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Original Article

Spinal dermoid and epidermoid tumors: Clinical series of 15 cases

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Abstract

Aim: Dermoid tumors are benign tumors originating from ectopic ectoderm and mesoderm remnants in the spinal tract. The congenital epidermoid cyst is considered to be developed as a result of ectodermal tissue inclusion during primitive neural tube enclosure. The aim of this study is to share our surgical results of spinal dermoid and epidermoid tumor cases performed in our clinic.

Material and Methods: 8 (53.3%) dermoid tumor and 7 (46.7%) epidermoid cases, which have been operated at our clinic between 2010 and 2015, were assessed retrospectively.

Results: 5 females (33.3%) and 10 males (66.7%) patients are included with an average age of 16.7 (1-43). The mass of 1 patient (6.7%) was cervical, 3 (20%) were thoracic, and 11 (73.3%) were lumber region located. One patient (6.7%), operated 7 years before at an outer site, applied for relapse in the lumbar region. Two patients (13.3%) had a dermal sinus tract. Three patients (20%) paraplegia and 4 patients (26.7%) had paraparesis preoperatively. Patients were evaluated using X-ray, spinal CT and spinal MRI tests. 3 patients (20%) with paraplegia were operated in emergency conditions. Intraoperative neuromonitorisation was performed. They were excised in 13 patients (86.7%) in total and 2 patients in subtotal. Two patients' (13.3%) paraplegia improved in early period controls. No change occurred in 1 patient (6.7%). Four patients' paralysisimproved (26.7%). One patient developed wound site infection (6.7%).

Conclusion: Dermoid tumors are rare benign congenital lesions. The purpose of the treatment is to excise the mass as total as possible without destructing the capsule. Subtotal excision is recommended rather the forming a neurological deficit.

Keywords: Epidermoid Tumor; Dermoid Tumor; Spinal Mass; Spinal Surgery.

INTRODUCTION

Dermoid tumors develop from remnants involving all layers of the dermis during neural tube enclosure between 3rd snd 5th weeks in the fetal period. It contains hair follicles, sebaceous glands, sweat glands, and epithelium remnants. Mostly the dermal sinus accompanies, and thus recurring meningitis attacks and stiff person syndrome may occur (1). It locates at the midline. It constitutes 1.1% of the spinal tumors (2). They are rare, benign, and slow-growing lesions. It commonly occurs in the second-third decade. It is encountered equally in females and males. Commonly locates in the lumbosacral region (60%), rarely occurs in cervical and thoracic regions (3). They are generally asymptomatic and rarely result in motor and sensory loss, bladder, and sphincter disorders, pains, and complaints. It may rarely result in ruptured clinical finding. In this case, somnolence, nausea, vomiting, vertigo, visual loss, and aseptic meningitis finding may occur (4,5). The first treatment option is to completely excise the lesion microsurgical.

The epidermoid tumors may develop congenitally as a result of ectoderm remnants during neural tube enclosure, and they may develop also as acquired by moving epidermis cells in late meningomyelocele repair and lumbar punctures without a guide wire in the lumbar puncture needle (6,7,8,10,11). Congenital form is typically accompanied with spina bifida, dermal sinus, and syringomyelia. They are benign lesions comprising of keratin and squamous epithelium cells and slowly growing with these epithelium cells. There are no hair follicles,

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sebaceous and sweat glands on the contrary of dermoid tumors. They are like the white mother of pearl drops. It has been introduced as pearl tumors by Cruveilhier in 1835 (12). Paramedian localization is frequent contrary to the dermoid tumors locating at the midline. Although they generally locate intradural extramedullary, intramedullary or extradural is possible as well (13). Cranial localization is more frequent. Most common locations in the spinal are lumbosacral (60%) and then thoracic (10%) regions. They constitute less than 1% of all spinal tumors (14,15,16,17). Its treatment is total excision; however, the purpose is mostly to perform the nearest safe resection to the total as they are adherent to the surrounding neural tissue. The aim of this study is to share our surgical results of spinal dermoid and epidermoid tumor cases performed in our clinic.

