

Symptomatic Postoperative Spinal Subdural Hematoma Following Posterior Lumbar Spinous Process-Splitting Decompression Surgery for Lumbar Spinal Canal Stenosis: A Case Report

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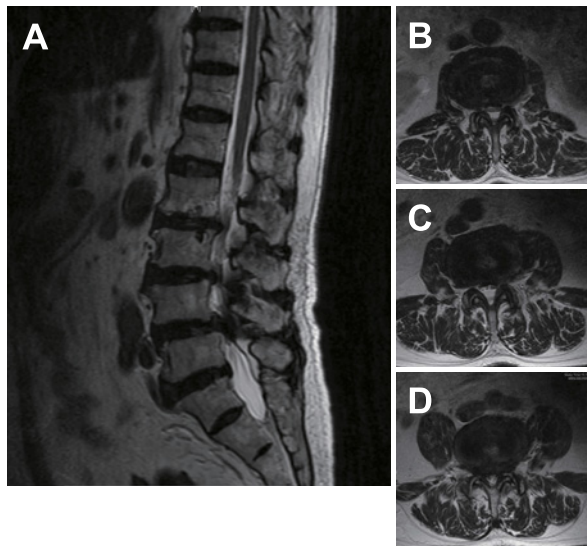
Posterior lumbar spinous process-splitting decompression surgery for lumbar spinal canal stenosis (LSS) is a well-established procedure with a relatively low risk of complications¹⁾. However, serious complications, such as surgical site infections and symptomatic postoperative spinal epidural hematomas, occasionally occur and require prolonged hospitalization or surgical intervention^{2,3)}. Among the serious complications, symptomatic postoperative spinal subdural hematoma (PSSH) following lumbar surgery is extremely rare. We present the case of a patient with symptomatic PSSH following posterior lumbar spinous process-splitting decompression surgery for LSS.

A 79-year-old man diagnosed with LSS consulted our hospital for surgery. The patient presented with low back pain, bilateral leg pain, and intermittent claudication. He had been treated for lung cancer but had no other medical history. His blood test results, including APTT, PT, and platelet count, were normal. Lumbar magnetic resonance imaging (MRI) showed LSS at L2/3, 3/4, and 4/5 (Fig. 1). We performed posterior lumbar spinous process-splitting decompression surgery at the L2-5 level. The operative time was 83 min, and there was no considerable blood loss as well as no unusual events during the surgery. The postoperative epidural suction drain was removed on the second postoperative day, after which his neurological symptoms improved. However, on the fifth postoperative day, his severe right leg pain recurred. Postoperative lumbar MRI showed no disk herniation or spinal epidural hematoma, but the presence of mild PSSH (Fig. 1). The patient's condition, in-

cluding the Numerical Rating Scale score of right leg pain, was monitored, but severe pain persisted (Fig. 2). On the 14th postoperative day, revision surgery was performed to confirm the diagnosis. Intraoperative findings showed no disk herniation, epidural hematoma, or nerve incarceration, but a subdural hematoma was observed (Fig. 3A); however, it did not show strong compression to the dura mater or nerve roots. An incision of the dura mater released yellow serous fluid (Fig. 3B). The arachnoid was intact (Fig. 3C). His symptoms dramatically improved, and his Numerical Rating Scale score of pain was 2 at discharge (Fig. 2). At postoperative 1 year, the patient continues to have no complaints of symptoms.

Our literature review found eight cases of symptomatic acute to subacute PSSH that occurred after posterior lumbar surgery⁴⁻⁹⁾ (Table 1). Unintentional dural tear during surgery was reported to be involved in symptomatic PSSH^{4,5)}; however, no intraoperative dural tears were observed in our case. We speculate that surgery-related traumatic manipulation on the dura mater may have damaged the subdural vascular structures and caused the hematoma^{5,6,8,9)}. Gehri et al. first reported that in PSSH, lumbar axial MRI shows semilunar fluid collection under the dura mater⁴⁾. Unlike postoperative spinal epidural hematomas, PSSH does not clearly show compression of the cauda equina or nerve root on MRI; therefore, the cause of neurological symptoms is unknown. Considering the rapid improvement of symptoms after removal of the hematoma in our case, the biochemical mediators included in the hematoma may have caused the neuro-

Preoperative lumbar spine T2-weighted MRI



Postoperative lumbar spine T2-weighted MRI

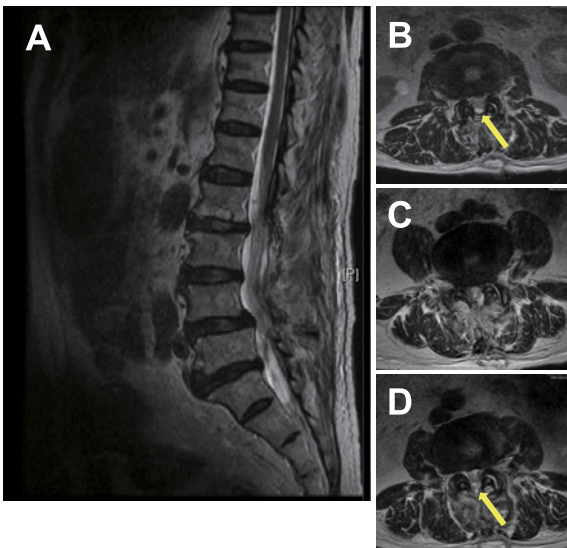


Figure 1. Pre- (top) and postoperative (bottom) lumbar spine T2-weighted magnetic resonance imaging on sagittal view (A) and axial view at L2/3 (B), L3/4 (C), and L4/5 (D). Yellow arrows suggest a subdural hematoma.

logical symptoms¹⁰). Both conservative and surgical successful treatments for symptomatic PSSH have been reported⁴⁻⁹). In our case, the patient's postoperative symptoms, including leg pain, did not improve after 1 week of observation; however, drainage through a dural incision was effective. Therefore, hematoma evacuation should be considered in patients with symptomatic PSSH for whom conservative therapy does not relieve the neurological symptoms. Although symptomatic PSSH is much less common than postoperative spinal epidural hematoma or surgical site infection, it should be considered as a possible complication of posterior lumbar spinous process-splitting decompression surgery for LSS.

