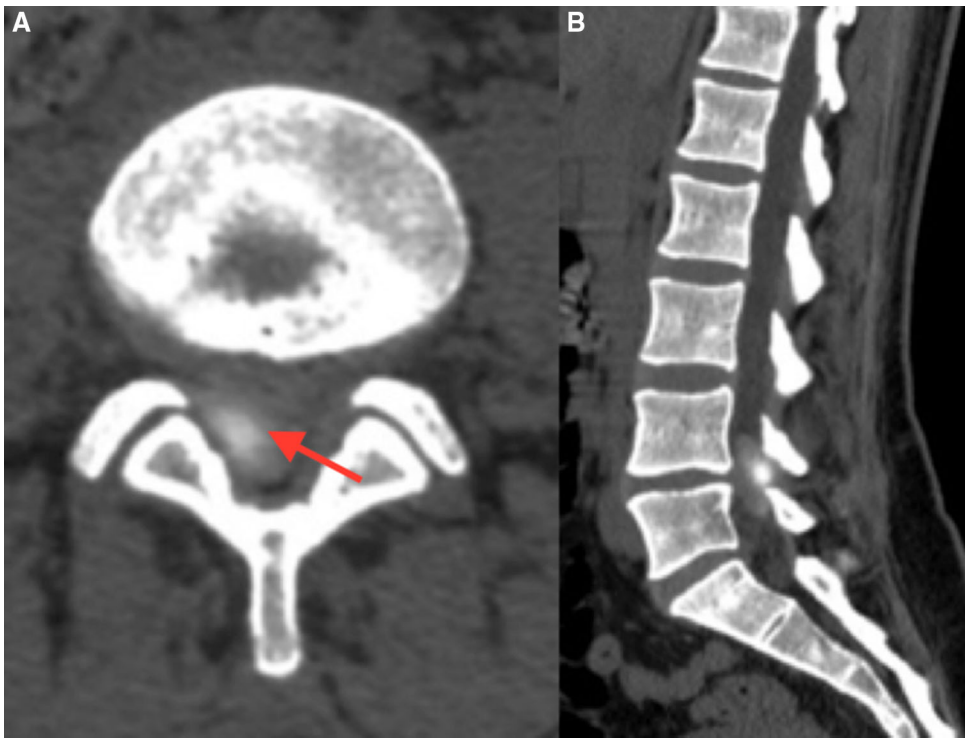

Fig. 3 Axial (**A**) and sagittal (**B**) CT showing opacification of the disk herniation corresponding to the iodinated contrast media injected during the infiltration

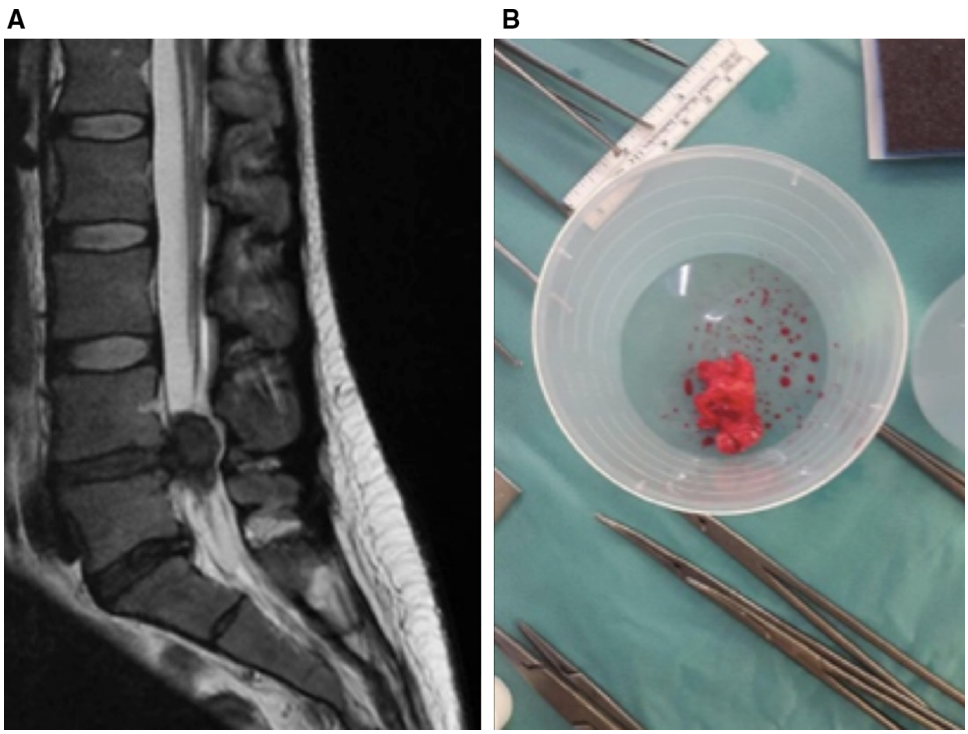

Fig. 4 T2 MRI after contrast media injection eliminating the diagnosis of intra-ductal hematoma or medullary ischemia (**A**) and macroscopic aspect of the large intra-ductal hernia excluded measuring 2 cm by 1 cm of major axis (**B**)

large discal fragment was resected, measuring 2 cm in greatest dimension (Fig. 4B).

The motor deficit and the paresthesia of the lower limbs remained present during the immediate postoperative period. Improvement was progressive until 1 month after surgery although a slight deficit persisted. Control imaging showed no abnormalities, neither hernia recurrence nor hematoma.

Discussion

Injection directly inside a herniated bag is a rare complication which must be known and seems probably underestimated. The case described has the peculiarity of being complicated by severe neurological disorders requiring emergency decompression surgery. Consequently, the infiltration under fluoroscopic guidance did not allow visualizing the herniated disk or avoiding the intra-hernial injection of contrast agent. This type of complication can hardly be prevented by injection with or without fluoroscopic control alone. The difference in resistance of the passage of the needle to the level of the muscular, ligamentary and then epidural structures is very delicate and not sensitive to the detection of a passage in the hernia. Also, the instantaneous appearance of clinical signs during the intra-hernial passage of contrast is difficult to be apprehended as the epidural injection may be painful in some patients.

Neurological decompensations linked to an iatrogenic increased hernia pressure is probably underestimated; « blind » injections without contrast can probably lead to a product passage into the hernia and cause an increased localized pressure leading to compression of the adjacent nerve roots.

How is it possible to avoid this complication? Initially, recent imaging would eliminate a large intra-ductal hernia. However, in our case, the imaging performed was up to date and could not predict a change in the morphology of the hernia. Current recommendations for recent imaging should be respected. The realization of infiltration under guidance with CT seems to us to be the best solution to avoid this pitfall. The scanner makes it possible to visualize a possible disk herniation excluded in the canal, but also to more precisely position the end of the needle at the level of the epidural fat. Moreover, the injection of contrast allows visualizing good diffusion and avoiding intra-hernial injection [4–11]. Neurological complications of epidural infiltrations remain rare, but should be known to any practitioner.

In the setting of critical spinal stenosis due to massive disk extrusion, lumbar epidural injection should be performed at a level above or below the extrusion to avoid intradiscal injection and serious neurological complication. The CT guidance offers better visibility of the anatomical structures and can reduce the accidents of intra-hernial injections.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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