Dermal sinus and intramedullary spinal cord abscess
Report of two cases and review of the literature

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Abstract Intramedullary abscesses of the spinal cord are uncommon. Most of them occur in association with heart, pulmonary or urogenital infections. We report two cases of intramedullary spinal cord abscesses secondary to congenital dermal sinus. Only 14 cases of such an association have previously been reported. In our cases, dermal sinus was associated with an epidermoid tumour. The clinical presentation, pathogenesis, magnetic resonance imaging findings, surgical management and outcome are discussed.

Key words Abscess · Spinal cord · Dermal sinus · Epidermoid · Magnetic resonance imaging

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Introduction

Intramedullary abscess of the spinal cord is a rare condition. Only 80 reports have been found since that of Hart [10] in 1830. The rarity of reported spinal cord abscesses can be explained by the few autopsies performed with detailed study of the spinal cord [5]. Most of the abscesses have been metastatic in origin, occurring in association with such diseases as bacterial endocarditis, pulmonary infection, septic abortion and infection of the urogenital tract. Some have arisen by way of direct spread from local infective lesions, such as diseases of the vertebrae, penetrating injuries and meningomyelocele [5, 17, 25]. Congenital dermal sinuses are dermal tubes that extend inward from the surface for varying distances and frequently connect the central nervous system or its covering with the surface of the body [15, 18]. Congenital dermal sinuses become symptomatic either by infections or because of associated mass lesion. According to List [13], infection in the central nervous system complicating a dermal sinus may present diffusely as a meningitis or focally as epidural, subdural, or parenchymal abscess. Meningitis is by far the most common septic complication, and intramedullary abscess the least common. The mass lesions may be benign tumours such as epidermoids, dermoids or teratoma.

The development of an intramedullary spinal cord abscess and purulent meningitis by contamination through the dermal sinuses indicates the importance of early excision of such congenital lesions. In 1877, Dubreuilh [8] described the first case of intramedullary spinal abscess secondary to a dermal sinus, and since then only 14 cases have been reported. Among them, 3 were associated with an intramedullary epidermoid tumour [4, 6, 16]. We report here two cases of intramedullary abscess associated with dermal sinuses and epidermoids. The clinical features, pathogenesis, radiology, treatment and outcome of these previously reported cases are discussed.

Case reports

Case 1
A boy born on 14 February 1992, the product of a normal pregnancy (39 weeks), underwent prophylactic surgery for a lumbosacral
dermal sinus associated with lumbosacral meningocele 2 weeks after birth. Preoperative MRI showed tethering of the spinal cord down to the L-4 level but no intradural mass (Fig. 1a). An elliptical skin incision was made longitudinally to include the skin defect, and the sinus tract was traced to its entrance into the dura. The neck of the dermal tube was ligated close to the dura and its superficial part excised. The wound was closed without drainage. Next day, the boy showed fever and signs of meningitis, and a clinical diagnosis of pyogenic meningitis was confirmed by lumbar puncture. Gram staining of the cerebrospinal fluid (CSF) revealed no organism, but culture demonstrated *E. coli*. The patient was treated with antibiotics for 2 weeks (Ceftriaxon 100 mg/kg per day, Neltimicin 6 mg/kg per day). Over the next few days, his temperature came down to normal and his general condition improved. He was discharged on 15 March 1992, and regular follow-up examinations showed normal neurological and psychomotor development.

On 26 February 1996, he began to complain of headaches, nausea and photophobia, and his temperature was 39.8°C. He was referred to our hospital next day because of urinary and bowel incontinence. Lumbar puncture showed purulent liquid from which *E. coli* was grown on culture. Despite intensive antibiotic treatment the symptoms persisted, and 2 days later examination showed complete flaccid paralysis of the legs and anaesthesia up to the T-12 level. The patient underwent MRI examination of the thoracolumbar spine. Sagittal T1- and T2-weighted sequences were performed with and without gadolinium administration (Fig. 1b–d). These studies showed an intramedullary/extramedullary lesion extending from the sacral to the midthoracic level and thought to be an abscess. An emergency laminectomy from L-2 to S-1 was performed. The dura was opened and a large quantity of pus discharged from the subdural space. An epidermoid tumour was found among the nerve roots and extending rostrally as an intramedullary lesion of the lower end of the conus medullaris. Removal of the epidermoid tumour was subtotal in the conus medullaris, because its capsule was extremely adherent to neural tissues. The wound was irrigated profusely with saline, the dura was closed, and the deep tissues and the skin were closed in several layers with absorbable sutures. The antibiotics were continued postoperatively. Ten days later, the patient was apyretic and neurological examination revealed a very partial motor recovery on the distal extremity of the right lower limb. Subsequent MRI evaluation showed residual probably intramedullary abscess between T-10 and L-2 (Fig. 1e). A second operation was performed, and a laminectomy from T-10 to L-1 was carried out. The dura was opened and the cord appeared swollen without subdural pus. A midline myelotomy 1 cm in length was made over the dorsum of the cord, and at a depth of 2 mm a large cavity containing thick pus was entered. The cavity was irrigated with saline so that complete drainage of this purulent collection could be assumed. Before closure of the dura, the spinal cord was seen to collapse and show pulsations. The antibiotics associating cefotaxim (100 mg/kg per day) and vancomycin (50 mg/kg per day) were carried on for 6 weeks. Pathological evaluation of the surgery specimen confirmed an epidermoid tumour. Two weeks after surgery, partial sensation and motor activity began to return to both the lower extremities. Follow-up examination at 6 months revealed

**Fig. 1a–f** Case 1. a Preoperative sagittal T1-weighted MRI showing tethering of the spinal cord down to the L-4 level. b Sagittal T1-weighted image. The conus medullaris is markedly enlarged, with low-signal areas within the cord. c After the administration of gadolinium, there is sharp peripheral enhancement of the intramedullary abscess. d Sagittal T2-weighted image demonstrates increased signal intensity within the enlarged spinal cord. e Postoperative sagittal T1-weighted MRI with gadolinium. There is thick, irregular enhancement within the cord between T-10 and L-2, corresponding to residual intramedullary abscess. f Sagittal T1-weighted MRI with gadolinium at 6 months. There is a large conus medullaris without any contrast enhancement or syringomyelia.