The Cervical Sequestrated Disc Fragment Presenting as Mass Lesion: Case Report and Review of the Literature

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Abstract

Background & Importance: Disc herniation is defined as the prolapsed of material disc into the spinal canal. If the disc fragment is free in spinal canal, it is called sequestration disc fragment. Occasionally, alteration in sequestration disc fragment makes the diagnosis of the disc herniation, challenging.

Case Presentation: We reviewed a rare case of the cervical sequestrated disc herniation mimicking a spinal canal extradural abscess. The 55-year-old man presented cervical axial and radicular pain. Cervical spine MRI showed an extra-axial longitudinal mass behind C5 and C6 vertebral body association with anterior compression on cord. In T2 images of lesion, the signal intensity varied from isointense to hyperintense and marked peripheral enhancement with GD injection. After unilateral right C6 hemilaminectomy, a sequestrated disc fragment was resected from epidural space.

Conclusion: The histopathologic findings were in favor of sequestrated disc herniation. Although MRI is the main preoperative diagnostic tool for accurate diagnosis of the sequestrated disc herniation, the sequestrated disc fragment can show the variable features on MRI and can be misdiagnosed with the other space-occupying lesions.

Keywords: Cervical Disc Herniation; Sequestrated Disc Fragment; Mass Lesion

Case Presentation

A 55-year-old man was admitted with cervical axial and radicular pain in the right C6 root from 6 months ago. Physical examination showed mild weakness in the right distal muscles force, hypoesthesia in the right C6 root and generalized hyper-reflexia. The cervical spine MRI showed an extra-axial longitudinal mass behind C5 and C6 vertebral body association with anterior compression on cord. It was isointense to hyperintense on T2 and showed marked peripheral enhancement after GD injection (Figure 1). The cell blood Count (CBC), ESR and CRP were reported normal. Medical and conservative treatment failed and patient was candidate for surgical resection. The differential diagnoses included abscess, spinal canal extra-dural tumor and metastasis. The posterior approach with unilateral right C6 hemilaminectomy was done. Under surgical magnification, a sequestrated disc fragment was resected from epidural space. There was no evidence of pus or infectious process and no tumoral mass. The post-operative MRI showed no residual fragment (Figure 2). The patient muscle force improved gradually but the pain and hypoesthesia relief after surgery.

Discussion

The sequestration disc herniation occurs in rare cases and can migrate to rostral, caudal and lateral direction (1). Although MRI
is the best diagnostic tool in the cases of disc herniation, in some cases of the sequestrated disc fragment, the diagnosis can be confused with other pathologies and other occupying, mass lesion and only surgery can lead to the exact diagnosis (3-5,6,7). The differential diagnosis includes abscess and infections, benign and malignant neoplasm, metastasis as well as cyst.

In the present study, we reported a 55 year-old man, suffering from radicular pain and mild weakness. The MRI showed a mass lesion, located in the epidural space of the posterior of C6 and C7 vertebral body and intervertebral space, longitudinally. The lesion was iso-signal intensity on T2 image sequence and marked peripheral enhancement on GD injection image sequence. Our primary diagnosis was epidural abscess because of the significant mass lesion, presence of mass without relation to intervertebral disc material and MRI findings. The differential diagnosis included abscess, metastasis, and other neoplasm and sequestrated disc herniation. During surgery, we observed a fibrosis disc fragment that was free in the epidural space without any relation to the intervertebral disc material and also there was no evidence of abscess or neoplasm. The histological findings were in favor of the sequestrated disc fragment. This situation is rare and only few studies reported similar finding.

Srinivasan et al. suggested that nontraumatic sequestrated disc fragment migrating to the epidural space is a rare disease and found only 10 cases in the literatures (1).

Nievias and Hoellerhage analyzed 3000 patients and demonstrated that only 11 patients presented an unusual sequestrated disc fragment. The differential diagnosis in their patients included abscess, hematoma, synovial cyst, and various neoplasms. In only one of the 11 patients, the disease occurred in the cervical region and the others presented in dorsal and lumbar region. They reported a 72 year-old man with a mass in intradural space compressing the cord at the level of C6-C7. The lesion was hypersignal on T2-weighted images and showed peripheral enhancement after GD injection. The initial diagnosis was teratoma and an old capsulated hematoma (8).

