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MRI in acute poliomyelitis

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Abstract MRI can be used in the diagnosis of anterior horn infection and for assessing the extent of disease. There are no specific MRI signs to differentiate between the various possible pathogens. This is demonstrated in the present case of poliomyelitis, in which MRI of the spine played an important role in establishing the diagnosis.

Key words Poliomyelitis · Magnetic resonance imaging · Spinal cord, infections

Introduction

The introduction of vaccines has almost eradicated paralysis caused by poliomyelitis. A similar clinical presentation with asymmetrical flaccid paralysis may be caused by other viruses, such as Coxsackie, echovirus or enterovirus [1, 2]. MRI examination of the spine is capable of revealing lesions in the anterior horns of the spinal cord, thus demonstrating a pathological process characteristic of poliomyelitis or poliomyelitis-like infections.

Case report

A 10-year-old boy from an African country was investigated because of acute flaccid paralysis. His medical history was unremarkable, except for incomplete immunisation.

On admission to the intensive care unit sensation was normal, but reflexes were absent. Muscle tone was 1/6 in both legs and the right hand and 3/6 in the left hand. The rest of the physical examination was normal. The white blood count (WBC) was $5640 \times 10^3/\mu l$ with a normal differential. Electrolytes, liver and renal function tests were normal. On lumbar puncture, pressure was 25 cm H_2O, and examination of the fluid revealed a WBC of $77 \times 10^6/l$ with 90 % lymphocytes, glucose 52 mg/dl and protein 33 mg/dl. During the following 48 h the patient's neurological status remained stable. To exclude the possibility of an intraspinal tumour, MRI of the cervical spine was performed.

Axial and sagittal T1-weighted images were obtained before and after gadolinium injection. Since the boy was restless, most of the images were degraded by motion. Contrast enhancement was seen in the anterior portion of the spinal cord at the C4–C5 level, indicating anterior horn infection (Fig. 1). Two weeks later, stool culture and serology confirmed the diagnosis of poliomyelitis. The boy returned to his country, and no improvement in his physical status was reported during the following month.

Discussion

Nowadays, physicians faced with a child presenting with paralysis will not list poliomyelitis as the most common cause; spinal tumour, encephalitis, Guillain-Barré syndrome and neuropathy will be considered more likely. Therefore, even in the presence of the characteristic neurological signs of anterior horn disease (asymmetrical, flaccid motor impairment), MRI of the spine is mandatory to exclude one of these other lesions.

Pathologically, the acute stage of poliomyelitis is manifest by congestion and oedema of the spinal cord.

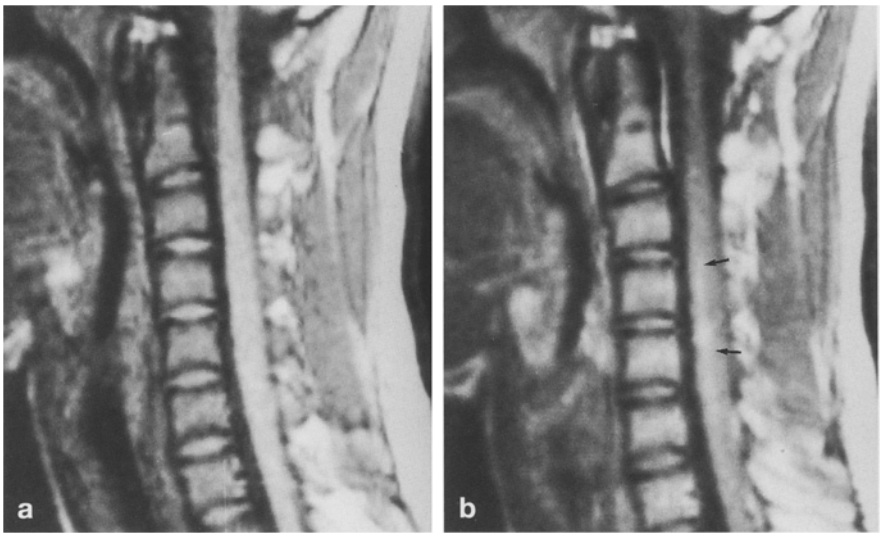

Fig. 1 a, b T1-weighted (450/30) sagittal sections of cervical spine. **a** Prior to gadolinium injection. No structural changes are identified. **b** After gadolinium there is enhancement in the anterior segment of the cervical cord at the level of C4–C5 *(black arrows)*

In the later stages cavitation and atrophy of the anterior horns appear [3]. Wasserstrom et al. [4] described the MRI findings in the chronic phase of bulbar poliomyelitis in a child, demonstrating an exact correlation between areas of high signal on T2-weighted images and areas of necrosis in the pathological sections of the midbrain and medulla oblongata. In our patient, the localised enhancement of the ventral portion of the cervical spine presumably reflected the hyperaemia and oedema seen in the acute phase of the disease.

No further imaging data are available on acute poliomyelitis in children. Sporadic reports are available on the imaging in poliomyelitis-like syndromes [1, 2]. MRI during the acute phase showed an enlarged cervical spinal cord without evidence of an intrinsic mass, compatible with oedema [1]. Gadolinium was not injected. Follow-up of the same patient and of another patient 5 and 7 months later, respectively, revealed a circular area of low signal on T1-weighted images, or small high-signal foci on T2-weighted images. The lesions were in the anterior horns of the spinal cord, corresponding to the side and distribution of the residual weakness. Similar findings were noted in another case [2] of a poliomyelitis-like syndrome, and considered consistent with necrosis. These findings suggest a common pattern of insult in both enterovirus and poliomyelitis paralysis.

MRI of the spine is valuable in the investigation of sudden-onset paralysis; it can exclude spinal cord compression or an intrinsic mass. Moreover, as in this case, the use of intravenous contrast medium can localise the lesion to the anterior horns in the acute stage. Thus, it promptly confirms the clinical suspicion of anterior horn infection, although without distinguishing among possible pathogens.

References

1. Hayward JC, Gillespie SM, Kaplan KM, Packer R, Pallansch M, Plotkin S, Schonberger LB (1989) Outbreak of poliomyelitis-like paralysis associated with enterovirus 71. Pediatr Infect Dis J 8: 611–616
2. Wakamato M, Morimoto T, Nagao H, Matsuda H (1992) MRI in poliomyelitis-like syndrome. Pediatr Radiol 22: 533–534
3. Berry CL (1989) Paediatric pathology. Springer, London Berlin Heidelberg, pp 1270–1271
4. Wasserstrom R, Mamaorian AC, McGary CT, Miller B (1992) Bulbar poliomyelitis: MRI findings with pathologic correlation. AJNR 13: 371–373