Immunoglobulin G4-Related Disease Masquerading an Epidural Spinal Cord Tumor

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Abstract

Introduction

Immunoglobulin G4-related disease (IgG4-RD) is a recently identified multisystemic fibroinflammatory condition of unclear etiology.1,2 It usually involves the pancreas, hepatobiliary tract, lungs, salivary gland, orbit, and lymph nodes.1,3-5 Spinal epidural tissue involvement is extremely rare.1,3-6 This report aims to present a rare case occurrence of IgG4-related epidural inflammatory pseudotumor (IPT), causing compression on the spinal cord in a young male with a relevant literature review.

Case Description

A 27-year-old male with an 8-day history of back pain and progressive numbness and weakness in both lower limbs was admitted without any previous traumatic spinal injury. The patient denied fever or fecal and urine incontinence. The vital signs were normal, and the patient was fully awake. Neurological evaluation revealed paraparesis (Grade ⅗ Medical Research Council) and bilateral leg hypesthesia. Bilaterally, there was an acceleration of knee and ankle reflexes and positive Babinski signs.

All laboratory investigations were within normal limits, as were the findings on chest radiography. Cervicothoracic magnetic resonance imaging (MRI) demonstrated a posterior, expansile, epidural mass from D5 to D6, causing spinal cord compression. The mass displayed isointensity in the T1-weighted sequence (►Fig. 1A), heterogeneous hyperintensity in the T2-weighted sequence (►Fig. 1B), and homogeneous enhancement in postcontrast T1-weighted sequence (►Fig. 1C). No bone marrow abnormality in the vertebrae.
adjacent bony destruction, or bony sclerosis was seen on MRI. The whole-body positron emission tomography scan revealed no signs of malignancy or abnormality in the spleen, liver, pancreas, adrenal, or salivary glands. The differential diagnosis entertained was spinal epidural tumors, such as lymphoma, plasmacytoma, or metastases.

The patient underwent a decompressive laminectomy of the D5–D6 vertebrae with excision of the compressive mass lesion. The mass was hard, grayish-white, located inside the epidural space below the ligamentum flavum, and attached to the thecal sac at its midlevel. After removing the mass, we sutured the dural defect using a fascial flap. A diagnosis of epidural IPT related to IgG4 was obtained by histopathology (Fig. 2). The resected mass revealed abundant lymphoplasmacytic infiltrates and radiating collagen fibrosis with no evidence of neoplastic cells. The results of mycobacterial and fungal staining and cultures were all negative. The lymphoma panel was negative. Several IgG4 positive plasma cells, greater than 50/high power field, IgG4+/IgG+ plasma cell percentage >50%, were found in the IgG4 immunohistochemistry analysis. Elastic staining revealed obliteratorive phlebitis. The patient’s serum IgG4 level (0.70 g/L) was within normal limits. The patient was started on steroid treatment and reported a complete resolution of his symptoms over a 3 years’ follow-up period.

Discussion

IgG4-RD is a rare, potentially underdiagnosed cause of pseudotumor-like lesions. The condition is defined by fibrosis induced by IgG4+ plasma cells, which may ultimately contribute to end-organ failure. IgG4-RD manifests predominately in the pituitary gland, brain parenchyma, meninges, peripheral nerves, and rarely less often epidural tissue in the central nervous system.

IgG4-related epidural IPT may present with varied symptoms depending upon how severe the compression is and on the segment of the spinal cord affected. In the case discussed here, the patient stated back pain that eventually led to paraparesis and bilateral leg hypoesthesia.