MATERIAL and METHODS

Fifteencases, operated for spinal mass at Adana City Training and Research Hospital's Neurosurgery Department between 2010 and 2015 and reported as dermoid epidermoid tumor as per the pathology, were evaluated retrospectively. Eightpatients (53.3%) had dermoid and 7 patients (46.7%) had epidermoid tumor diagnoses. Patients had been followed up for 2 to 5 years after the surgery. Patients were evaluated over their preoperative and postoperative complaints and examination results, radiologic results, tumor location level, performed surgery, mass excision amount, and hospitalization periods. Gold standard magnetic resonance imaging (MRI) was used as the radiologic diagnosis method. X-ray and computerized tomography (CT) were used as the additional radiologic test. Lesion-level total laminectomy and laminoplasty, total mass excision, and duraplasty were aimed as the surgical method. Mass lesion was excised in total in 13 patients. Subtotal excision was applied in 2 patients. Patient with a neuro deficit started physiotherapy.

RESULTS

Five females (33.3%) and 10 males (66.7%) patients included in the study were found to be between 1and 43 years of age with an average of 16.7. 8 patients (53.3%) were determined to be with dermoid and 7 patients (46.7%) with the epidermoid tumor as per the pathology. Mass lesion located at the cervical region in 1 patient (6.7%), the thoracic region in 3 patients (20%), and lumbar region in 11 patients (73.3%). Oneof the applied patients (6.7%), which has been diagnosed to have a dermoid tumor as per the pathology, has been operated at an outer site, and this patient applied to our clinic for recurring mass. Two of the patients (13.3%) had a surgery history due to dermal sinus tract and 1 of them to spinal abscess. These three patients (%20) were determined to have an epidermoid tumor as per the pathology. As there was no interventional procedure in histories of the other three patients with the epidermoid tumor as per the pathology, they were considered to be congenital rather than acquired.

The most frequent complaint was found to be low back and back pain in all patients. The second one was determined to be weakness in legs in 7 patients (46.7%). The duration from the complaint onset varied from1 month to 2 years and ascertained to be 18 months on average. No such rupture-related manifestation was encountered in our cases.

MRI, CT, and X-ray were used to diagnose and follow-up the patients. Dermoid tumors appear to be hypointense in T1-weighted images in MRI and heterogeneous hyperintense in T2-weighted images due to its dermis remnants (Figure 1).

