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ORIGINAL ARTICLE

Progression of Spinal Dermal Sinus Tracts to Intraspinal Abscess: A Single Center Experience

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Abstract

Introduction: Dermal sinus tract (DSTs) is a midline lesion between skin and deep tissues. They are crucial to be early diagnosed before leading to severe complications. In this paper, we report 5 spinal (DSTs) cases that were lead to intradural/intramedullary abscess formations because of late diagnose or late admission to hospital.

Methods: The patients with spinal (DSTs) who were operated in the authors' department between January 2010 to September 2019 were investigated from medical records.

Results: Five patients diagnosed with intradural/intramedullary abscess due to spinal (DSTs) were found. It is understood that all abscess formations were complications of undiagnosed and missed spinal (DSTs).

Discussion and Conclusion: (DSTs) is one of the important pathologies that pediatricians and neurosurgeons should pay attention to. Missing or delay in diagnosis can lead to irreversible deficits.

Keywords: Complication; dermal sinus tract; intraspinal abscess.

Dermal sinus tracts (DSTs) are abnormal links between skin and deep tissues. The DST is a midline lesion that extends from superficial dermal structures to a deep intracranial structure, terminates bluntly or expands at any depth, and ends with a dermoid or epidermoid cyst[1].

They are incomplete closing neural tube remains. Embryologically, dermal sinuses are the faulty result of the separation of superficial ectoderm and dermal structures from the neuroectoderm[2]. DSTs can occur in any region along the neural axis, but are most commonly located in the lumbar and lumbosacral regions[3]. Approximately 60% of DST cases include dermoid or epidermoid cysts[4]. DST may be clinically asymptomatic, but may also manifest itself with recurrent meningeal episodes, mass imaging, skin tears, pigmentation, and hirsutism[5]. Most of the DSTs are not associated with the central nervous system, therefore, they have limited neurological significance[6]. Spinally located DSTs were found in the cervical region (<1%), thoracic 10%, lumbar 40%, lumbosacral 12%, sacral 23%, and sacrococcygeal compartment 13%. Cranial occlusions are mostly in occipital region (85%) followed by frontal (11%) and posterior parietal region (5%)[7].

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In this study, we present five patients with DSTs who were admitted late to the health facility or diagnosed late at different centers were followed up with a spinal intradural abscess.

Materials and Methods

We performed a retrospective analysis of patients with diagnosed with intradural abscess from January 2010 to September 2019. Collected data included clinical history, laboratory results, treatment, and review of all imaging studies performed. All patients were referred to our department by different neurosurgery clinics.

Results

In this study, records of total five patients were analyzed, of which 2 were male (40%) and 3 (60%) were female. Patients' age on first admission to our clinic ranged from 3 months to 30 months (mean-16, 8 months). Every patient underwent a detailed neurological examination and a complete radiological workup to delineate any underlying/associated spinal abnormalities. It was astonishing to note that all our patients presented with neurological deficits. Reason for application to health services was inability to walk in 80% of cases. One (20%) patient applied to our department with inactivity in legs. In one patient presenting with inability to walk, there was purulent drainage from sinus tract. On admission, a paraparesis was detected on all patients' neurological examination. One of the cases had urinary incontinence in addition to paraparesis. Magnetic resonance imaging (MRI) was the investigation of choice and was performed in all cases preoperatively and postoperatively (Figs. 1, 2). The abscess of four patients is lumbar and one patient had lumbosacral localization. After clinical and radiological evaluation, all patients were diagnosed with intradural abscess. Furthermore, it is understood that all abscess formations were complications of undiagnosed and missed spinal DSTs. About 80% of all cases were operated by our clinic for the 1st time. One patient was operated 2 times by an another clinic when he was 30 months old. Abscess was drained and DST was totally removed. The intramedullary and subdural abscesses were found in 40% and 60%, respectively. Dermoid tumor was detected in 3 patients (60%). Post-operative antibiotic treatment was initiated in all patients. Follow-up durations for these patients in our clinic ranged from 25 months to 125 months (mean -85, 4 months). Table 1 summarizes the ages, genders, clinical presentations of patients, neurological examinations, and follow-up periods.

