Intramedullary Spinal Cord Abscesses in Children: A Review

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Abstract
Intramedullary spinal cord abscess in children is extremely a rare infection of the central nervous system and may resemble spinal cord neoplasms. Since this entity is one of the treatable conditions of paraparesis, clinical awareness of patients at risk is crucial for early diagnosis and intervention. Once the abscess is established; immediate surgical drainage along side adequate antibiotics should be instituted. The predisposing factors in the pediatric population differ from the adult population in prevalence. Congenital dermal sinus is implicated as the leading cause of intramedullary spinal cord abscesses in children. The diagnosis of intramedullary abscess should be considered and aggressively ruled out in any patient with a dermal sinus who presents with symptoms of a partial or complete transverse myelitis. Rapid treatment is essential for satisfactory neurological recovery. Prognosis is often unfavorable, if diagnosis is delayed. In the present paper a broad overview of intramedullary spinal cord abscess in children is provided. Epidemiology, predisposing factors, pathogenesis, clinical presentation, diagnosis, management, and prognosis of pediatric intramedullary spinal cord abscesses are discussed. The reviewed data are organized in such a way to constitute a guide for the reader who seeks practical information about this rare but extremely important issue.

Keywords: Intramedullary spinal cord abscess; Dermal sinus; Pediatric

Çocukluğu Çağı Intramedüller Spinal Kord Abseleri

Özet

Anahtar Kelimeler: Intramedüller spinal kord absesi; Dermal sinüs; Pediatrik
INTRODUCTION

Intramedullary spinal cord abscess in children is extremely rare infection which, may clinically resemble spinal cord neoplasms. Since this entity is one of the treatable conditions of paraparesis, early diagnosis and rapid treatment is essential for satisfactory neurological recovery. The predisposing factors in the pediatric population differ from the adult population in prevalence. As in adults, hematogenous spread from a variety of sources does occur in children, but the largest source of probable hematogenous spread has been shown to be from a urogenital tract source. However, congenital dermal sinus is implicated as the leading cause of intramedullary spinal cord abscesses in children. The diagnosis of intramedullary abscess should be considered and aggressively ruled out in any patient with a congenital spinal dermal sinus who presents with symptoms of a partial or complete transverse myelitis. Systemic signs of sepsis, fever, and leukocytosis may be absent. The diagnosis of intramedullary spinal cord abscess in infants and children may be difficult and delayed until significant neurologic deficits become apparent because of their indolent presentation. Progressive sensory and motor loss are the clinical picture, and pain is often absent. The signs and symptoms depend on the location of the lesion; thoracolumbar segments and midthoracic segments are the most commonly areas involved. Clinical suspicion and radiological findings are essential for early diagnosis and treatment; consequently, irreversible spinal cord damage can be avoidable. In the present paper a broad overview of intramedullary spinal cord abscess in children is provided. Epidemiology, predisposing factors, pathogenesis, clinical presentation, diagnosis, management, and prognosis of pediatric intramedullary spinal cord abscesses are discussed. The reviewed data are organized in such a way to constitute a guide for the reader who seeks practical information about this rare but extremely important issue.

Epidemiology of Intramedullary Spinal Cord Abscesses In Children

Incidence and prevalence

Abscesses within the spinal cord itself are rare. In 2002, Helvacı et al. found about 100 cases, including their patient. Only 38 cases of pediatric intramedullary spinal cord abscess were identified between the years of 1875 and 2001.

Age Distribution

In their analysis of 100 cases of intramedullary abscess, Desai et al. reported that the first and the third decades were the most common age groups. Candon and Frerebeau noted in their review that 67% of abscesses occur in the first 4 decades of life. Of the 38 cases of pediatric intramedullary spinal cord abscess, that were identified between 1875 and 2001, age of presentation ranged from 8 days to 17 years. The median age of presentation was 36 months. Intramedullary spinal cord abscess may present at any age but children under the age of five are more likely affected. One review reported that 68% of children who had intramedullary spinal cord abscess when they were younger than 5 had a preexisting spinal cord defect, whereas only 15% of those presenting at age 5 years or older had a preexisting defect, which was significantly lower.