Rosenberg reported two cases of the cervical disc herniation, presented as an epidural mass in the posterior of the odontoid process. The initial symptom in his report was extradural mass lesion (9).

Stavrinou et al. reported a case of cervical disc herniation that was misinterpreted with the nerve sheath tumor. Their patient refused surgery, but within seven weeks, her symptoms improved and the mass lesion vanished on MRI. The final diagnosis was the cervical disc herniation (6). Ashizawa reported a case of calcified sequestrated disc herniation at C4-C5 level. MRI demonstrated a large extradural mass compressing the spinal cord and had slightly high intensity on both T1- and T2-weighted images. A low intensity rim at the periphery of the mass on axial T1-weighted is seen in the images (10).

Another study performed by Tofuku and colleagues reported a case with the oval mass lesion in the epidural space at the level of C7. The lesion was iso-signal on T1-weighted images and hypersignal on T2-weighted images and peripheral enhancement on T1-weighted images with GD injection (11).

Joaquim et al. reported a 66-year-old man presented with a well defined mass, compressing the dural sac at the level of C7. The lesion was isointense on T1-weighted images and heterogeneously hyperintense on T2-weighted and showed peripheral enhancement after GD injection. A diagnosis of extramedullary lesion was done. As a result, the differential diagnosis included epidural hematoma, epidural abscess, synovial cysts, epidermoid cysts, and extradural tumor (12).

**Review of Literature**

After search for the sequestrated disc fragment mimicking extradural tumor and its synonyms, we found 51 English articles related to this issue. These articles reported 88 cases of the sequestrated disc fragment mimicking other pathologies. In 22 cases, the sequestrated disc fragment mimicked other pathologies, but excluded because the sequestrated disc fragment was the initial preoperative diagnosis. Two cases were excluded due to the sequestrated disc fragment as the initial diagnosis, but final diagnoses were epidural abscess and hematoma (13,14). Three cases were excluded for the absence of enough data and also nine patients because of the sequestrated disc fragment migrated to intradural space. We surveyed other 52 patients as well, 37 cases were male and 15 female. The mean age was 53±90 with a range of 28 to 83 years old. From a total of 52 patients, sequestrated disc fragment occurred in lumbosacral, dorsal and cervical region, in 40, 6 and 6 patients, respectively. The sequestrated disc fragment migrated to anterior, lateral, anterolateral, posterior and
postrolateral direction in 6, 3, 1, 22 and 19 patients, respectively. In one patient, the location of sequestered disc fragment was unclear. The diagnostic survey was CT scan in three patients and MRI in other 49 patients. The T1-weighted images showed sequestered disc fragment hypo, iso, hyper and iso-to-hyper signal intensity in 13, 7, 3 and 1 patients, respectively. The sequestered disc fragment was hypo, iso, hyper, iso-to-hyper and heterogeneous signal intensity on the T2-weighted images in 10, 1, 16, 1 and 3 patients, respectively. After GD injection, the lesion demonstrated the peripheral rim enhancement in 30 patients, heterogeneous enhancement in one patient and diffuse enhancement in one patient. In one patient, the lesion showed no enhancement and in one patient, MRI was done with no injection due to renal problems. The lesion of two patients, revealed enhancement but no more information were reported. Finally, the initial preoperative diagnosis was nerve sheath tumor in 1, dumbbell shape tumor in 1, facet cyst in 1, metastasis in 1, cystic tumor in 4 and synovial cyst in 3 patients. The other 41 patients, the initial diagnosis was epidural mass lesion (the differential diagnosis included abscess, hematoma, extradural benign and malignant neoplasm). Table 1 summarizes the most important data of these 53 patients.

Conclusion
Preoperatively, MRI is the outstanding diagnostic tool for accurate diagnosis of the sequestrated disc herniation which shows varying features on MRI and can make diagnoses very difficult. It is sometimes misdiagnosed with similar space-occupying lesions. In a case with peripheral enhanced mass lesion in the epidural space, the diagnosis of a sequestrated disc fragment should be considered in the differential diagnosis.