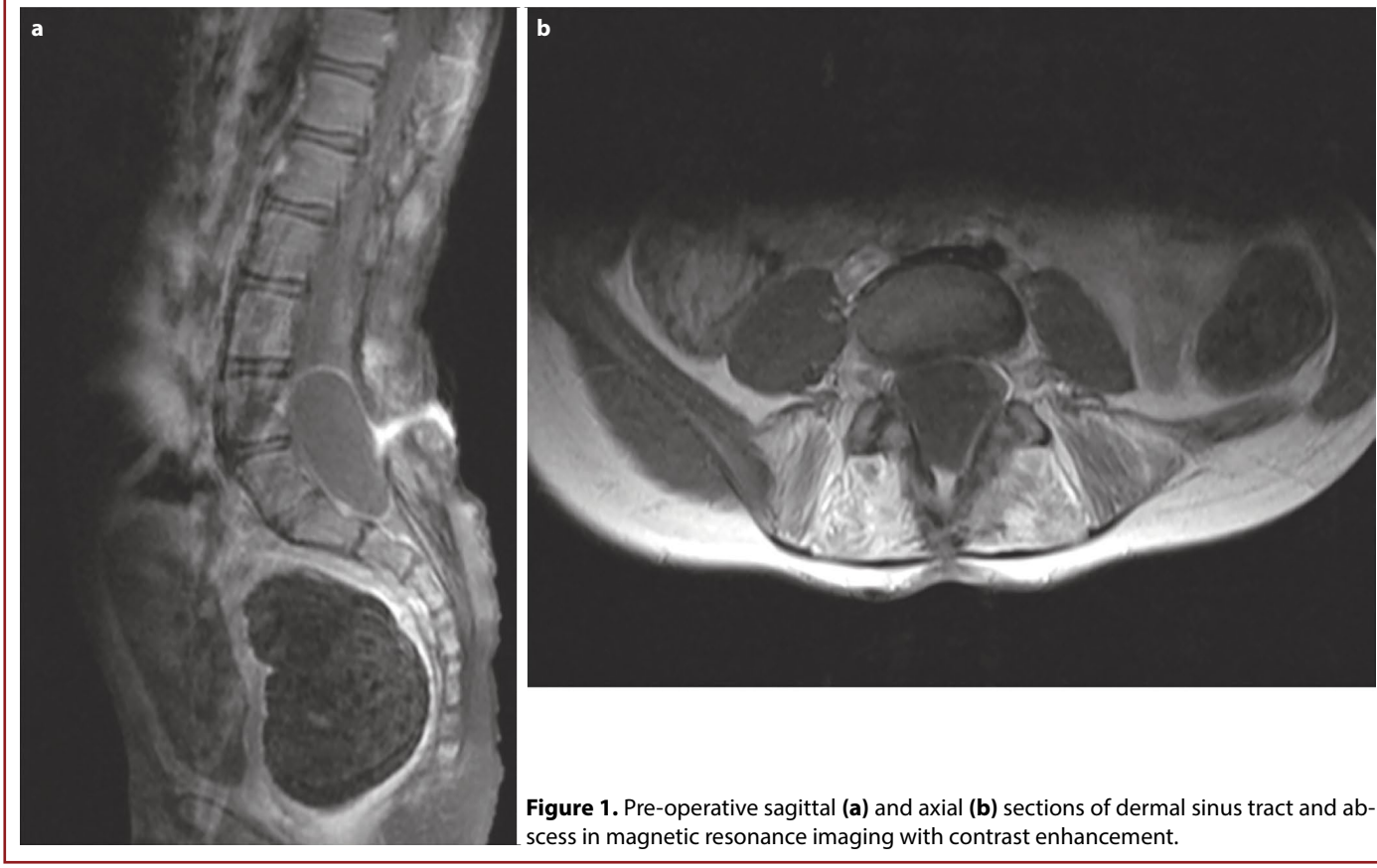

Figure 1. Pre-operative sagittal **(a)** and axial **(b)** sections of dermal sinus tract and abscess in magnetic resonance imaging with contrast enhancement.