Sex Predilection

In their analysis of 100 cases of intramedullary abscess, Desai et al. have found a male preponderance. Of the 38 cases of pediatric intramedullary spinal cord abscess, that were identified between 1875 and 2001, 45% were female and 55% were male.
In children preexisting congenital defects in spinal cord development are a common means by which infection occurs. Of the 38 pediatric cases that have been published in the literature between 1875 and 2001, 20 (53%) had a prior anatomic defect. These defects included dermal sinus (17 cases), isolated meningocele (1 case), unspecified lumbar defect (1 case) and sacral decubitus ulcer (1 case). One patient had a dermal sinus concomitantly with an intestinal connection to the spinal cord (36). Congenital dermal sinuses account for 20% of spinal cord abscesses (30). Inadequate exploration and incomplete removal of the dermoid sinus tract can cause recurrent cyst formation and subsequent intramedullary spinal cord abscess in children.

**History of the Management of Spinal Cord Abscesses in Children**

*Understanding of Disease*

Intramedullary spinal cord abscess was described initially in an adult patient by Hart in 1830 (17). In 1877, Dubreuilh described the first case of intramedullary spinal abscess secondary to a dermal sinus (12). Between 1877 and 1998 only 16 cases of intramedullary spinal abscess secondary to a dermal sinus have been reported. Among these 16 recorded cases, 4 were associated with epidermoid tumours (30). Between years 1830 and 1996, more than eighty cases of spinal cord abscesses have been reported. In half of these cases, it was unfortunately a post-mortem diagnosis (25). Only 38 pediatric cases were identified in a review of the world medical literature between 1875 and 2001 (36).

*Technological Development*

Although differences in surgical procedures and postoperative care may have contributed to the reduction in mortality rates in the postantibiotic era, it is likely that the concomitant antibiotic therapy contributed significantly to the reduction in mortality and morbidity seen in the patients who received antibiotics in the postantibiotic era compared with those who had only surgical drainage in the preantibiotic era (36). The congenital neural tube defect is just recently considered as the most important source of intramedullary spinal cord abscess in the antibiotic era, it is highly likely, because other sources of infection are more effectively treated with antibiotics before they end with a serious central nervous infection (1). The outcome after diagnosis of an intramedullary spinal abscess was poor before the antibiotic era, with the mortality rate ranging between 71 and 90%. The first review of cases of intramedullary spinal cord abscess described between 1830 and 1944 reported a 90% mortality rate (2). The introduction of antibiotic treatment has resulted in a more favorable prognosis. A subsequent review of cases of intramedullary spinal cord abscess described between 1944 and 1977 reported a mortality rate of 24% (28). A recent review revealed a substantial improvement in the mortality rate to only 8% in cases of intramedullary spinal cord abscess described between 1977 and 1997 (7). A more recent review by Kurita et al. of the literature published between 1998 and 2007 reported only 4% mortality (24).

*Surgical Technique*

With the introduction of operating microscope and microsurgical techniques, surgical outcome of intramedullary spinal cord lesions and intradural congenital spinal cord malformations improved. In the treatment of intraspinal pathologies, multilevel laminectomy has a significant rate of postoperative spinal deformity in children. In 1976, the use of osteoplastic laminotomy has been advocated by Raimondi et al. to minimise the risk of spinal deformity by preserving the normal architecture of the spine (33). Even with laminoplasties, spinal deformity is a concern, especially when laminoplasties involve multiple levels. In 2008, Steinbok reported a novel technique to avoid
postoperative spinal deformity using multiple short-segment replacement laminoplasties to access pathology over a long segment of the intraspinal space\(^{(37)}\). In 2009, Ito et al. described safe and minimally invasive laminoplastic laminotomy using an ultrasonic bone curette. They reported that the scalpel-type ultrasonic bone curette is useful for cutting bone and effective for reconstruction of the laminae\(^{(20)}\). In cases of extensive abscess, an unique technique has been described. In this technique, gentle advancing of inside catheter rostrally through the limited myelotomy, to communicate the septated cavities and to drain the abscess, can be achieved effectively with remarkable results. With the use of this technique, the child can be protected from unnecessary extensive laminectomy and its subsequent orthopedic complications\(^{(1,10,31)}\).