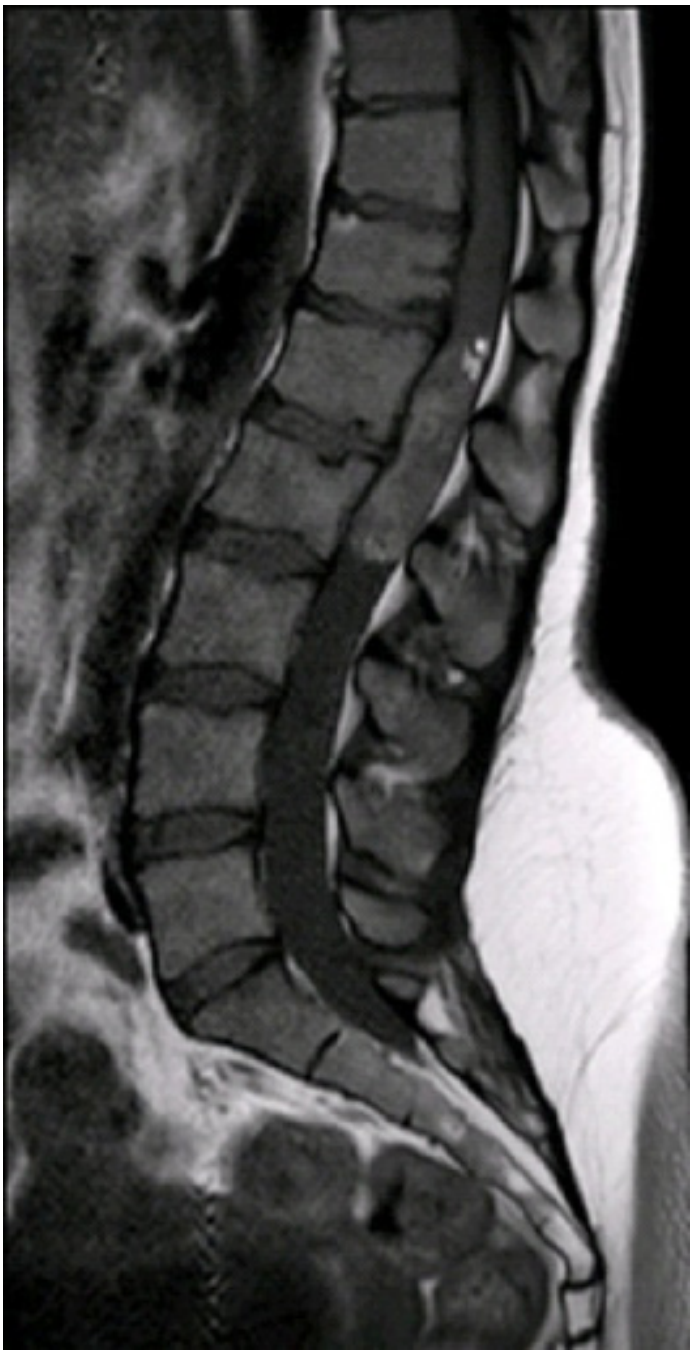

Figure 1. Massive lesion compatible with the dermoid tumor in hyperintense heterogeneous internal structure at the level of the conus. T1 sagittal section of lumbar MRI

Epidermoid tumors appear to be hypo-isointense in T1-weighted cross-sections and hyperintense in T2-weighted cross-sections with cerebrospinal fluid (Figure 2,3,4). Although X-ray and CT are not of substantial help in definitive diagnosis, they are useful in evaluating mass-bone structure relation and in terms of surgical planning.

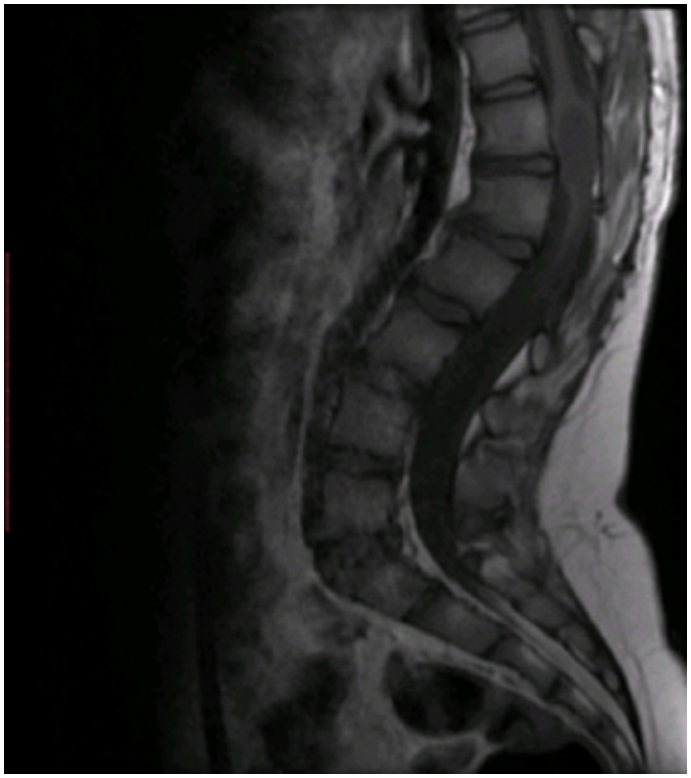

Figure 2. Intramedullary located hypointense mass lesion (Epidermoid tumor). T1 sagittal section of lumbar MRI