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Figure 2. Postoperative MRI Demonstrating no Residual Mass: A) Sagittal View and B) Axial View.

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Conflicts of Interest
The authors declare that they have no conflicts of interest.

Authors’ Contribution
Data collection: Ali Babashahi. Morteza Taheri. Drafting the article: Morteza Taheri.
### Table 1. The Most Important Features of the Reported Cases

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<tr>
<th>Study</th>
<th>Age</th>
<th>Sex</th>
<th>Level</th>
<th>Migration</th>
<th>Location</th>
<th>T1</th>
<th>T2</th>
<th>GD Injection</th>
<th>Initial Diagnosis</th>
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<tr>
<td>Rosenberg, et al 1991(9)</td>
<td>74</td>
<td>F</td>
<td>C2</td>
<td>Anterior</td>
<td>Extradural</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Neoplasm</td>
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<tr>
<td>Rosenberg, et al 1991(9)</td>
<td>82</td>
<td>F</td>
<td>C2</td>
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<td>-</td>
<td>-</td>
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<td>Neoplasm</td>
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<tr>
<td>Ashizawa, et al(10)</td>
<td>57</td>
<td>M</td>
<td>C4-5</td>
<td>Anterior</td>
<td>Extradural</td>
<td>Hyper</td>
<td>Hyper</td>
<td>Marked Heterogeneous Enhancement</td>
<td>Nerve Sheath Tumor</td>
</tr>
<tr>
<td>Stavrinou, et al 2009(6)</td>
<td>46</td>
<td>F</td>
<td>C5-6</td>
<td>Anterior</td>
<td>Extradural</td>
<td>Hypo</td>
<td>-</td>
<td>Peripheral Enhancement</td>
<td>Epidural Hematoma, Epidural Abscess, Synovial Cysts, Epidermoid Cysts, and Extradural Tumor</td>
</tr>
<tr>
<td>Tofuku, et al 2007(11)</td>
<td>72</td>
<td>M</td>
<td>C7</td>
<td>Postrolateral</td>
<td>Extradural</td>
<td>Iso</td>
<td>Hyper (Heterogeneous)</td>
<td>Peripheral Enhancement</td>
<td>Extramedullary Lesion (Epidural Hematoma, Epidural Abscess, Synovial Cysts, Epidermoid Cysts, and Extradural Tumor)</td>
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<td>Joaquim, et al 2010(12)</td>
<td>66</td>
<td>M</td>
<td>C7</td>
<td>Posterior</td>
<td>Extradural</td>
<td>Iso</td>
<td>Hyper (Heterogeneous)</td>
<td>Peripheral Contrast Enhancement</td>
<td>Mass Lesion</td>
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<tr>
<td>Bose, et al 2003(20)</td>
<td>54</td>
<td>M</td>
<td>T11-12</td>
<td>Anterior</td>
<td>Extradural</td>
<td>Hypo</td>
<td>Hyper (Heterogeneous)</td>
<td>Peripheral Enhancement</td>
<td>Mass Lesion</td>
</tr>
<tr>
<td>Derincek, et al 2009(3)</td>
<td>60</td>
<td>F</td>
<td>L1-2</td>
<td>Posterolateral</td>
<td>Extradural</td>
<td>Iso</td>
<td>Hyper</td>
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<td>Dimogerontas, et al 2012(4)</td>
<td>56</td>
<td>M</td>
<td>L1-4</td>
<td>Lateral</td>
<td>Extradural</td>
<td>Iso</td>
<td>Hyper</td>
<td>Peripheral Rim Enhancement</td>
<td>Tumor-like Lesion</td>
</tr>
<tr>
<td>Yoo, et al 2015(22)</td>
<td>32</td>
<td>M</td>
<td>L2-3</td>
<td>Posterior</td>
<td>Extradural</td>
<td>-</td>
<td>Hypo (Heterogeneous)</td>
<td>-</td>
<td>Intraspinal Facet Cyst</td>
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<tr>
<td>Gonçalves, et al 2010(23)</td>
<td>51</td>
<td>M</td>
<td>L2-3</td>
<td>Posterolateral</td>
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<td>Hypo</td>
<td>Hyper</td>
<td>No Injected</td>
<td>Epidural Hematoma, Epidural Empyema, Nerve Sheath Tumor and Meningioma and Posterior Disc Migration</td>
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<td>Lichtor 1989(24)</td>
<td>61</td>
<td>M</td>
<td>L2-3</td>
<td>Posterior</td>
<td>Extradural</td>
<td>Iso</td>
<td>-</td>
<td>-</td>
<td>Epidural Mass</td>
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## Cervical Disc Fragment, Presenting as Mass Lesion

