Neurological Sciences (2019) 40:2193–2195
https://doi.org/10.1007/s10072-019-03954-9

LETTER TO THE EDITOR

Idiopathic hypertrophic cranial pachymeningitis as a rare cause of status epilepticus

Monica Margoni[1,2] · Mattia Barbareschi[3] · Umberto Rozzanigo[4] · Silvio Sarubbo[5,6] · Franco Chioffi[5,6] · Raffaella Tanel[7]

Received: 4 April 2019 / Accepted: 27 May 2019 / Published online: 1 June 2019

Dear Editor,

Hypertrophic cranial pachymeningitis (HCPM) is characterized by marked diffuse thickening of the cranial dura mater. Several clinico-pathological entities determinate thickening of the pachymeninges (i.e., infectious, neoplastic, or autoimmune disorders). Despite the evaluation for the causes of the HCPM, there are numerous cases without cause, termed idiopathic hypertrophic cranial pachymeningitis (IHCPM). IHCPM is a diagnosis of exclusion and a meningeal biopsy is essential to rule out known causes [1].

The main clinical symptoms at IHCPM onset consist of headache or cranial nerve palsies caused by compression of anatomic structures due to the abnormally thickened dura [2]. Even though seizures are an uncommon manifestation of IHCPM, we describe two cases that highlight the importance of this condition as a possible cause of status epilepticus.

✉ Monica Margoni
monicamargoni@hotmail.com

1 Department of Neurosciences DNS, University Hospital of Padova, Padua, Italy

2 Padova Neuroscience Center (PNC), Padua, Italy

3 Department of Histopathology, Santa Chiara Hospital, Trento, Italy

4 Department of Radiology, Santa Chiara Hospital, Trento, Italy

5 Division of Neurosurgery, Department of Neurosciences, Santa Chiara Hospital, Trento, Italy

6 Structural and Functional Connectivity Lab, Division of Neurosurgery, Santa Chiara Hospital, Trento, Italy

7 Division of Neurology, Department of Neurosciences, Santa Chiara Hospital, Trento, Italy

Case presentation

Case 1

A 30-year-old man presented to the emergency room for sensory aphasia. The patient's medical history was unremarkable. An urgent electroencephalogram (EEG) showed a focus of neuronal dysfunction and a superimposed irritative activity in the left temporal zone. A CT scan revealed a hypodense lesion in the left temporal region.

Initially, epileptic status was controlled with benzodiazepines; therapy with levetiracetam was then established.

Routine blood investigation resulted negative. A detailed immunological screening, including C-reactive protein (CRP), anti-SS-A (Ro), anti-SS-B (La), Scl-70, antineutrophil cytoplasmic and antinuclear antibodies (ANCA and ANA, respectively), erythrocyte sedimentation rate (ESR), complement, immunoglobulins (including IgG4), and rheumatoid factor resulted within normal limits. Work-ups for sarcoidosis such as angiotensin-converting enzyme (ACE), chest radiography, and serum calcium were negative. Viral testing (hepatitis B, C virus, immunodeficiency virus, cytomegalovirus, Epstein-Barr virus, varicella zoster virus) was also negative. Quantiferon-TB Gold test gave a negative result.

Cerebrospinal fluid (CSF) analysis revealed normal cell counts, glucose, and protein values. No atypical cells were detected. Blood and CSF cultures were negative. Oligoclonal bands were not seen on immunofixation.

A T2-weighted MR image (Fig. 1a) showed a hypointense lesion surrounded by cortical swelling; contrast-enhanced T1-weighted image (Fig. 1b) revealed a homogenously enhanced mass with diffusely thickened and enhanced dura mater along left temporo-parietal region.