**Pathology of Intramedullary Spinal Cord Abscesses in Children**

**Pathogenesis**

The source of intramedullary spinal abscess can be divided into the following hemopoietic spread, contagious spread, and unknown source (namely, cryptogenic).

The spinal canal is an uncommon site for abscess formation resulting from bloodstream disseminated infection\(^{(9)}\). Abscesses within the spinal cord can arise via septic emboli or through penetrating injuries\(^{(44,45)}\). The pathogenesis of this disease in adults is chiefly hematogenous spread from a cardiopulmonary source. Most of the infections are secondary to metastatic spread from infections of the lung, endocarditis or genitourinary tract. In children the largest source of probable hematogenous spread has been shown to be from a urogenital tract source (vulvovaginitis, urinary tract infection, pyelonephritis and perinephric abscess). Other probable hematogenous sources included pneumonia, endocarditis, middle ear infection, sagittal sinus thrombosis, schistosomiasis and brucellosis\(^{(36)}\). In children hematogenous spread from a variety of sources does occur, but preexisting congenital defects in spinal cord development are a more common means by which infection occurs. The dermal sinus has been increasingly observed as a source of intramedullary spinal abscess in the antibiotic era, likely because other deep-seated and adjacent infections are more effectively eliminated before they spread to the spinal cord\(^{(7)}\). Numerous reports have described intramedullary abscesses in pediatric cases secondary to dermal sinus, dermoids and epidermoids\(^{(1,31,41)}\). Congenital dermal sinus has been found to be the source of infection in 45% of children compared with 24% in all age groups\(^{(7,36)}\). Because all cases of intramedullary spinal cord abscess with concomitant isolated dermal sinus presented at later than 6 months of age, this suggests that complete resection of the dermal sinus before 6 months of age may prevent the formation of intramedullary spinal cord abscess and it's significant morbidity and mortality. Also inadequate exploration and incomplete removal of the dermoid sinus tract can cause recurrent cyst formation and subsequent intramedullary spinal cord abscess in children\(^{(36)}\). In 25% to 55% of patients with spinal cord abscesses, the primary source of the infection cannot be found\(^{(5,6)}\).

**Localization and Spreading**

The analysis of the data of 38 pediatric intramedullary spinal cord abscess cases, that were identified between 1875 and 2001, showed that the spinal segments most often involved were the thoracolumbar segments. The midthoracic segments were the next most common involved, with the rest of the patients having spinal segments ranging from C1 to S2\(^{(36)}\). Byrne, et al., reported that the mean range of involvement is three to six levels\(^{(5)}\). Involvement of the entire cord is exceedingly rare\(^{(4,10)}\). Once infection develops in the spinal cord, it has a
tendency to spread longitudinally along the fibers of the cord itself(10). A devastating mechanicovascular insult of the spinal cord may be established from rapid formation of the abscess and a swift expansion of the spinal cord within the limited intraspinal space(1).

Histopathology

Intramedullary spinal cord abscess is a suppurative infection of the CNS with histopathologic features and stages of abscess development that are remarkably similar to those in cases of pyogenic brain abscess. Necropsy examination in the early stages of abscess development reveals purulent myelitis with areas of central necrosis. In the late stages of abscess development, a central core of pus is surrounded by a well-vascularized capsule(7). True encapsulation of these abscesses is unlikely to occur(45). Intramedullary spinal cord abscesses have a tendency to enlarge longitudinally and it has a potentiality to spread vertically along the fiber tracts of the cord itself to involve the entire spine(1,14,22).

