BMJ Neurology Open

New onset headache caused by histiocytic sarcoma of the spinal cord and leptomeninges: a case report

Matthew Silsby [1], Winny Varikatt,[2] Steve Vucic,[1] Parvathi Menon[1]

To cite: Silsby M, Varikatt W, Vucic S, *et al*. New onset headache caused by histiocytic sarcoma of the spinal cord and leptomeninges: a case report. *BMJ Neurology Open* 2021;**3**:e000147. doi:10.1136/bmjno-2021-000147

Accepted 20 May 2021

Check for updates

© Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

[1]Neurology, Westmead Hospital, Westmead, New South Wales, Australia
[2]Anatomical Pathology, Westmead Hospital, Westmead, New South Wales, Australia

Correspondence to
A/Prof Parvathi Menon;
parvathi.menon@sydney.edu.au

ABSTRACT

Background Headache due to raised intracranial pressure is rarely caused by spinal lesions. We describe a patient with primary histiocytic sarcoma who presented with a new onset headache with features of raised intracranial pressure and subtle signs of cauda equina syndrome due to predominant lower spinal cord infiltration and minimal intracranial involvement.

Case A previously well 54-year-old man presented with a 2-month history of new onset headache with features of raised intracranial pressure. Progression of lower limb weakness was delayed and mild with diagnostic delay resulting from the primary presentation with headache leading to an initial focus on cerebral pathology. Subsequent investigations revealed a previously unreported presentation of primary histiocytic sarcoma infiltrating the cauda equina causing raised intracranial pressure headache.

Conclusion This case highlights the importance of a broad search in the investigation of new onset raised intracranial pressure headache, including imaging of the lower spinal cord. Primary histiocytic sarcoma should be considered in the differential diagnosis of this rare syndrome.

INTRODUCTION

New onset headache in the setting of papilledema and symptoms of raised intracranial pressure (ICP) raises the possibility of intracranial pathology such as intracerebral mass lesions, parenchymal oedema or disturbances to cerebrospinal fluid (CSF) flow.[1] Headache with such symptoms is rarely described as resulting from lesions in the spinal column.[2]

Intradural spinal infiltrative lesions have been reported with many neuroepithelial cells and other central nervous system (CNS) tumours, spinal nerve tumours, tumour-like cysts and metastatic deposits.[3] Intradural extramedullary infiltration by histiocytic sarcoma, a rare neoplasm arising from histiocytes, a mononuclear phagocytic cell of myeloid lineage[4] has not previously been reported. The typically reported presentation of histiocytic sarcoma is in lymph nodes, skin or gastrointestinal tract with rare primary extranodal presentation in the CNS.[5]

We present a patient with new onset headache with features of raised ICP, who described non-specific systemic symptoms and developed delayed onset lower limb symptoms. The cause of his presentation was detected to be a spinal intradural extramedullary histiocytic sarcoma without significant intracranial lesions.

This case demonstrates the rare presentation of headache attributed to increased ICP resulting from a spinal lesion. In addition, histiocytic sarcoma has not previously been reported presenting as an infiltrative spinal cord lesion, thus expanding the clinical phenotype for this rare neoplasm.

CASE REPORT

A 54-year-old previously well man presented with the complaint of headache worse with recumbency and blurred vision. Symptoms had been present for 2 months and he reported moderate weight loss during this period. Funduscopy revealed papilledema. Shortly after admission, he was noted to have mild strength reduction (Medical Research Council grade 4) in bilateral hip and knee flexor and ankle plantar flexor muscle groups. Reflexes were sluggish in the upper limbs and absent at the knee and ankle joints. The plantar response was flexor bilaterally. Sensory examination was normal in the lower limbs and there was no saddle anaesthesia, anal sphincter tone was normal. On further direct questioning, the patient reported no symptoms of bladder or bowel control.