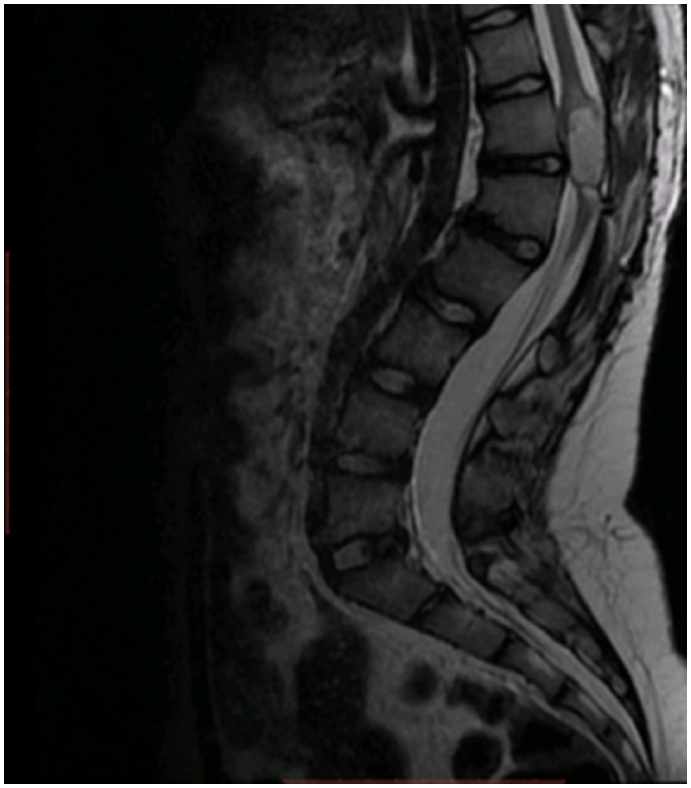

Figure 3. Intramedullary located hyperintense mass lesion (Epidermoid tumor). T2 sagittal section of lumbar MRI

Patients have applied lesion-level total laminectomy or laminoplasty and mass excision microscopically (Figure 5,6). Intraoperative neuromonitoring of somatosensory evoked potentials (SSEPs) and also at the same time electromyography (EMG) was applied for the operation of all patients. Nerve roots and external anal sphincter activities were monitored. As no instability result was acquired in patients, no fusion surgery was applied additionally. Fivepatients (33.3%) were applied laminoplasty, and the old laminectomy defect was used in 3 patients (20%) previously operated for the spinal abscess. Eightpatients (53.3%) underwent total laminectomy. Thirteenpatients (86.7%) underwent total and 2 patients underwent (13.3%) subtotal mass excision. Sevenpatients (46.7%) had a motor deficit at the application. Deficits were in paraplegia form in 3 patients (20%) and in paraparesis form in 4 patients (26.7%).

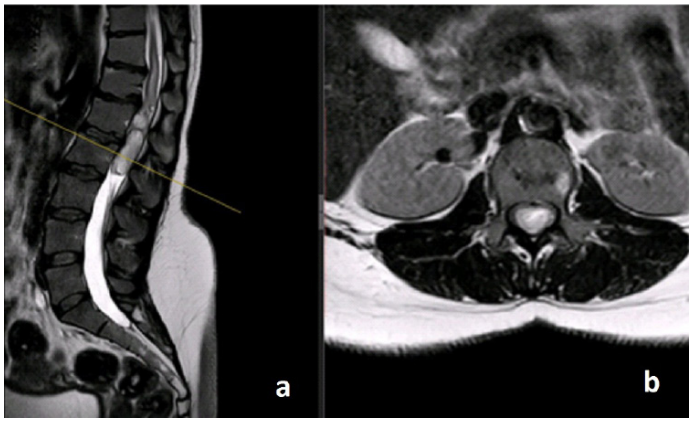

Figure 4. Massive lesion compatible with the epidermoid tumor in hyperintense heterogeneous internal structure at the level of the conus. T2 sagittal (a) and axial (b) section of lumbar MRI

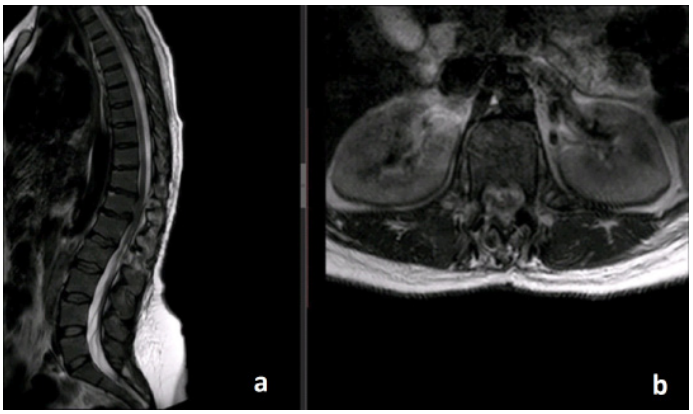

Figure 5. L1-L2 epidermoid lesion total excised. Postoperative thoracolumbar T2 sagittal (a) and axial (b) section MRI

