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Case Report

Multiple plasma cell granuloma of the central nervous system: a unique case with brain and spinal cord involvement. Case report and review of literature

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Study Design: Single subject (male, 34 years-of-age) case report.
Objectives: To describe a unique case of plasma cell granuloma (PCG) with simultaneous brain and spinal cord involvement.
Setting: Private hospital, capital city, Turkey.
Methods: The patient presented with headache and paraplega. T2 weighted MR images showed multiple hyperintense cerebral, cerebellar, brainstem and spinal cord lesions that enhanced homogeneously with contrast medium. The patient was operated on, and the two intramedullary spinal cord lesions at T11 and T12 were totally excised.
Results: After 3 months of an intense physiotherapy programme the patient was able to walk with help.
Conclusion: We report for the first time, the occurrence of multiple, simultaneous brain and intramedullary spinal cord plasma cell granulomas.
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Keywords: inflammatory pseudotumour; plasma cell granuloma; paraplegia

Introduction

Inflammatory pseudotumour (IPT) of the plasma cell granuloma (PCG) type is a rare disease characterized by non-neoplastic proliferation of inflammatory cells, predominantly plasma cells, mixed with collagen tissue.[1] IPT most often occurs in the lungs, but has been found in other locations, such as the orbit, sinuses, larynx, thyroid, mammary gland, spleen, liver, digestive tract, urinary tract, skin, lymph node, peripheral nervous system and central nervous system.[1] Intracranial occurrence is rare. To our knowledge, 35 cases of IPT affecting the central nervous system (CNS) have been published to date.[2–4] Of these, only two originated in the spinal meninges,[3,5] and one in the spinal cord parenchyma.[6]

The unique aspect about our case of PCG is the fact that there is both simultaneously brain and spinal cord involvement.

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Case report

On admission, a previously healthy 34-year-old man reported a history of recurrent headaches of 1 month's duration. Since onset of the headache, he had developed coughing, fever, weakness in both legs, and urinary retention. Neurological examination revealed moderate paraparesis (3/5), exaggerated deep tendon reflexes of the lower extremities, extensor plantar reflex on the left side, and sensory disturbances below thoracic (T) 8 level.

The results of routine laboratory tests (complete blood count, blood biochemistry, urinalysis, electrocardiogram) were within normal limits. The patient's erythrocyte sedimentation rate was 38 mm/h. Chest X-ray revealed a reticular pattern in both lung fields, and computed tomography (CT) scan of the chest showed diffuse micronodular infiltration and focal sites of hyperintensity in the parenchyma of the lower lung regions. Abdominal ultrasonography (USG) was normal. Cranial CT revealed multiple hypodense supra- and infratentorial lesions that enhanced with contrast medium. Cranial magnetic resonance imaging (MRI) showed multiple cerebral, cerebellar, and

brainstem lesions that were hypointense on T1-weighted (W) sequences, hyperintense on T2-W sequences, and enhanced in a nodular pattern after injection of gadolinium-DTPA (Figures 1 and 2). Spinal T2 weighted MR images revealed hyperintensity of the cord between the T9 and T12 levels. In the central part of the oedematous section of the spinal cord, contrast enhanced T1 weighted images showed two hypointense, homogeneously enhanced, nodular lesions, one at T11, and one at T12 (Figure 3).

The differential diagnosis included metastasis, tuberculosis, lymphocytic infiltrates, granulomatous inflammation, histiocytosis X, Wegener's granulomatosis, brucellosis, and aspergillosis.

Cultures of blood, urine, stool, sputum, gastric lavage material, and cerebrospinal fluid were all negative. Agglutination tests for *Brucella sp*. and *Salmonella sp*., indirect haemagglutination testing for *Aspergillus sp*., Lyme's disease screening, and tests for anti-HIV antibodies were all negative. Serum protein electrophoresis was normal. Quantitative serum immunoglobulin (Ig) electrophoresis showed normal Ig, G, Ig A and Ig M levels. Bone marrow biopsy was not performed.

The patient refused surgery as a management option. In spite of the fact that we were unable to identify tuberculous bacilli on direct microscopic examination of four consecutive sputum samples, a urine sample, transbronchial lavage material, and gastric lavage material, we elected to treat the patient with anti-tuberculosis therapy in addition to dexamethasone.