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<tr>
<th>Study</th>
<th>Age</th>
<th>Sex</th>
<th>Level</th>
<th>Migration</th>
<th>Location</th>
<th>T1</th>
<th>T2</th>
<th>GD Injection</th>
<th>Initial Diagnosis</th>
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<tr>
<td>Akhaddar, et al 2011(26)</td>
<td>60</td>
<td>F</td>
<td>L2-3</td>
<td>-</td>
<td>Extradural</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Epidural Abscess or Neoplasm</td>
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<tr>
<td>Rahimizadeh, et al 2013(27)</td>
<td>53</td>
<td>M</td>
<td>L3-4</td>
<td>Posterior</td>
<td>Extradural</td>
<td>Iso</td>
<td>Hetro</td>
<td>-</td>
<td>Ligamentum Flavum or Synovial Cyst</td>
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<tr>
<td>Dosoglu, et al 2001(28)</td>
<td>47</td>
<td>M</td>
<td>L3-4</td>
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<td>Iso</td>
<td>Hyper</td>
<td>-</td>
<td>Mass Lesion</td>
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<tr>
<td>Kim, et al 2003(29)</td>
<td>60</td>
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<td>L3-4</td>
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<td>Hypo</td>
<td>-</td>
<td>Slight Ring Enhancement Mass Lesion</td>
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<td>41</td>
<td>M</td>
<td>L3-4</td>
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<td>Hypo</td>
<td>-</td>
<td>Peripheral Rim Enhancement Tumor or Old Hematoma</td>
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<td>Robe, et al 1999(33)</td>
<td>68</td>
<td>M</td>
<td>L3-4</td>
<td>Posterior</td>
<td>Extradural</td>
<td>Hypo</td>
<td>-</td>
<td>Peripheral Rim Enhancement Cystic Tumor</td>
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<tr>
<td>Senel, et al 2003(36)</td>
<td>44</td>
<td>M</td>
<td>L3-4</td>
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<td>-</td>
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<td>45</td>
<td>M</td>
<td>L4-5</td>
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<td>Hypo</td>
<td>-</td>
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<td>Teufack, et al 2010(37)</td>
<td>49</td>
<td>M</td>
<td>L4-5</td>
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<td>Extradural</td>
<td>Hyper- (Heterogeneous)</td>
<td>Isointense to Hyper-intense</td>
<td>Rim of Enhancement Epidural Abscess</td>
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<td>Biasi, et al 2013(5)</td>
<td>60</td>
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<td>L4-5</td>
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<td>Hyper</td>
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<td>Emamian, et al 1993(38)</td>
<td>49</td>
<td>F</td>
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<td>F</td>
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<td>Extradural</td>
<td>-</td>
<td>-</td>
<td>Peripheral Rim Enhancement</td>
<td>Tumor or Old Hematoma</td>
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<tr>
<td>Lakshmanan, et al 2006(40)</td>
<td>58</td>
<td>M</td>
<td>L4-5</td>
<td>Posterior</td>
<td>Extradural</td>
<td>-</td>
<td>-</td>
<td>Peripheral Rim Enhancement</td>
<td>Cystic Tumor</td>
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<tr>
<td>Lakshmanan, et al 2006(40)</td>
<td>28</td>
<td>F</td>
<td>L4-5</td>
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<td>Extradural</td>
<td>-</td>
<td>-</td>
<td>Peripheral Rim Enhancement</td>
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<tr>
<td>Peng, et al 2013(7)</td>
<td>49</td>
<td>M</td>
<td>L4-S1</td>
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<td>Hyper</td>
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<td>-</td>
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<td>60</td>
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<td>Hyper</td>
<td>-</td>
<td>-</td>
<td>Epidural Metastasis</td>
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