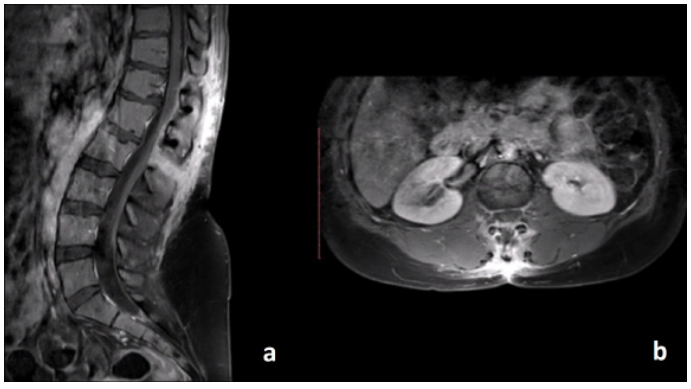

Figure 6. L1-L2 epidermoid lesion total excised. Postoperative 4thmonth thoracolumbar T1 contrast sagittal (a) and axial (b) section MRI

Motor deficits were defined in patients with cervical-, thoracic-, and conus medullaris-level mass lesions. Patients with strength loss were operated under emergency conditions. Loss of strength in the paraparesis level was recovered completely at the late period. Near full recovery occurred only with 1 patient of full strength loss (6.7%) (4/5 muscle strength) and just 1 patient (6.7%) had partial recovery (2/5 muscle strength). Onepatient (6.1%) showed no recovery in strength loss postoperatively. Hospitalization period for patients varied between 4 days and 26 days. Average hospitalization period was found to be 7.6 days. Cerebrospinal fluid leakage occurred in 1 patient (6.7%) postoperatively. Leakage was stopped through wound revision. Onepatient (6.7%) developed superficial wound infection (Table 1). Infection was treated via antibiotherapy upon suggestion by the infectious diseases department.

Table 1. Demographics and clinical data of the patients

Gender	Male	10 (66.7%)
	Female	5 (33.3%)
Complaint	Low back and back pain	15 (100%)
	Weakness in legs	7 (46.7%)
Lesion level	Cervical	1 (6.7%)
	Thoracic	3 (20%)
	Lumbar	11 (73.3%)
Preoperative neurological status	Paraplegia	3 (20%)
	Paraparesis	4 (26.7%)
	No neurological deficit	8 (53.3%)
Mass excision	Subtotal	2 (13.3%)
	Total	13 (86.7%)
Late postoperative neurological status	Intact	12 (79.9%)
	Near full recovery (4/5 motor strength)	1 (6.7%)
	Partial recovery (2/5 motor strength)	1 (6.7%)
	No change	1 (6.7%)
Pathology result	Epidermoid	7 (46.7%)
	Dermoid	8 (53.3%)
Complication	Cerebrospinal fluid leakage	1 (6.7%)
	Superficial wound infection	1 (6.7%)

Dermoid tumors develop from remnants involving all dermis layers during neural tube enclosure in the fetal period and contain hair follicles, sebaceous glands, sweat glands, and epithelium remnant. Epidermoid tumors may result from remaining ectoderm remnants during fetal tube enclosure as well as after spinal surgical interventions and lumbar puncture as acquired. In 2 of 3 epidermoid tumor patients among our cases, 2 had a history of surgery due to dermal sinus tract and 1 had an operation history for the spinal abscess. Our other case was considered to be congenital. Dermoid epidermoid tumors locate mostly at lumbosacral region (60%) (3,18). In accordance with the literature, 1 of our patients had a mass lesion at the cervical region, 3 of them had it at the thoracic region, and 11 at the lumbosacral region.

