Case Report

Primary Intracranial Abscess localized in the Basal Ganglia: A Case Report

by Omer Kilic,[1] Ali Kafadar,[2] Yildiz Camcioglu,[1] Necla Akcakaya,[1] Haluk Cokugras,[1] *and* Zehra Isik Hasiloglu[3]
[1]*Department of Pediatrics, Infectious Diseases, Clinical Immunology and Allergy, Cerrahpasa Medical School, Istanbul University, Istanbul, Turkey*
[2]*Department of Neurosurgery, Cerrahpasa Medical School, Istanbul University, Istanbul, Turkey*
[3]*Department of Radiology, Cerrahpasa Medical School, Istanbul University, Istanbul, Turkey*

Correspondence: Omer Kilic, Cerrahpasa Medical School, Department of Pediatrics 34098 Kocamustafapasa-Fatih-Istanbul. Tel: 905339243269; Fax: 902126328633; E-mail: <omerkilic7@yahoo.com>.

Downloaded from https://academic.oup.com/tropej/article-abstract/58/1/71/1685867 by guest on 05 March 2020

Summary

Brain abscesses are serious infections that cause neurological problems and generally require antibiotic treatment and surgical drainage. Hematogenous brain abscesses are generally located in the region fed by the middle cerebral artery, but are occasionally found in deep tissues, such as the basal ganglia and thalamus.

Key words: brain abscess, basal ganglia, child.

Introduction

Brain abscesses are serious infections that cause neurological problems and generally require antibiotic treatment and surgical drainage. Microorganisms can localize to the brain parenchyma following penetrating head trauma, intracranial surgery or hematogenous spread. Hematogenous brain abscesses are generally located in the region fed by the middle cerebral artery, but are occasionally found in deep tissues, such as the basal ganglia and thalamus. This study presents the clinical and imaging results of a primary abscess that developed in the lentiform nucleus, in a patient with no trauma, surgery or accompanying focus of infection.

Case Report

A 5-year-old female was brought to hospital complaining of weakness in the arms and legs. On examination, she was fully conscious. The muscle strength in her right arm and leg was 4/5 and the remaining system evaluation was normal. The laboratory examination showed leukocytes 14.700 mm^{-3} (50% neutrophils, 40% lymphocytes, 10% monocytes), hemoglobin 11.2 g/dl, hematocrit 34%, platelets 303 000/mm^3 and C-reactive protein 3 mg/l. Cranial contrast-enhanced computed tomography (CT) showed a 3×4 cm lesion in the left lentiform nucleus, with peripheral contrast enhancement, which partially extended to the external capsule (Fig. 1A). Cranial magnetic resonance imaging (MRI) showed a lesion with peripheral contrast enhancement in the left lentiform nucleus with obvious edema around it. In the diffusion images, the lesion showed obvious restricted diffusion. The images were interpreted as an abscess. A stereotactic biopsy of the lesion drained material consistent with an abscess. MRI obtained on the first postoperative day showed hyperintense diffusion restriction, consistent with a residual abscess (Fig. 1B). Empirical treatment with ceftriaxone and metronidazole was started. Peptostreptococcus grew in the abscess material. Two weeks after her surgery, facial paralysis developed and T1-weighted cranial MRI showed a 4×2.5 cm lesion in the left lentiform nucleus with peripheral contrast and a necrotic center. In diffusion images, this lesion did not show obvious diffusion restriction. The stereotactic abscess drainage was repeated, but this time the drainage was an xanthochromic liquid, and not pus. Abdominal ultrasonography and chest CT showed no metastatic abscess foci. An echocardiogram and immune system scan looking for pathologies that could lead to abscess formation were normal (IgG 795, IgA 83, IgM 156, IgE 18). The antibiotic therapy was terminated

© The Author [2011]. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oup.com
doi:10.1093/tropej/fmr019 Advance Access published on 11 February 2011

FIG. 1. (**A**) Cranial CT showed a 3×4 cm lesion in the left lentiform nucleus, with peripheral contrast enhancement, which partially extended to the external capsule. (**B**) MRI showed hyperintense diffusion restriction, consistent with a residual abscess.

after 8 weeks. Subsequent MRI showed no residual abscess in the axial contrast T1-weighted or diffusion images. At the 1-year follow-up, no sequelae were observed.