Common Causative Pathogens of Intramedullary Spinal Cord Abscesses in Children

In their analysis of 100 cases of intramedullary abscess, Desai et al. reported that Staphylococcus and Streptococcus were the most common causative organisms(10). In the series of Murphy et al., the identified organisms were: Streptococcus milleria, S pyogenes, atypical mycobacteria, Mycobacterium tuberculosis, and Schistosoma mansoni (in two children)(32). The analysis of the data of pediatric intramedullary spinal cord abscess cases, that were identified between 1875 and 2001, showed that 55% had a single organism isolated, 17% had mixed bacterial flora and 28% had sterile fluid in abscess cultures. The majority of cases in which a single organism was isolated included Staphylococcus spp., Streptococcus spp., and fermentative coliform bacteria(36). All mixed bacterial flora grew from patients with lumbar dermal sinuses and included aerobic Streptococcus, Staphylococcus spp., fermentative coliform bacteria and anerobic bacteria. According to Candon et al., the pathogenic organisms identified most frequently are Staphylococcus spp., Streptococcus spp., E. coli, Actinomycyes spp. and Pneumococcus spp(6). Staphylococcus aureus was reported to be the commonest offending organism in the case of abscess associated with dermal sinus in a recent series(29), contrary to Proteus mirabilis as described previously in the literature(30).

Unusual microorganisms causing intramedullary spinal cord abscess in children included Brucella abortus, Mycobacterium tuberculosis and Schistosoma spp. Intramedullary spinal cord tuberculomas due to Mycobacterium tuberculosis infection tend to occur predominantly in young people of developing countries and are associated with systemic disease, usually pulmonary, in most of the cases(23).

Although 30% of cases are microbiologically sterile, a diverse range of organisms, including staphylococcus, Streptococcus pneumoniae, Haemophilus, Proteus, Listeria, Actinomycyes, and Pseudomonas cepacia, have been isolated in the cases, as well as the tapeworm sparganum and the yeast Histoplasma capsulatum. Toxoplasma and Mycobacterium tuberculosis have been identified in the abscesses of two patients with human immunodeficiency virus, and there seems to be an increased susceptibility in immunocompromised patients to spinal epidural and intramedullary abscesses(16,39).

Presentation of Intramedullary Spinal Cord Abscesses in Children

Symptom

The signs and symptoms depend on the location of the lesion; the thoracic spine is the most commonly area involved(6). The
analysis of pediatric intramedullary spinal cord abscess cases, that were identified between 1875 and 2001, showed that 89% of the patients presented with neurologic deficits: paralysis; paresthesia; urinary or fecal incontinence. The single most sensitive and objective indicator of intramedullary spinal cord abscess in children is the finding of paralysis, seen in 58% of the cases reviewed. It is, however, often a late clinical finding after irreversible neurologic impairment has already occurred\(^{(36)}\). Parents may not observe early signs and symptoms of intramedullary spinal cord abscess in diapered infants and toddlers unable to complain of back pain and where urinary and fecal incontinence is not unusual.

In children with intramedullary spinal cord abscess, systemic signs of sepsis, fever, and leukocytosis may be absent\(^{(45)}\). In their analysis of 38 pediatric cases of intramedullary abscess, that were identified between 1875 and 2001, Simon et al. have shown that only one-third of the patients presented with documented body temperature over 100.4°F (38 °C) on admission\(^{(36)}\).

Being extremely rare, the clinical presentation of intramedullary spinal cord tuberculomas is that of subacute spinal cord compression with the appropriate motor and sensory findings depending on the level of the lesion\(^{(23)}\). Some tuberculomas may appear following a good initial response to antituberculosis therapy. Late development of symptomatic intramedullary spinal cord tuberculomas in successfully treated tuberculous meningitis patients has been reported very rarely\(^{(42)}\).

**Patterns of evolution**

Patients are usually divided into three clinical groups; acute onset (symptoms less than 1 wk), subacute onset (symptoms up to 6 wk), and chronic course (symptoms more than 6 wk). Patients with the acute form are more likely to have a fever and an elevated white blood cell count and may show either a partial or complete transverse myelitis picture. The patients with chronic abscesses are less likely to have fever and leukocytosis, and their symptoms often mimic those of an intramedullary spinal tumour.

