Neurocysticercosis: a case report

Hsio-Yun Chang1  Chan-Ming Yang1  Tzu-Chieh Cheng1  Jing- Shan Huang2  Shih-Hung Huang3  Yung-Cheng Wang1

Department of Radiology1, Department of neurosurgery2, Department of pathology3, Cathay General Hospital

Neurocysticercosis (NC) in the central nervous system (CNS) caused by Taenia solium (TS) larvae is the most common worldwide parasitic infection. TS is an important medical issue in Taiwan aborigines. However, NC is reported sporadically and its prevalence is unclear in the general population in Taiwan. We reported a case of NC diagnosis on the basis of surgical resection.

CASE REPORT

A 24-year-old woman was admitted for right limbs weakness for 2 weeks. The physical examination revealed decreased muscle power on the right arm and leg. Her medical history and family history were unremarkable. Computed tomography (CT) of brain was performed in the second admission day and revealed a small rim enhanced nodular lesion with perifocal edema, located within the left frontal lobe (Fig. 1).

Contrast enhanced magnetic resonance imaging (MRI) of brain was performed on the third day and revealed a rim enhancing small nodular lesion, which had two parts of opposite signal intensities on both ADC map and diffusion weighted images (Fig. 2). Surgical resection was performed for this symptomatic intracranial lesion and pathology revealed a Taenia solium larva (Fig. 3). A travel history to Hainan, China one year ago was confirmed after pathology proven.

DISCUSSION

Pig is the normal intermediate host and human is the definitive host of TS. Typically, people develop taeniasis after eating pork contaminated by encysted...
Figure 1. a. Brain axial CT shows a low density nodule in left frontal lobe, and mild perifocal edema. b. Postcontrast axial CT shows a well-defined capsular enhancement measured 1.2 cm in diameter.

Figure 2. a. Axial T2-weighted FLAIR turbo spin-echo MR image (3400/120 [repetition time msec/echo time msec], 5-mm section thickness, 240-mm field of view, 256*256 matrix) shows a well-defined, thin, isointense capsule with perifocal edema in the left frontal lobe. The center of the lesion is hypointense. b. Corresponding postcontrast axial T1-weighted spin-echo MR image (600/14 [repetition time msec/echo time msec], 5-mm section thickness, 240-mm field of view, 256*256 matrix) shows a 1.4-cm mass with rim enhancement. c. and d. The lesion presents two parts with opposite signal intensities on DWI & ADC map, with perifocal edema.
larvae, which develop into tapeworms in the small bowel [4]. Human can also be intermediate host of TS by ingesting ova which mature into larvae, penetrate bowel walls and migrate hematogenously into CNS, eye, muscle and skin [1, 7].

Larvae develop into liquid-filled cysticerci consist of vesicular wall and scolex in brain parenchyma. NC presents various clinical symptoms ranging from asymptomatic, mild headache, seizure to fatal shock [1, 5, 7]. Most NC are asymptomatic, common manifestations in descending order are seizures, headache, learning disability, behavior changes, psychomotor involution and increased intracranial pressure [4].

CT and MRI findings depend on staging of NC [7, 8]. In the early stage, larva invasion appears as localized edema on T2-weighted images and displays nodular tissue enhancement [1]. Then cyst encircles the scolex in the vesicular stage. The cyst is typically 1-2 cm in size and the scolex is approximately 2-3 mm in size. The cyst contains clear fluid without inflammation and appears as a non-enhancing thin-walled spherical cyst with low density on CT and high signal intensity on T2-weighted images of MRI [1, 8]. The scolex is usually visualized as a pathognomonic ‘hole-with-dot’ lesion and numerous NC resemble ‘Swiss cheese’ [8].

Then larva dies and decomposes into proteinaceous fluids and granulations in the colloidal stage, causing edema. The proteinaceous fluid appear hypointense on T1-weighted images and hyperintense on T2-weighted images respectively [1]. Most of them show enhancing ring lesions with perifocal edema on CT and MRI [1, 8].

NC gradually diminishes and begins to mineralize in the nodular granular stage. They may appear as nodular or ring enhancement with perifocal edema and start to calcify in CT termed as "cysticercus granulomas"[1, 2, 8, 9].

Finally in the calcified stage, NC typically appears as a non-enhancing calcification. Intracranial nodular calcification is most common and may be the only finding of NC in many cases. Thus CT remains a practical screening tool. MRI findings are variable in this late stage [1, 8].

While CT and MRI findings in NC are helpful in differention of different stage of NC, differentiation with other diseases is difficult. Metastatic lesions can also be an enhancing rim-like lesion with peripheral edema. Abscesses are typically encapsulated with enhancement, too. Parasitic infection, such as NC couldn’t be easily concluded without a travel history to the endemic regions [1]. The single small, spherical, ring-enhancing lesion with peripheral edema and acute infection, such as NC couldn’t be easily concluded without a travel history to the endemic regions [1].

CT and MRI findings in NC are helpful in differention of different stage of NC, differentiation with other diseases is difficult. Metastatic lesions can also be an enhancing rim-like lesion with peripheral edema. Abscesses are typically encapsulated with enhancement, too. Parasitic infection, such as NC couldn’t be easily concluded without a travel history to the endemic regions [1].

Figure 3. The histopathology (H&E stain, 100x) confirmed the diagnosis of the neurocysticercosis. The larve is encapsulated in the granulation cyst. The large upper portion with purple columnar cells is the body of the larve. The small lower portion with pink cells is compatible with scolex.
conclusion.

Corresponding to the histopathological finding (Fig. 3) of the larva, including body & scolex, encapsulated in high protein content and granulation cyst, the imaging findings (Fig. 1, 2) of the solitary, small, spherical, rim-enhancing lesion with peripheral edema in our case, indicate colloid stage of NC with the degenerated larva. Our lesion has two parts with opposite signal intensities on ADC map and DWI, which may result from water restrictive effect of scolex, high protein contents, or both, within the cystic lesion (Fig. 2), according to previous reports [3, 10, 11]. But the definite diagnosis depends on finding a TS larva from CNS studies, including a biopsy, a scolex within cyst on neuroimaging, or subretinal parasites via fundoscopy [4].

REFERENCE

8. García HH, Brutto OH. Review article: Imaging findings in neurocysticercosis. Acta Tropica 2003; 87: 71-78
腦囊尾幼蟲：病例報告

張筱筠¹ 楊展明¹ 鄭子傑¹ 黃金山² 黃世鴻³ 王永成¹

國泰綜合醫院 放射線部¹ 神經外科部² 病理部³

中樞神經囊尾幼蟲症是豬肉絛蟲幼蟲所引起，且為中央神經系統受寄生蟲感染最常見的病症之一。豬肉絛蟲在臺灣原住民是相當重要的健康問題，此一病症在臺灣地區有零星研究報告，但整體盛行率並不清楚。因此我們報告一個經手術切除證實中樞神經囊尾幼蟲症的病例。