Discussion

Brain abscesses are rare pediatric diseases that remain life threatening despite advances in diagnosis and treatment methods. In children, risk factors for brain abscess formation included congenital heart disease, sinusitis, otitis, mastoiditis, meningitis, penetrating head trauma, neurosurgical procedures and immune suppression. In some cases, no underlying cause is found. In various reports, risk factors for brain abscesses are present in 82–93% of pediatric cases [1–4]. In our patient, imaging and other studies identified no risk factor or focus of infection.

TABLE 1
Childhood basal ganglia and thalamic abscess cases

Reference	Year	Age/Sex	Risk factors	Focus	Location	Microorganism	Treatment	Surgery	Prognosis
Bhatia *et al.* [8]	1986	18/M	–	–	T	–	Isoniazid, streptomycin, thiacetazone	–	Good
Yamamoto *et al.* [9]	1993	9/F	Single ventricle, PS	–	T	–	Ampicillin, cephalexin	Burr hole	Excellent
Barlas *et al.* [10]	1999	10/F	Immunosuppression	–	T	–	Ampicillin-sulbactam, metronidazole	CT-assisted stereotactic drainage	Neurological deficit
Singh and Singh [11]	2002	15/F	–	–	T	*Pseudomonas aeruginosa*	Cephalexin, metronidazole, vancomycin	Burr hole	Good
Gajdhar and Yadav [12]	2005	7/F	Cyanotic heart disease (?)	–	T	*Streptococcus viridans*	?	Endoscopic drainage	Good
Peker *et al.* [13]	2008	14/F	–	–	T	*Peptostreptococcus*	Ceftriaxone, metronidazole	Stereotactic drainage	Good
This study	2010	5/F	–	–	BG	*Peptostreptococcus*	Ceftriaxone, metronidazole	Stereotactic drainage	Good

T, thalamus; BG, basal ganglia; PS, pulmonary stenosis; ? represents not specified.

Downloaded from https://academic.oup.com/tropej/article-abstract/58/1/71/1685867 by guest on 05 March 2020

Brain abscesses are rarely localized to the basal ganglia and thalamus and occur in 0.9–4% of all cases [4–7]. Pediatric cases are rare (Table 1).

With a brain abscess, fever, headache, vomiting, convulsions and focal neurological disorders may be seen. It can be accompanied by a high white blood cell count, erythrocyte sedimentation rate and C-reactive protein levels. Cranial CT and MRI assist in determining the location and number of abscesses. With both, contrast enhancement is seen around the periphery of the abscess. In an infant with open fontanelles, cranial ultrasonography can be used. Diffusion-weighted MRI or magnetic resonance spectroscopy can be used to differentiate between an abscess and tumor [13].

On cranial MRI of our patient taken the day after the initial surgery, a residual abscess was seen as hyperintense signal diffusion restriction. The T1-weighted contrast-enhanced cranial MRI conducted 12 days after the initial surgery showed dense contrast enhancement of the lesion membrane, but no diffusion restriction within this, which was unusual and verified the absence of an intraoperative abscess. While purulent abscess material drained through the stereotactic puncture at the first surgery, xanthochromic liquid drained through the puncture at the second surgery. This verified the radiological findings, revealing the importance of diffusion-weighted MRI for assessing abscess healing [14].