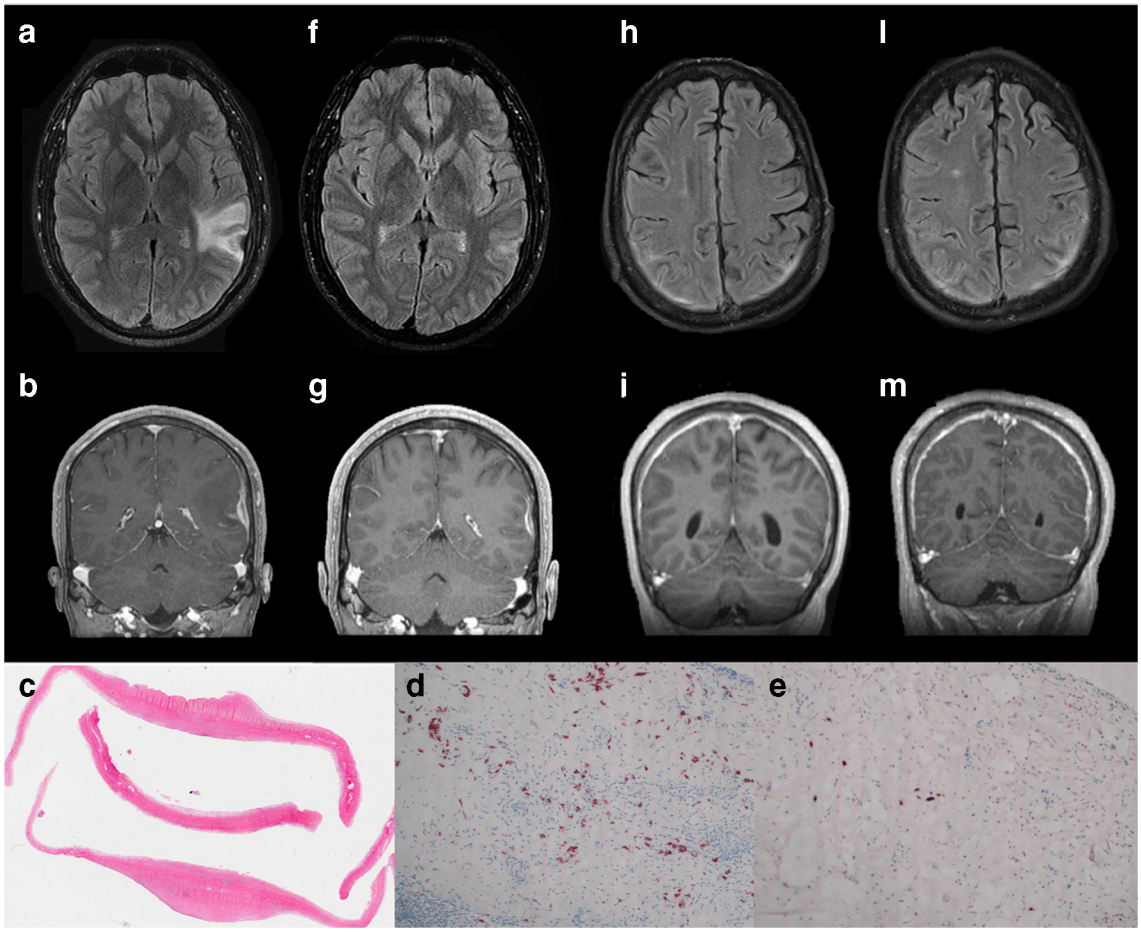

Fig. 1 FLAIR and contrast-enhanced T1-weighted images at baseline (**a**, **b**, **h**, **i**) and control MRI of the lesion performed after corticosteroid therapy (**f**, **g**, **l**, **m**). Panoramic view of pachymeningitis (hematoxylin and eosin-stain) (**c**). Sections of the dura show increasing inflammatory change, mainly composed of mature lymphocytes (hematoxylin and eosin-stain) (**d**). Immunohistochemical staining of immunoglobulin G (IgG) and IgG4 were negative (**e**)

A meningeal biopsy revealed a chronic hypertrophic pachymeningitis (Fig. 1c). Immunohistochemical staining of immunoglobulin G (IgG) and IgG4 was negative (Fig. 1d, e).

Consequently, the patient started oral corticosteroids (prednisone 75 mg daily) for 3 months, followed by decreasing dosage and azathioprine (150 mg daily). A 3-month follow-up MRI showed persistent meningeal thickness but a reduced area of perilesional edema (Fig. 1f, g). The patient has remained seizure-free.

Case 2

A 53-year-old man was evaluated for the acute onset of focal status epilepticus consisting of motor aphasia. Pre-existing medical conditions included headache and bipolar syndrome. An urgent EEG disclosed irritative activity in both temporo-parietal regions.

A brain MRI showed diffuse thickened and gadolinium enhanced dura mater, particularly in parieto-occipital regions (Fig. 1h, i).

Laboratory work-up was unremarkable; in particular ESR, CRP, ACE level, complement, immunoglobulins, extractable nuclear antibodies (Scl-70, anti-Jo-1, anti-SS-A, anti-SS-B), ANA, ANCA, cardiolipin antibody and thyroid function tests, HIV, hepatitis, herpes simplex, varicella zoster, and Epstein-Barr virus resulted within normal limits.

