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Paraplegia induced by mild trauma in a child with thoracic spinal arachnoid cyst☆

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ABSTRACT

Spinal arachnoid cysts are rare entities that often present with progressive myelopathy and are treated via surgical excision and fenestration. The acute onset of symptoms from these lesions is not well described in the literature. We report an 18-month-old child with acute onset of paraplegia following a mild trauma, who was found to have a compressive dorsal thoracic intradural spinal arachnoid cyst and emergently treated via surgical decompression and cyst resection. After several months of physical therapy the child achieved meaningful neurologic recovery. Spinal arachnoid cysts can cause acute decompensation in children with serious neurological injury following mild trauma, this risk should be weighed when managing asymptomatic lesions.

Spinal arachnoid cysts (SACs) are rare entities which can arise throughout the spinal column in children or adults. Most commonly these lesions are extra-dural, however intra-dural and even intra-medullary lesions are well described in the pediatric literature which consists mainly of case reports or case series [1–23]. Most often, SACs are found after months or years of symptoms such as progressive lower extremity weakness, back pain, gait spasticity, or other signs of myelopathy, and the management strategy of choice is surgical excision or fenestration of the lesion with restoration of normal cerebrospinal fluid (CSF) flow. Due to the increasing use of routine magnetic resonance imaging (MRI) within the pediatric population, these lesions are at times now found incidentally in an asymptomatic patient; the management strategy and natural history of these lesions are not well-established. The acute onset of symptoms from SACs is exceedingly rare. Here, we report a case of acute paraplegia following mild trauma in a young girl with a dorsal thoracic intradural SAC.

1. Case report

1.1. History and examination

An 18-month-old girl was brought to our hospital's emergency department with acute onset paraplegia. She was otherwise healthy and had developed normally prior to hospitalization. She first walked at approximately 1 year of age and had no gait difficulty prior to presentation. There was no family history of neurological illness or arachnoid cyst.

The evening prior to admission, the child was jumping onto a short plastic children's chair when the seat broke, causing her to fall approximately one foot. She landed first on her feet and immediately fell into a seated position. After the mild trauma, her mother noted some gait clumsiness but the patient was ambulatory. She did not complain of severe back pain. Shortly thereafter she was put to bed.

The next morning, the child awoke unable to move her legs. The family brought her immediately to a local hospital and she was then emergently transported to our facility. We observed flaccid paralysis of the lower extremities and bilateral Babinski signs in our hospital's emergency department. Knee and ankle reflexes were not appreciated. She was otherwise awake, alert, and her upper extremities were full strength. She underwent a spinal MRI that demonstrated a large dorsal heterogenous fluid collection with ventral displacement of the thoracic spinal cord (Fig. 1).

Abbreviations: CSF, cerebrospinal fluid; MRI, magnetic resonance imaging; SAC, spinal arachnoid cyst; SSEP, somatosensory evoked potential.

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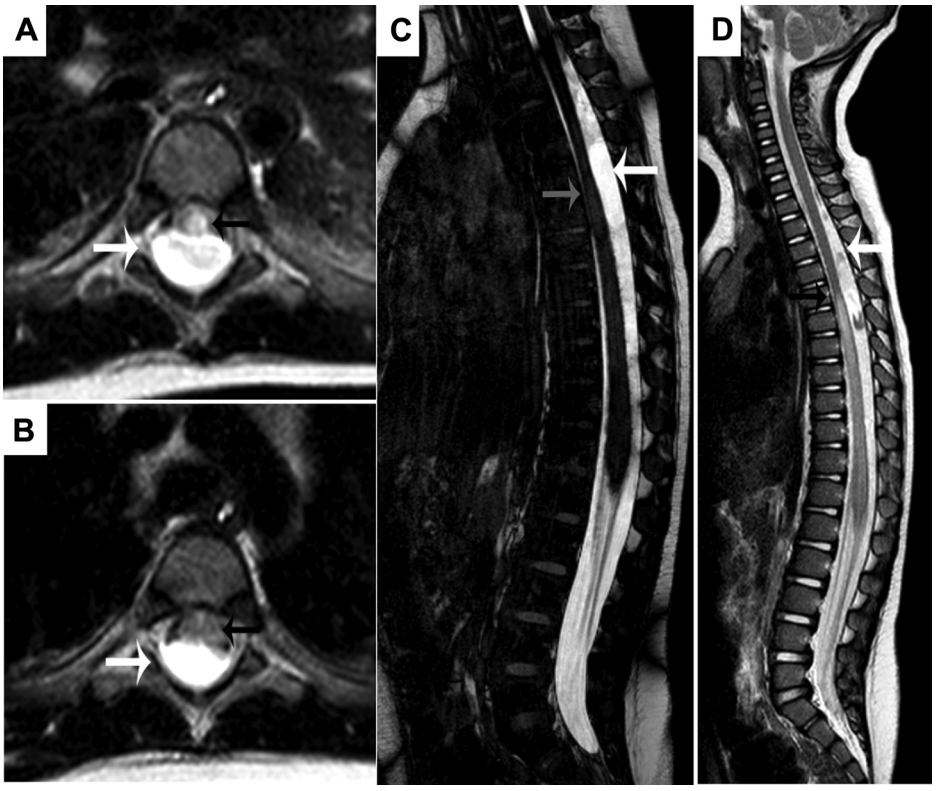