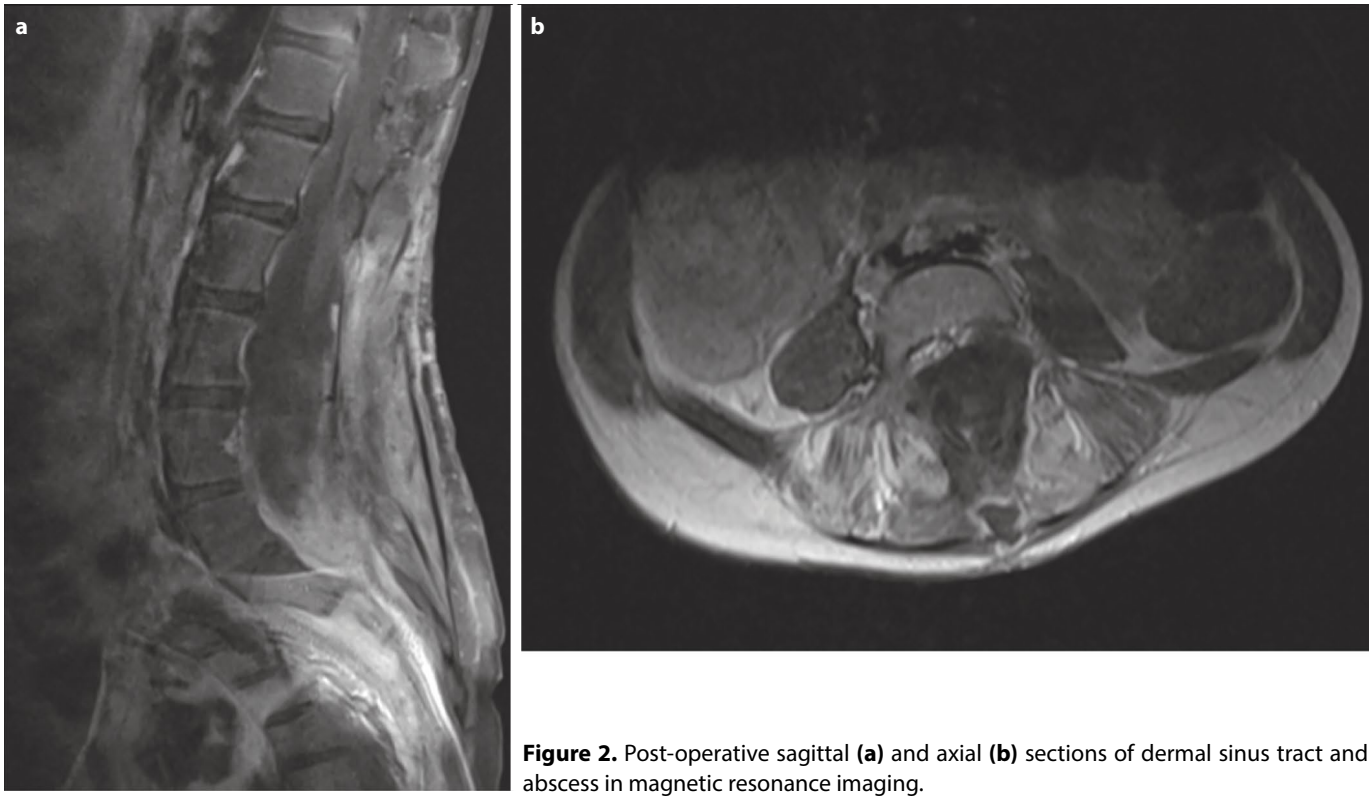

Figure 2. Post-operative sagittal **(a)** and axial **(b)** sections of dermal sinus tract and abscess in magnetic resonance imaging.

Table 1. Clinical features of patients with contrast enhancement

Patient	Age	Gender	Presentation	Localization of DST	1st operation time	Number of surgery	Neurological examination	Follow-up	Survival
1	8	F	Inability to walk	Lumbar	20 months	1	Paraparesis	80 months	Alive
2	12	F	Inability to walk	Lumbar	18 months	1	Paraparesis	125 months	Alive
3	7	F	Inability to walk	Lumbosacral	13 months	2	Paraparesis	73 months	Alive
4	12	M	Purulent drainage, inability to walk	Lumbar	30 months	4	Urinary incontinence, paraparesis	25 months	Alive
5	11	M	Inactivity in legs	Lumbar	3 months	2	Paraparesis	124 months	Alive

DST: Dermal sinus tracts.

Discussion

Spinal DST is a rare form of spinal dysraphism that results from a failure of disjunction early in embryogenesis. The tract can be found in or near the midline anywhere from the coccyx to the cervical area; however, most cases are located in the sacral and lumbar areas[8]. Within the tract nerve or ganglion cells, fat tissue, vein structures, cartilage, and meningeal residues may be present (2). Assessment of DST in the presence of mouth as an isolated skin problem may cause delays in treatment and leads to complications. For this reason, the presence of the DST must be investigated radiologically and surgically[9]. Infection through the DSTs can easily lead to meningitis by reaching the spinal cord or meninges. In addition, as in our study, they can lead to recurrent infections and abscess formation[7]. Intraspinal abscess development is reported in about 50% of cases. The abscess may develop intramedullary or at different vertebral distances by holding the epidural or subdural spaces[4].

In our cases, we have seen paraparesis and urinary incontinence in patients. In cases of tethering spinal cord, gait difficulty with lower extremities and bladder dysfunction is common neurologic presentations[10]. Delay in applying to hospital or diagnosis leads serious complications like intramedullary abscesses as in our cases. Ackerman and Menezes noted that patients who were younger than 1 year were more likely to be neurologically intact than older

ones[11]. In our series, most of our patients were over 1 year age old and all of them presented neurological deficits which may due to lack of awareness at the primary health care and late admission. In the series of Radmanesh et al.[10] 37.1% had meningitis on admission or had experienced it before while 25.7% had abscess formationEarly diagnosis is very critical step to prevent its happening. Image modalities for diagnosis of spinal DSTs include plain X-ray, sonography, computed tomography, and MRI. MRI is the first choice diagnostic study and pre-operative evaluation because MR images provide significant information on the neural structures, level of conus, and other associated anomalies and the lesion[12].

Limitations

There are two important limitations in this study. One is its retrospective nature and the other is that current study has small sample size. Future studies with more patients are needed.

Conclusion

DST is one of the important pathologies that pediatricians and neurosurgeons should pay attention to. Missing or delay in diagnosis can lead to irreversible deficits. Therefore, the diagnosis of DST should be given shortly by clinical examination and radiological examinations. The presence of dermal sinuses should be investigated carefully in the newborn physical examination. They should be followed up after diagnosis closely and surgical treatments should be done instead of conservative treatments. Spinal DSTs should be offered surgical treatment in the form of total excision of sinus tract and correction of spinal malformation, as soon as diagnosed since chances of preserving neural function are high.

Ethics Committee Approval: Retrospective study.

Peer-review: Externally peer-reviewed.

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Conflict of Interest: None declared.

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