MRI brain, including the orbits, showed optic disc swelling consistent with papilledema, however, there were no parenchymal lesions. The oculomotor, trigeminal, abducens and facial cranial nerves were thickened and enhanced post-contrast. Lumbar puncture was unsuccessful both at the bedside and subsequently following fluoroscopic guidance. MRI spinal cord undertaken thereafter showed diffuse leptomeningeal enhancement

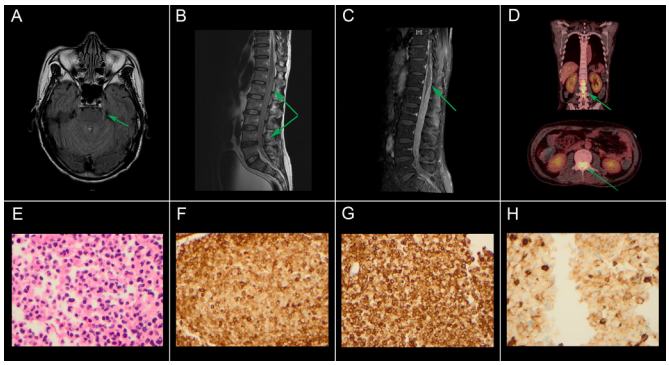

Figure 1 Imaging and pathological findings. Panel A: MRI brain, axial T2 FLAIR sequence, shows mild hyperintensity and thickening of the trigeminal nerve (arrow) without other changes sufficient to cause raised intracranial pressure. Panel B: MRI lumbosacral spine, sagittal T2 sequence, shows a soft tissue density causing complete effacement of the CSF spaces around the lower spinal cord. Panel C: MRI lumbosacral spine, sagittal T1 post-contrast sequence, shows diffuse leptomeningeal enhancement along the surface of the spinal cord and the cauda equina (arrow). Panel D: FDG-PET whole body scans show intense FDG uptake in the spinal column, corresponding to the soft tissue lesions detected on MRI. Panel E: H&E stain at 40× magnification shows sheets of intermediate to large cells with abundant eosinophilic cytoplasm and eccentrically placed nuclei with pale chromatin. Panels F and G: the tissue stained strongly positive for CD4 and CD163, respectively. Panel H: leucocyte common antigen (LCA) stain was weakly positive. This pattern of staining is in keeping with a diagnosis of histiocytic sarcoma. CSF, cerebrospinal fluid; FDG, fluorodeoxyglucose; PET, positron emission tomography.

and nerve root thickening throughout the spine, most conspicuously in the cervical and lumbar segments. An intradural infiltrative process caused complete effacement of the CSF spaces surrounding the cauda equina and conus medullaris (figure 1A,B).

CSF analysis obtained by cisternal puncture revealed slightly elevated protein of 0.53 g/L (normal range 0.15–0.45 g/L) with 81 mononuclear cells. Microscopy showed increased numbers of atypical histiocyte-like cells.

Positron emission tomography (PET) showed increased metabolic activity along the base of the skull and a dramatic increase in fluorodeoxyglucose (FDG) avidity throughout the spinal cord and nerve roots, most notably at C4–C7 and T12–L4 levels, with no increase in uptake in lymph nodes, solid organs or bones (figure 1C,D).

The patient underwent open biopsy of the infiltrative mass in the lumbar canal. Pathological examination of tissue showed intermediate-sized tumour cells with epithelioid morphology negative for keratin and S-100 with a weak positive staining for leucocyte common antigen on immunohistochemical staining. The cells were positive for CD68, CD163 and CD4, and negative for T-cell and B-cell markers, thus confirming their histiocytic/monocytic lineage (figure 1E–H). No bone marrow infiltrates or circulating leukemic cells were detected.

Histiocytic sarcoma was diagnosed and chemoradiotherapy including temozolomide was commenced. While the patient initially achieved remission, brain parenchymal relapse 18 months later led to death shortly after.

DISCUSSION

We present the case of a previously well man with new onset headache associated with symptoms and signs of raised ICP, moderate weight loss and delayed signs of cauda equina syndrome, caused by a primary extranodal histiocytic sarcoma of the spinal cord and cauda equina.

Headaches attributed to increased ICP are rarely caused by lesions outside the cranial vault.[2] Malignant lesions in the spinal column can lead to hydrocephalus, though the causative mechanism is unclear. The leading hypothesis regarding symptom causation, first advanced in 1954, is that malignancy causes CSF protein elevation leading to a mechanical clogging of the semipermeable blood brain barrier, reducing fluid reabsorption.[6] A more recent theory suggests that infiltrative tumour in the lower spinal cord reduces compliance in the total CSF compartment, amplifying minor volume changes that would otherwise be managed by this dynamic system.[2]