Fig. 1. Axial (A, B) and sagittal (C, D) preoperative T2-weighted MR images demonstrate a dorsal fluid collection consistent with arachnoid cyst (White arrow) in the thoracic spine compressing the spinal cord with early spinal cord (Black/gray arrow) signal change.

Pre-operatively, the cord itself had significant swelling and T2 signal change on MRI. She was taken emergently to the operating room for decompression of the spinal cord in an attempt to maximize functional recovery.

1.2. Operation

Electrophysiological monitoring was established, and initial baseline motor evoked potentials and somatosensory evoked potentials (SSEPs) were absent in the lower extremities prior to skin incision. A standard thoracic laminoplasty was performed, with exposure of T3-T9. The operative microscope was brought into use, and the dura was carefully opened. In the caudal direction of exposure was a thickened arachnoid membrane with clear CSF. There was no evidence of acute or subacute hemorrhage. The venous system of the dorsal spinal cord appeared full and the fluid here was not under significant pressure. However, in the rostral aspect of our exposure, a thinner arachnoid membrane was visualized as well. This was entered sharply, and CSF was expressed under significant pressure. At this rostral site, the dorsal spinal cord vasculature appeared blanched and the cord itself was displaced ventrally (Fig. 2). Upon decompression at this rostral aspect of the lesion, there was a slight improvement in SSEPs, but no return of motor potentials. After resection of the visualized arachnoid membranes and ensuring good CSF flow in all directions, the dura was closed, the lamina were replaced using suture, and the wound was closed in a standard multilayer fashion.

1.3. Postoperative course

Post-operatively, the child returned to the intensive care unit where Mean Arterial Pressure (MAP) was kept elevated (>85 mm Hg) for five days to maximize spinal cord perfusion. An MRI was performed demonstrating excellent decompression (Fig. 3) but with significant progression in spinal cord signal change and edema, consistent with infarct. After one month of intensive

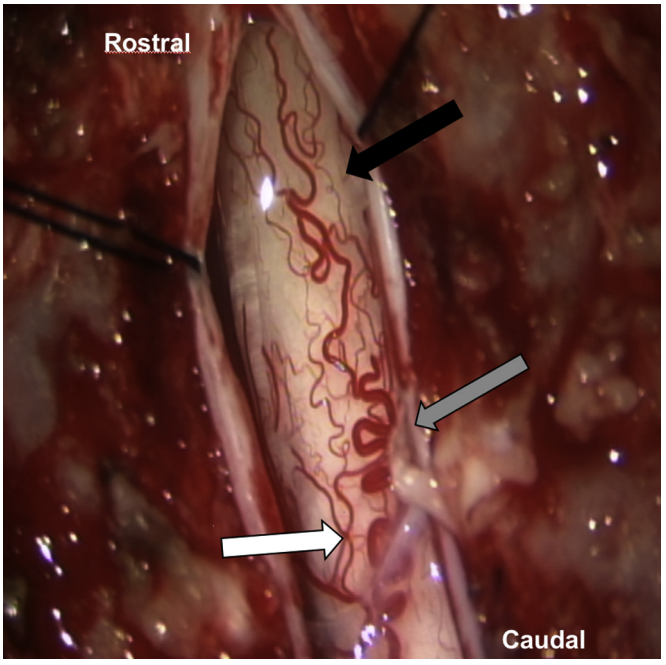

Fig. 2. Intraoperative microscopic view demonstrating operative findings including, paucity of dorsal vessel filling with blanched cord (Black arrow) at site of high-pressure CSF space, remnant of thickened arachnoid membrane caudally (Gray arrow), and caudal cord under the arachnoid cyst with normal blood vessel filling and cord color (White arrow).