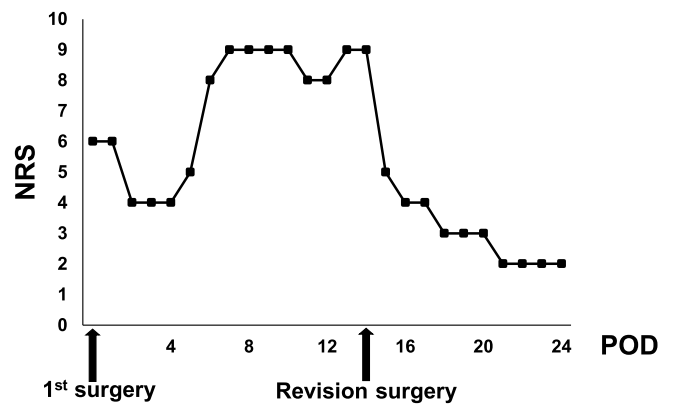


Figure 2. Postoperative Numerical Rating Scale scores of pain. The horizontal axis indicates postoperative day (POD).

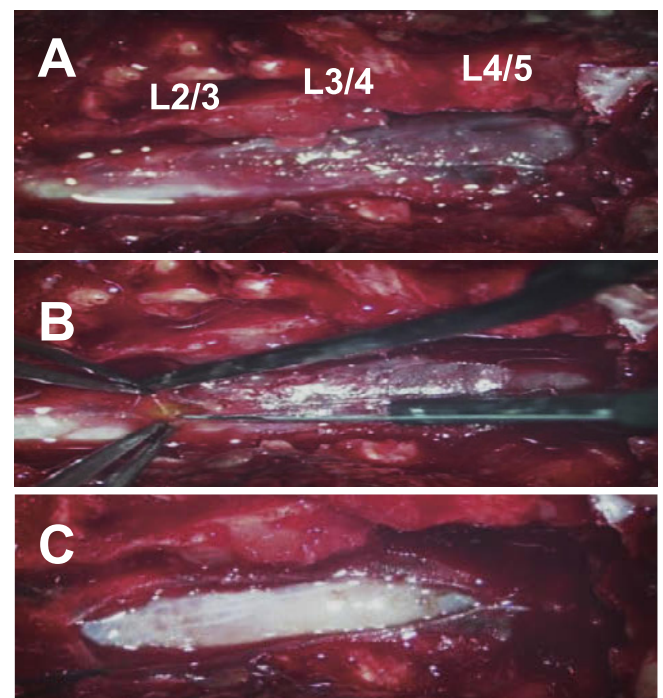


Figure 3. Intraoperative findings of the second surgery. Pre- (A), intra- (B), and post- (C) incision of the dura mater.

Conflicts of Interest: The authors declare that there are no relevant conflicts of interest.

Ethical Approval: This study was approved by the Keio University Hospital Ethics Committee (approval number, 20110141).

Author Contributions: Conception and design: Nobuyuki Fujita, Kota Watanabe.

Acquisition of data: Keitaro Ito.

Interpretation of data: Satoshi Nori, Satoshi Suzuki, Osahiko Tsuji, Narihito Nagoshi, Eijiro Okada, Mitsuru Yagi, Kota Watanabe, Masaya Nakamura, Morio Matsumoto.

Study supervision: Kota Watanabe, Masaya Nakamura,

Table 1. Previously Reported Cases of Symptomatic Postoperative Spinal Subdural Hematoma.

	Age	Sex	Disease	Level	Surgery	Dural tear	Occurrence sites	Treatment	Number of PODs of revision surgery	Intraoperative characteristics of PSSH	Outcome	Reference
1	77	M	LDH	L5/S1	Discectomy	+	Dorsal	Surgery	Unknown	Xanthochromic fluid + clots	Partial recovery	4
2	68	M	LSS	L3-S1	PLIF	-	Dorsal	Conservative therapy			Complete recovery	5
3	63	M	LDH	L3/4	Discectomy	+	Dorsal + ventral	Surgery	3 days	Unknown	Complete recovery	5
4	59	M	LSS	L3-S1	PLIF	-	Dorsal	Surgery	6 days	Xanthochromic fluid	Partial recovery	6
5	48	M	DS	L4/5	PLIF	Unclear	Dorsal	Conservative therapy			Complete recovery	7
6	76	M	SS	L5	PLIF	Unclear	Dorsal	Conservative therapy			Complete recovery	7
7	76	M	SS	L5/S1	PLIF	-	Dorsal	Conservative therapy			Complete recovery	8
8	76	M	LSS	L3-5	Laminectomy	-	Dorsal	Surgery	Unknown	Xanthochromic fluid	Complete recovery	9

LDH, lumbar disc herniation; DS, degenerative spondylolisthesis; SS, spondylolytic spondylolisthesis; LSS, lumbar spinal canal stenosis; PLIF, posterior lumbar interbody fusion; PODs, postoperative days; PSSH, postoperative spinal subdural hematoma

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The final version of the manuscript was approved by all the authors.

Informed Consent: Informed consent was obtained by a participant in this study.

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