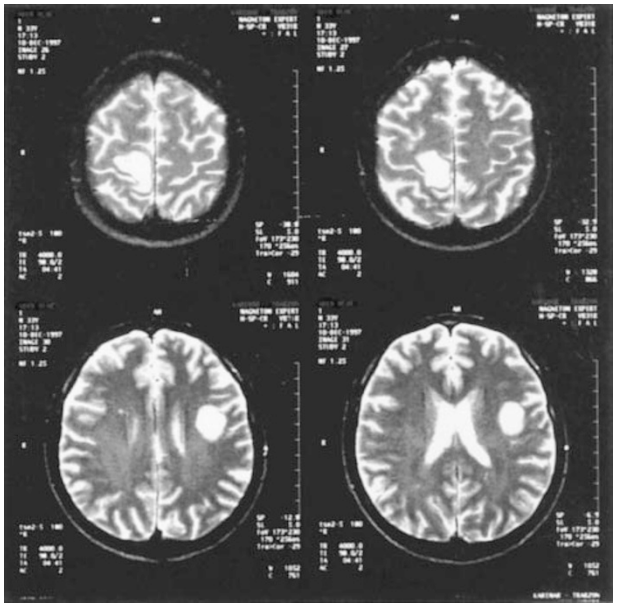

Figure 1 Axial T2 weighted cranial MRI shows two hyperintense lesions, in the right convexity and left parietal regions

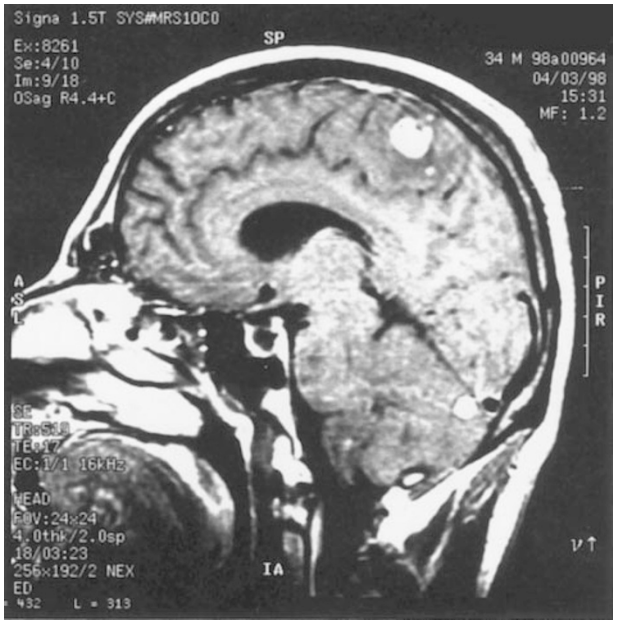

Figure 2 Sagital T1 weighted cranial MRI after Gd-DTPA injection shows multiple enhancing lesions in the convexity, cerebellum and brain stem

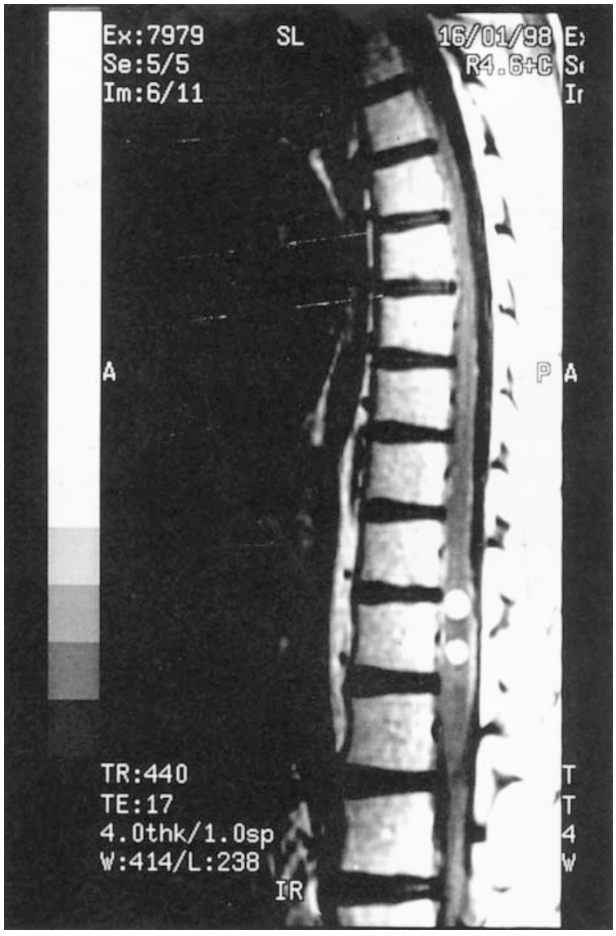

Figure 3 Sagital T1 weighted spinal MRI after Gd-DTPA injection shows two intramedullary lesions at the levels of T11 and T12 with homogeneous contrast enhancement

However, paraparesis gradually worsened during the first 10 days of treatment, and the neurological examination on the 10th day revealed paralysis of the lower limbs (0/5). At this stage, the patient consented to surgery, and we totally excised the two intramedullary spinal cord lesions via myelotomy.

The specimens were pale brown and of very firm consistency. Histological examination revealed a lesion composed of mixed cellular elements, with predominantly plasma cells. These had single peripheral nuclei, abundant eosinophilic cytoplasm, and some contained Russell bodies. Other types of cells, including histiocytes, epithelium-like cells, and lymphocytes, were also identified among the diffusely distributed plasma cells. All the cells were interspersed with strands of hyalinised fibroblastic connective tissue. These findings were compatible with PCG. We noted no whorl formation or psammomatous bodies, nor any vasculitis or abscess formation (Figure 4). The results of special staining for bacteria, fungi, acid-fast bacilli, and spirochetes were all negative.