The diagnosis of histiocytic sarcoma requires demonstration of expression of the histiocytic markers CD68 and CD163, combined with lack of expression of B-cell markers, T-cell markers, myeloid markers and follicular dendritic cell markers.[4] CNS involvement by histiocytic sarcoma is rare and most reported cases involve the brain parenchyma.[5] Spinal cord lesions have been reported, though these were intramedullary lesions in the cervical or thoracic cord.[5] A case of headache with diffuse leptomeningeal involvement but no parenchymal lesions in the brain or spinal cord has been previously reported.[7] One case of lumbosacral parenchymal involvement has been reported; however, the clinical presentation was with chronic meningitis.[8]

Radiological features of histiocytic sarcoma vary depending on the site of involvement and are non-specific. Imaging abnormalities include hepatosplenomegaly and multifocal FDG-avid disease involving lymph nodes.[9] Several reports[10–12] have demonstrated very intense FDG uptake on PET, particularly in the setting of solid mass lesions, as seen in our patient. Treatment for histiocytic sarcoma is individualised as no standard treatment protocol has been established; though even with treatment, this is an aggressive disease that typically results in death within 2 years.[13]

CONCLUSION

The present case expands the phenotype of extranodal histiocytic sarcoma while also emphasising the importance of a broader search for the aetiology of raised ICP headache in the absence of a causative lesion on primary brain imaging.

Acknowledgements We thank the patient and his family for providing their informed consent to publish this case history and investigation findings.

Contributors MS, SV and PM contributed to the conception, drafting and revising of the manuscript, and were responsible for patient care. WV analysed and reported the pathological findings and revised the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data sharing not applicable as no datasets generated and/or analysed for this study.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID iD

Matthew Silsby http://orcid.org/0000-0002-7249-210X

REFERENCES

1 Dunn LT. Raised intracranial pressure. *J Neurol Neurosurg Psychiatry* 2002;73:i23–7.
2 Morandi X, Amlashi SFA, Riffaud L. A dynamic theory for hydrocephalus revealing benign intraspinal tumours: tumoural obstruction of the spinal subarachnoid space reduces total CSF compartment compliance. *Med Hypotheses* 2006;67:79–81.
3 Traul DE, Shaffrey ME, Schiff D. Part I: spinal-cord neoplasms-intradural neoplasms. *Lancet Oncol* 2007;8:35–45.
4 Swerdlow SH, Campo E, Harris NL. *WHO classification of tumours of haematopoietic and lymphoid tissues*. 4 edn. Lyon, France: International Agency for Research on Cancer (IARC), 2008.
5 So H, Kim SA, Yoon DH, *et al*. Primary histiocytic sarcoma of the central nervous system. *Cancer Res Treat* 2015;47:322–8.
6 Gardner WJ, Spitler DK, Whitten C. Increased intracranial pressure caused by increased protein content in the cerebrospinal fluid. *N Engl J Med Overseas Ed* 1954;250:932–6.
7 Zanelli M, Ragazzi M, Marchetti G, *et al*. Primary histiocytic sarcoma presenting as diffuse leptomeningeal disease: case description and review of the literature. *Neuropathology* 2017;37:517–25.
8 Ueno T, Nishijima H, Kurotaki H, *et al*. An unusual case of chronic meningitis due to histiocytic sarcoma of the central nervous system with meningeal dissemination. *Neurol Sci* 2016;37:1875–7.
9 Saboo SS, Krajewski KM, Shinagare AB, *et al*. Imaging features of primary extranodal histiocytic sarcoma: report of two cases and a review of the literature. *Cancer Imaging* 2012;12:253–8.
10 Dong A, Wang Y, Cui Y, *et al*. Enhanced CT and FDG PET/CT in histiocytic sarcoma of the pericardium. *Clin Nucl Med* 2016;41:326–7.
11 Makis W, Ciarallo A, Derbekyan V, *et al*. Histiocytic sarcoma involving lymph nodes: imaging appearance on gallium-67 and F-18 FDG PET/CT. *Clin Nucl Med* 2011;36:e37-8.
12 Yaman E, Ozturk B, Erdem O, *et al*. Histiocytic sarcoma: PET-CT evaluation of a rare entity. *Ann Nucl Med* 2008;22:715–7.
13 Takahashi E, Nakamura S. Histiocytic sarcoma : an updated literature review based on the 2008 WHO classification. *J Clin Exp Hematop* 2013;53:1–8.