IgG4-related epidural IPT is often challenging to diagnose because clinical data and imaging are usually
nonspecific. It often appears as a well-enhanced extradu-
ral mass on computed tomography or MRI that does not
point to a specific diagnosis. 1 , 3 -6  Therefore, the diagnosis of
IgG4-RD is based primarily on the pathological evaluation
of the surgical specimen. 1 -6  The key pathological features
recognized in IgG4 lesions are lymphoplasmacytic infil-
trate, storiform fibrosis, and obliterator phlebitis. 1 -6  Other
possible findings are an increased serum IgG4 levels, an
IgG4/IgG proportion greater than 40%, and IgG4+ plasma
cells infiltration of organs. 1 -6  However, the sensitivity and
specificity of serum IgG4 in the diagnosis of IgG4-RD are
uncertain. 1

Steroid administration is the mainstay treatment for
IgG4-RD and leads to a dramatic clinical response in most
cases. 1 -6  For patients with motor function deficits or pro-
gressive neurological symptoms, spinal decompression
is usually recommended. 6  Steroid-sparing agents have
also been used in patients with recurrent or refractory
disease. 1 , 2

We utilized the PubMed database to identify five cases
(2000–2020) of IgG4-related epidural IPT causing spinal
cord compression (► Table 1 ). Counting our case, patients
averaged 48 years of age with a female predilection.
Thoracic spine involvement was most common, followed
by the cervicothoracic junction and lumbar spine (ratio
4:1:1). Serum IgG4 was normal in five of six cases (83.3%).
All lesions showed vivid contrast enhancement on MRI.
Only one lesion caused bony destruction (16.6%). Lesion
biopsy, lumbar puncture for cerebrospinal fluid cytology
analysis, and MRI were included as diagnostic modalities.
Spinal decompression, steroid administration, and immuno-
suppressive therapy are among the management
choices. All cases reported recorded symptomatic relief,
with four cases at the final follow-up reporting complete
symptoms resolution.

### Conclusion

Given the rare incidence of IgG4-related epidural IPT, it is
necessary to bear in mind the clinical suspicion of the disease
so that the treatment can begin at the optimal timing. While
steroid is the mainstay of treatment, spinal decompression
may be needed to alleviate spinal cord compression.

### Authors’ Contributions

All authors greatly contributed to the conception, analysis,
and interpretation of data. The article was critically revised
by all authors for relevant intellectual content and the man-
uscript version to be published was finally accepted.

### Conflict of Interest

None declared.

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### Table 1  Characteristics of cases of IgG4-related epidural IPT causing spinal cord compression reported in the literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Age(y)/sex</th>
<th>Location</th>
<th>Bony destruction</th>
<th>Contrast-enhancement</th>
<th>Serum IgG4 (g/dL)</th>
<th>Management</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferreira et al 2016^5</td>
<td>57/F</td>
<td>D10–D12</td>
<td>No</td>
<td>Well</td>
<td>0.662</td>
<td>Surgery, steroids</td>
<td>Improvement</td>
</tr>
<tr>
<td>Williams et al 2017^4</td>
<td>46/F</td>
<td>C4–T1</td>
<td>No</td>
<td>Well</td>
<td>0.38</td>
<td>Biopsy, steroids, azathioprine</td>
<td>Marked improvement</td>
</tr>
<tr>
<td>Rumalla et al 2017^7</td>
<td>50/M</td>
<td>T5–T6</td>
<td>Yes</td>
<td>Well</td>
<td>Normal</td>
<td>Surgery, steroids</td>
<td>Complete resolution</td>
</tr>
<tr>
<td>Winkel et al 2018^6</td>
<td>48/F</td>
<td>L2–L3</td>
<td>No</td>
<td>Well</td>
<td>Normal</td>
<td>Surgery, steroids</td>
<td>Complete resolution</td>
</tr>
<tr>
<td>Merza et al 2019^3</td>
<td>60/F</td>
<td>T4–T5</td>
<td>No</td>
<td>Well</td>
<td>2.07</td>
<td>LP, surgery, steroids</td>
<td>Complete resolution</td>
</tr>
<tr>
<td>Our case 2020</td>
<td>27/M</td>
<td>D5–D6</td>
<td>No</td>
<td>Well</td>
<td>0.70</td>
<td>Surgery, steroids</td>
<td>Complete resolution</td>
</tr>
</tbody>
</table>

Abbreviations: IgG4, immunoglobulin G4; LP, IPT, inflammatory pseudotumor; lumbar puncture.