One month postsurgery he showed mild improvement with moderate paraparesis. After 3 months of intense physiotherapy, the patient was able to walk with assistance. MRI, done 3 months postoperatively, confirmed that the intramedullary spinal cord lesions had been totally excised, and showed a mild reduction in the oedema surrounding the intracranial lesions.

Discussion

In cases with CNS involvement, IPT most often arises intracranially, usually originating from the dura mater, and rarely from the spinal cord meninges. Intracranial IPT is typically a solitary finding, though multiple lesions have been described.[3,4] The gender and age distributions for this form are roughly similar to those seen in pulmonary IPT. However, the two forms may present very differently in that more than 50% of pulmonary IPT cases are clinically silent, whereas patients with CNS involvement are always symptomatic. The most frequent complaint is headache, but other problems may be associated, such as seizures. Other signs, such as limb paresis and visual abnormalities, may also arise, according to lesion size and location. CT scans and MRI usually demonstrate a dense and homogeneous mass with contrast enhancement. The lesion may also be heterogeneous, and is often circumscribed by oedema in the adjacent cerebral tissue.

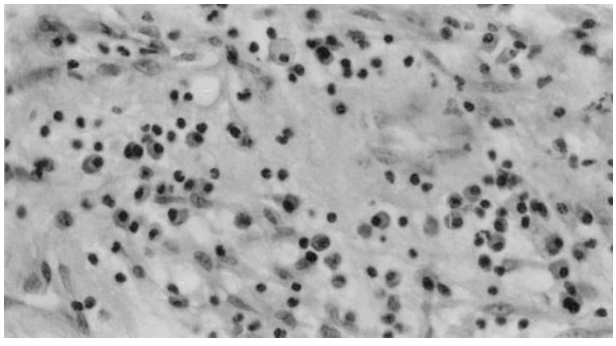

Figure 4 Spindle shaped fibroblastic connective tissue fibres along with inflammatory infiltration with abundant plasma cells, rare lymphocytes and eosionophils (H&E × 200)

Whatever its location, it is well established that IPT is an inflammatory lesion. The mass is often associated with polyclonal gammopathy, leukocytosis, or elevated erythrocyte sedimentation rate. Like every inflammatory process, the histological pattern of IPT changes with time, ranging from densely cellular lesions with neutrophil chemotactic activity in early IPT, to less cellular and more fibroblastic masses in end-stage lesions. This morphologic scale could explain why, in the lung, organising pneumonia can lead to either fibrous histiocytoma or typical IPT.

The pathogenesis of IPT remains a matter of debate. History of prior chest infection has been reported in pulmonary IPT, but the causative agent is not known.[1] The multiplicity of sites that can be involved suggests no particular route of entry, nor any specific agent. Some cases have been associated with malignancy or tuberculosis as satellite lesions.[7] Based on an ultrastructural study that revealed 25–50 nm particles in the bronchial mucosa of affected patients, some authors have suggested that IPT is of viral origin, whereas others believe bacteria to be responsible due to the fact that antibiotics sometimes help to resolve IPT.[2,8] Despite these findings, however, infection is seldom documented, and other investigators have suggested that pathologic conditions such as prior surgery at the affected site, trauma, or immune disturbances are involved.[2] The reaction that occurs could be one that is common to a particular organism, as in Whipple's disease, cat-scratch fever, or tuberculosis; however, the process might also reflect a host factor or defect, similar to what is seen in chronic granulomatous disease or certain hypersensitivity disorders. Whatever site or system it affects, IPT should be considered a nonspecific response to immune or inflammatory disturbances, and a response that presumably involves multiple factors.

In our case, like most of the other cases reported in the literature, we could not document an infection. There was no history of prior surgery at the affected sites, trauma or immune disturbance. The different localisations and multiplicity of the lesions with simultaneous occurrence in our case implicate a systemic cause for the disease.

The most common therapy for central nervous system PCG is complete excision, although subtotal removal may be all that can be achieved because of the difficult location of a mass, or its infiltrative behaviour.[2,3,6] In such cases, steroid and/or radiation therapy may be used.[7] All patients with the diagnosis of PCG require lifelong follow-up. In one case the lesion recurred following subtotal surgical excision. Steroid administration along with radiation therapy was employed with incomplete regression but apparent

cessation of further tumour growth.[9] In another case, PCG of the spinal meninges recurred in another location of the spinal meninges 5 years after the first operation.[3] The general prognosis is good except in these two cases. No transformation to malignancy has been reported up to date.

Conclusion

IPT is a rare disease, but should be considered in the differential diagnosis of contrast enhancing lesions of the central nervous system. Our case of IPT of PCG type is of particular significance in that it is the first in which multiple intracranial lesions and intraparenchymal spinal cord involvement have been simultaneously documented.

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