



Case Report

# Cauda equina syndrome due to lumbar disc herniation and ossification of the yellow ligament

Masatoshi Yunoki, Michiari Umakoshi, Masaki Tatano, Ryoji Imoto

Department of Neurosurgery, Kagawa Rosai Hospital, Marugame City, Kagawa, Japan.

E-mail: \*Masatoshi Yunoki - yunomasato@me.com; Michiari Umakoshi - umakoshi1008@yahoo.co.jp; Masaki Tatano - tatamasafukurou@i.softbank.jp; Ryoji Imoto - mrmohy@gmail.com



**\*Corresponding author:**

Masatoshi Yunoki,  
Department of Neurosurgery,  
Kagawa Rosai Hospital,  
Marugame City, Kagawa, Japan.

[yunomasato@me.com](mailto:yunomasato@me.com)

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## ABSTRACT

**Background:** Patients with lumbar disc herniation at a level with significant stenosis due to ossification of the yellow ligament (OYL) may rarely present with rapid neurological deterioration warranting emergent surgery.

**Case Description:** A 40-year-old female developed an acute cauda equina syndrome (CES) attributed to an acute lumbar disc herniation and to marked canal stenosis due to OYL. As the patient underwent a 9 h delayed removal of the ossified ligament and discectomy, she sustained only minimal recovery.

**Conclusion:** Patients diagnosed with acute lumbar disc herniation and severe stenosis due to OYL who present with acute CES warrant emergent surgical decompression to avoid permanent postoperative neurological sequelae.

**Keywords:** Cauda equina syndrome, Lumbar disc herniation, Ossification of the yellow ligament

## INTRODUCTION

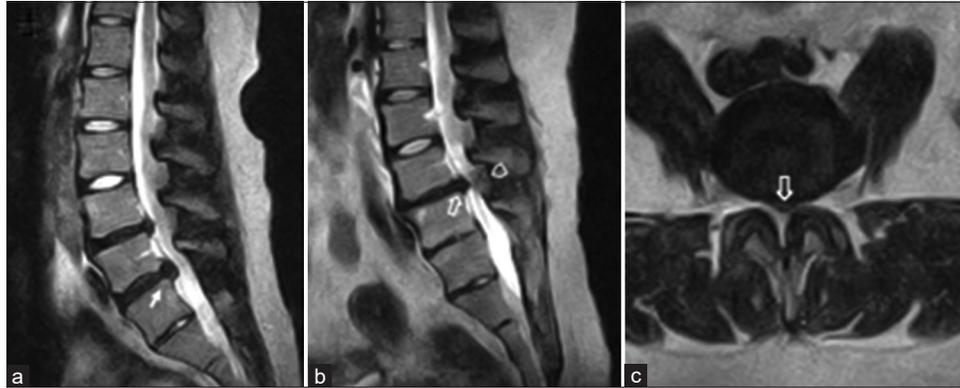
Patients with significant lumbar stenosis due to ossification of the yellow ligament (OYL) and an acute lumbar disc herniation may acutely develop new neurological deficits.<sup>[2]</sup> Here, a 40-year-old female presented to an emergency room with the sudden onset of paraparesis/cauda equina syndrome (CES) due to MR/computed tomography (CT) documented both L4-L5 marked stenosis/OYL and an acute central lumbar disc herniation. Unfortunately, her surgery was delayed by 9 h, at which point she was paraplegic, and she never significantly recovered.

## CASE PRESENTATION

Fifteen years ago, this now 40-year-old female had undergone a L5S1 discectomy [Figure 1a]. Ten months before this admission, due to complaints of low back pain and left leg numbness, she had undergone a lumbar MR; it documented significant cauda equina compression at the L4-L5 level due to a large central disc herniation and marked stenosis/OYL (i.e., isointense on T2-weighted sequences) [Figures 1b and c]. She now acutely presented to an emergency room with the sudden onset (i.e., over several hours) of 4/5 weakness in both lower extremities, bilateral leg numbness, and urinary retention.

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**Figure 1:** Mid-sagittal T2-weighted magnetic resonance imaging (MRI) 15 years before admission showed an L5/S1 disc herniation (on of the Yellow Ligament, or longitudinal) (a). Mid-sagittal and axial T2-weighted MRI 10 months before admission demonstrated cauda equina compression at L4/5 caused by a hypointense anterior central disc herniation ( $\hat{u}$ ) and a posterior isointense lesion ( $\square$ ) (b and c).

### MR findings

The new magnetic resonance imaging (MRI) and CT both demonstrated worsening of her L4-L5 cauda equina compression due to the large central disc herniation and severe stenosis/OYL; the CT further confirmed ossification of the OYL [Figures 2a-d].

### Delayed surgery

Notably, the patient should have undergone emergent surgery following the completion of the MR/CT studies. However, surgery was delayed for 9 h by which time she was fully paraplegic (0/5 motor function, L4-S1 loss of sensation, and urinary retention (JOA 2/29)).

Following a L4-L5 laminectomy for stenosis, OYL, and a partial central discectomy (i.e., not completely removed because of its central location), the patient never fully recovered; she had just 1/5 motor function bilaterally (i.e., residual loss perineal sensation and urinary incontinence – final JOA score 9/29) 1 month later. Of interest, the postoperative MR and CT studies, despite showing mild residual ventral disc, confirmed adequate cauda equina decompression [Figures 3a-d].