Abscesses with deep brain localization can be confused with tumors, in the absence of fever and infection-related laboratory findings [15, 16]. Stereotactic abscess drainage is being used increasingly, and allows the microbiological diagnosis and treatment of deep brain abscesses, reducing morbidity and mortality. For basal ganglia and thalamic abscesses, the most commonly encountered microorganisms are streptococci and anaerobes [15]. As empirical antibiotic therapy, a third-generation cephalosporin and metronidazole can be started. The treatment period averages 4–6 weeks, but should be extended in the presence of immune suppression. Our patient was presented with a focal neurological disorder with no fever. Based on cranial MRI, an abscess was considered. Peptostreptococcus grew in the abscess material obtained at stereotactic puncture.

Basal ganglia abscesses are extremely rare, especially in childhood. Since they cannot be differentiated from malignancy using clinical, laboratory and imaging techniques, a stereotactic procedure is quite important for deep brain lesions as it enables both diagnosis and treatment.

References

1. Shachor-Meyouhas Y, Bar-Joseph G, Guilburd JN, *et al*. Brain abscess in children-epidemiology, predisposing factors and management in the modern medicine era. Acta Paediatrica 2010;99:1163–7.
2. Auvichayapat N, Auvichayapat P, Aungwarawong S. Brain abscess in infants and children: a retrospective study of 107 patients in northeast Thailand. J Med Assoc Thai 2007;90:1601–7.
3. Kao KL, Wu KG, Chen CJ, *et al*. Brain abscess in children: analysis of 20 cases presenting at a medical center. J Microbiol Immunol Infect 2008;41: 403–7.
4. Goodkin HP, Harper MB, Pomeroy SL. Intracerebral abscess in children: historical trends at Children's Hospital Boston. Pediatrics 2004;113:1765–70.
5. Desprechins B, Stadnik T, Koerts G, *et al*. Use of diffusion-weighted MR imaging in differential diagnosis between intracerebral necrotic tumors and cerebral abscesses. Am J Neuroradiol 1999;20:1252–7.
6. Lunsford LD. Stereotactic drainage of brain abscesses. Neurol Res 1987;9:270–4.
7. Tonon E, Scotton PG, Galucci M, *et al*. Brain abscess: clinical aspects of 100 patients. Int J Infect Dis 2006;10: 103–9.
8. Bhatia R, Tandon P, Misra NK. Inflammatory lesions of the basal ganglia and thalamus: review of twenty-one cases. Neurosurgery 1986;19:983–8.
9. Yamamoto M, Hagiwara S, Umebara Y, *et al*. Solitary pyogenic thalamic abscess-two case reports. Neurol Med Chir (Tokyo) 1993;33:630–3.
10. Barlas O, Sencer A, Erkan K, *et al*. Stereotactic surgery in the management of brain abscess. Surg Neurol 1999; 52:404–11.
11. Singh P, Singh A. Thalamic and ganglionic abscesses: a report of two cases: letter to editor. Neurol India 2002; 50:225–6.
12. Gajdhar M, Yadav YR. A case of thalamic abscess treated by endoscopic surgery. Neurol India 2005;53: 345–6.
13. Peker S, Isik U, Akgun Y, *et al*. Deep brain stimulation for Holmes' tremor related to a thalamic abscess. Childs Nerv Syst 2008;24:1057–62.
14. Leuthardt EC, Wippold FJ Jr, Oswood MC, *et al*. Diffusion-weighted MR imaging in the preoperative assessment of brain abscesses. Surg Neurol 2002;58: 395–402.
15. Lutz TW, Landolt H, Wasner M, *et al*. Diagnosis and management of abscesses in the basal ganglia and thalamus: a survey. Acta Neurochir (Wien) 1994;127: 91–8.
16. Callovini GM, Bolognini A, Gammone V, *et al*. First-line stereotactic treatment of thalamic abscesses: report of three cases and review of the literature. Cen Eur Neurosurg 2009;70:143–8.

Downloaded from https://academic.oup.com/tropej/article-abstract/58/1/71/1685867 by guest on 05 March 2020