In a paper published in 1992 by Roux et al., the duration from complaint onset forward of 47 patients reported in the literature of the period scan was reported to be between 2 days and 53 years with an average 6 years. Average patient age was reported to be 34 (17). In a paper published by Yin H. et al., this period was reported to be between 2 and 120 months with an average 29.7 months (19). The average age was reported to be 37.7. It is reported in the literature that complaints and symptoms may vary as per the mass location and sizes (4,20,21). They may remain asymptomatic for a long time as per its location; however it is reported that cyst content, although rarely, may be ruptured as a result of a trauma and spontaneously and resulting severe headache, somnolence, nausea vomiting, visual impairments, chemical meningitis, motor deficits, and severe appearances up to coma may occur (4,5,22,23). The duration for our patients varied between 1 month and 24 months with an average 18 months. The average age of our patients was determined to be 16.7. These data make us think that particularly the widening of MRI is effective in revealing these rare diseases at considerably earlier ages.

MRI results are frequently reported in the literature as hypointense in T1-weighted cross-sections for epidermoid and dermoid tumors; however, they were reported to vary as per the mass content (11,24,25,26,27,28,29). Epidermoid tumors appear to be hypo-isointense in T1-weighted cross-sections and hyperintense in T2-weighted cross-sections with cerebrospinal fluid (19, 30). However,hyperintense appearance in T1-weighted images and hyperintense in T2-weighted images may also occur as per the cystic and lipomatosis sections and chemical content of the mass (27). Dermoid tumors appear to be hypointense in T1-weighted images in MRI and heterogeneous hyperintense in T2-weighted images due to its dermis remnants (24,26,28). Images varied for both tumors in our cases incompatible with the literature. The most frequent complaints of our patients were low back and back pain incompatible with the literature. 7 patients (46.7%) were found to have a motor deficit and operated under emergency conditions. Laminoplasty was not preferred for these patients, and laminectomy was applied for its decompression effects. Total laminectomy performed to 8 patients (53.3%). Total excision could not be applied to this patient. Recovery in the motor losses was considered to be directly related with early decompression microsurgery, total excision, short complaint duration, and intraoperative neuromonitorization application. The main purpose of the treatment is reported in the literature to be total mass excision without breaking the capsule and protection of neural structures (2,17,31,32,33). However it is not always easy to achieve this, therefore also subtotal excision is applied. Thus the patient satisfaction is ensured without any recurrence for a long time and neurological loss (2,17). Subtotal excision is an

increasing trend in order to avoid any neurological deficit (29,30,34). Also, microsurgery method and intraoperative neuromonitorization are of help for total excision. 13 patients (86.7%) operated at our clinic underwent total excision. Subtotal excision was applied in 2 patients (13.3%). No relapse was found in 2 to 5 years follow-ups of patients. Pain complaints, which occur in all patients at the baseline, disappeared in all patients except for 3 patients (20%). 5 of the 7 patients with different levels of neurological deficits showed nearly full recovery, and 1 of them maintained paraplegic. In cases, to which total excision could not be applied, relapse may occur although it is a benign lesion. If there are clinical finding, these lesions should be operated for the second time. However total excision would be harder than the first surgery due to fibrosis and changing anatomical structures. Here the purpose is to ensure surgical decompression sufficient to recover these symptoms. No relapse was found yet in patients that we operated, and 1 patient (6.7%) applying for relapse was operated and subtotal excision was ensured. No recovery occurred in motor deficit of the patient, to which total excision could not be applied, but their complaints for pain became less frequent.

CONCLUSION

Dermoid epidermoid tumors are rare benign lesions. They show clinical symptoms and radiological results varying as per the location and nature. Early diagnosis is of importance to recover the complaints and neurological deficits. Particularly MRI is substantial for diagnosis. The purpose of the treatment is to excise the mass as total as possible without destructing the capsule and forming any neurological deficit. However, subtotal excision is recommended rather the forming a neurological deficit. Microsurgery method and intraoperative neuromonitorization are useful in totally excising the mass without forming any neural damage.

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