A lumbar puncture demonstrated normal cells count and glucose but elevated protein (67 mg/dL with reference values 15–45). No atypical cells were disclosed. Oligoclonal bands were absent.

A meningeal biopsy was performed and revealed fibrosis with poor lymphocyte-monocytic infiltrate, with no evidence of malignancies or chronic granulomatous inflammation. Immunohistochemical staining of immunoglobulin G (IgG) and IgG4 were negative. A diagnosis of idiopathic hypertrophic cranial pachymeningitis was achieved.

Patient was treated with high-dose intravenous methylprednisolone (1 g daily for 5 days), valproate, and azathioprine (400 mg and 75 mg daily, respectively). A 3-month

follow-up MRI confirmed persistent meningeal thickness but the patient clinically improved (Fig. 1l, m).

Discussion

IHCPM is a rare disorder of unknown origin, characterized by a fibrosing inflammatory process that involves the dura mater. IHCPM diagnosis follows a process of excluding differential diagnoses such as infectious, autoimmune, and neoplastic disorders [1]. The most frequently reported symptoms at onset are headache [3], cranial neuropathies [4], and cerebellar ataxia [5]. Seizures are a very uncommon manifestation.

The mechanism of cerebral parenchyma injury is uncertain. Venous congestion of the draining sinuses [4], ischemia induced by compression of the cortical surface by pachymeninges [6], or inflammatory cells infiltrating the brain parenchyma after invading the subarachnoid and Virchow-Robin spaces [7, 8] are possible mechanisms involved.

Dural biopsy is usually performed to confirm the diagnosis and establish the correct therapeutic approach. Although no treatment guidelines exist, therapeutic strategies include steroids, immunosuppressive drugs, surgery, radiotherapy, and observation [9].

Conversely, follow-up MRI should be performed in asymptomatic patient and treatment should be established at symptoms onset. Our patients have been treated both with steroids and immunosuppressive therapy with progressive clinical recovery.

In conclusion, although a rare cause of focal status epilepticus or epileptic seizures, IHCPM must be considered in the differential diagnostic work-up. Early diagnosis is crucial to introduce anti-inflammatory treatment to antiepileptic drug therapy in order to avoid worsening of the condition.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval The study was approved by the local ethics committee according to the IV revision of declaration of Helsinki.

Consent This is a descriptive, observational study in which the identity of the patient is completely protected; therefore, no informed consent is required.

References

1. Lee YS, Lee HW, Park KS, Park SH, Hwang JH (2014) Immunoglobulin G4-related hypertrophic pachymeningitis with skull involvement. Brain Tumor Res Treat 2:87–91
2. Samandouras G (2010) The neurosurgeon's handbook. OUP, Oxford
3. Khalil M, Ebner F, Fazekas F, Enzinger C (2013) Idiopathic hypertrophic cranial pachymeningitis: a rare but treatable cause of headache and facial pain. J Neurol Neurosurg Psychiatry 84(3):354–355
4. Masson C, Hénin D, Hauw JJ, Rey A, Raverdy P, Masson M (1993) Cranial pachymeningitis of unknown origin: a study of seven cases. Neurology 43(7):1329–1334
5. Zhao M, Geng T, Qiao L, Shi J, Xie J, Huang F et al (2014) Idiopathic hypertrophic pachymeningitis: clinical, laboratory and neuroradiologic features in China. J Clin Neurosci Off J Neurosurg Soc Australas 21(7):1127–1132
6. Mamelak AN, Kelly WM, Davis RL, Rosenblum ML (1993) Idiopathic hypertrophic cranial pachymeningitis. Report of three cases J Neurosurg 79:270–276
7. Kadoya C, Soejima T, Yamada H, Yokota A (1993) Pachymeningoencephalitis: case report. Neurosurgery 33:131–135
8. Nishizaki T, Iwamoto F, Uesugi S, Akimura T, Yamashita K, Ito H (1997) Idiopathic cranial pachymeningoencephalitis focally affecting the parietal dura mater and adjacent brain parenchyma: case report. Neurosurgery 40:840–843
9. Dumont AS, Clark AW, Sevick RJ, Myles ST (2000) Idiopathic hypertrophic pachymeningitis: a report of two patients and review of the literature. Can J Neurol Sci 27(4):333–340