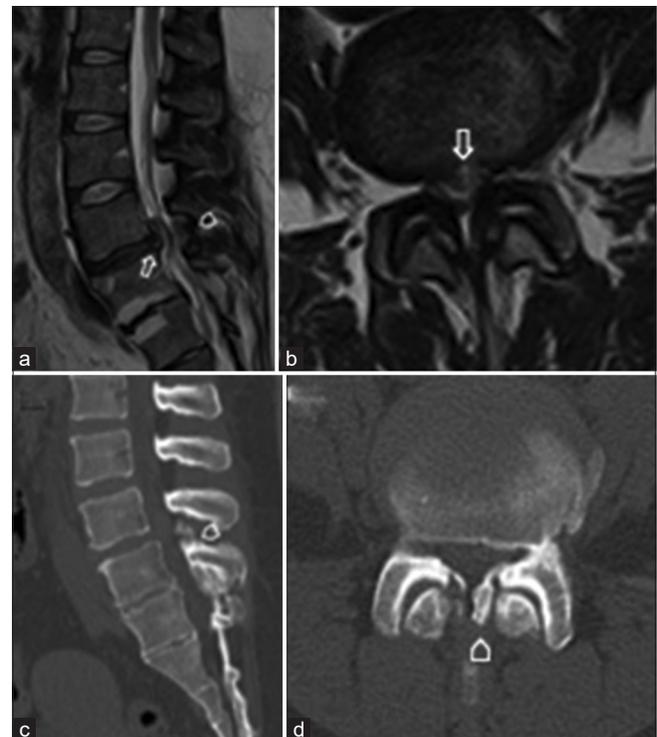
## DISCUSSION

### Lumbar OYL with acute disc herniation

Significant lumbar stenosis attributed to preexisting OYL may be acutely exacerbated by the development of an acute lumbar disc herniation; together, these factors may result in a rapidly progressive CES.<sup>[4]</sup>

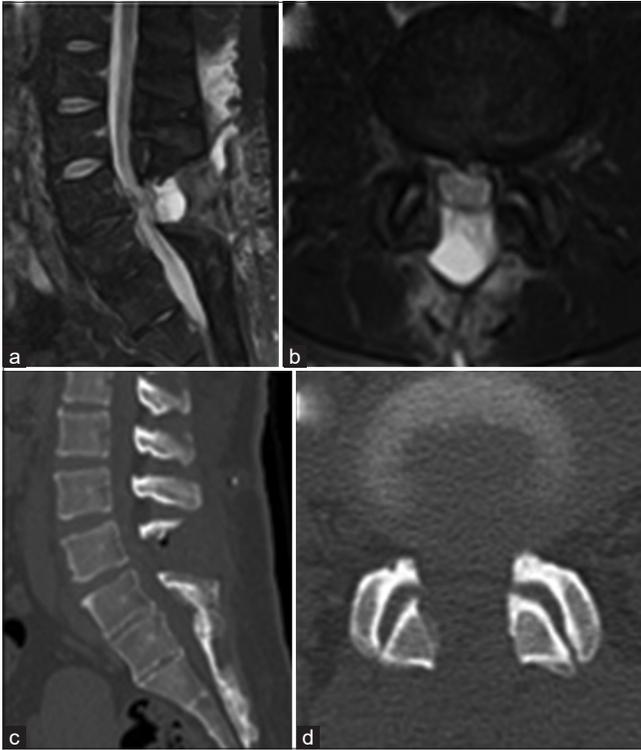
### Treatment of lumbar CES due to lumbar stenosis/disk disease

Many surgeons find that CES typically warrants acute lumbar decompressive surgery, while others advocate operating within 48 h of its onset.<sup>[1,3,4]</sup>



**Figure 2:** Mid-sagittal and axial T2-weighted magnetic resonance imaging after hospital admission demonstrated cauda equina compression caused by progression of the L4/5 disc herniation ( $\hat{u}$ ) (a and b). Mid-sagittal and axial computed tomography (CT) revealed ossification of the yellow ligament at the L4/5 level ( $\square$ ) (c and d).

Here, our patient unfortunately underwent delayed surgery, 9 h after presenting to an emergency room with an evolving paraparetic deficit and MR/CT documentation of an L4-L5 CES; this undue delay resulted in only a very limited recovery. Here, therefore, the authors concluded that in the future, early surgery for CES (e.g., in this case attributed to an acute L4-L5 disc and stenosis/OYL) is critical to avoid postoperative residual neurological sequelae.



**Figure 3:** Postoperative mid-sagittal and axial T2-weighted magnetic resonance imaging confirmed cauda equina decompression (a and b). Mid-sagittal and axial computed tomography confirmed complete removal of the ossified yellow ligament (c and d).

## CONCLUSION

A 40-year-old female with marked L4/5 lumbar stenosis/OYL due to a large ventral central disc herniation developed an acute CES. However, surgery was delayed 9 h following her original presentation to an emergency room, and this

failure resulted in her significant permanent residual CES/paraparesis.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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