**Time for evolution**

Analysis of the 38 cases of pediatric intramedullary spinal cord abscess, that were identified between 1875 and 2001, showed that the median duration of signs or symptoms was 8 days with a range from 1 day to 3 years\(^{(36)}\).

**Evaluation Of Intramedullary Spinal Cord Abscesses In Children**

**Laboratory Tests**

The analysis of the data of pediatric intramedullary spinal cord abscess cases, that were identified between 1875 and 2001, showed that the peripheral leukocyte count was normal in 87% of children when it was obtained\(^{(36)}\). The erythrocyte sedimentation rate tends to be elevated in all patients regardless of their clinical findings\(^{(6)}\). CSF cultures are usually sterile. It may be helpful to perform a PCR analysis of cerebrospinal fluid to detect lower levels of bacteria or bacteria that are difficult to culture\(^{(6,11)}\). Even with appropriate culture techniques in best settings, 25–40% of abscesses are microbiologically sterile (negative intraoperative cultures)\(^{(6,21,36)}\). Visualization of frank pus with polymorphonuclear cells under microscope is sufficient in establishing a diagnosis of abscess\(^{(36)}\).

**Radiologic Tests**

Plain x-rays of the spine are often normal. A myelogram in conjunction with a computed tomographic scan may show the intramedullary lesion. Myelogram may show a partial or complete block with evidence of widening of the spinal cord shadow\(^{(45)}\). MRI plays a decisive role and allows prompt diagnosis with a precise localisation of the suspected abscess. If MR imaging is unavailable, a spine CT
scan with and without contrast or spine ultrasound can confirm the clinical suspicion of intramedullary spinal cord abscess. Contrast-enhanced MRI is the ideal investigation for diagnosis. The most commonly reported signs are the presence of an intramedullary collection giving a low-intensity signal on T1-weighted images and a high-intensity signal on T2-weighted images with peripheral contrast uptake and generally extended adjacent medullary edema. A characteristic sequence of MR imaging findings aids in the differentiation of intramedullary spinal cord infection from other intramedullary lesions. MRI findings may differ in a wide spectrum from mild edema, swelling with mild or no contrast enhancement to prominent edema and abscess formation with diffuse, patchy or ring enhancement consistent with the stage of the infection. Intramedullary high signal intensities, expansion of the cord, necrotic center are well seen on T2-weighted images. Initial MR studies show intramedullary high signal on T2-weighted sequences with poorly defined marginal enhancement on T1-weighted images. On follow-up contrast-enhanced T1-weighted studies, the lesions may have well-defined enhancing margins with central low signal intensity. After the initiation of therapy, T2 signal abnormalities decrease and contrast-enhanced studies show ring enhancement. Murphy et al. described that the chronological changes of MRI findings in the spinal cord reveal the same progression that has been documented in the brain. In the series of Condette-Auliac et al., the collected abscesses presented as round lesions within the canal with contrast uptake. The authors noted that the periependymal gray matter adjacent to the lesion also took up the contrast agent in all patients with a collected abscess. This sign has not been described previously and appears to be a going argument orienting the diagnosis towards an infectious rather than tumoral formation. The radiological differential diagnosis in the early stage includes spinal infarction, necrotizing myelitis, intramedullary abscess, low grade astrocytoma, and demyelinating diseases, such as neuromyelitis optica, and multiple sclerosis. Even with MRI examinations, it is difficult to detect an intradural extension of a sinus or a related lesion such as an epidermoid. Without any known predisposing factors, the diagnosis may be really difficult. Infected syrinx may also simulate an intramedullary abscess particularly in the pediatric age group. Dörflinger-Hejlek et al. reported a case in which DWI provided a more specific diagnosis than conventional MR imaging and allowed differentiation of a ring-enhancing lesion from intramedullary tumor.

Management Of Intramedullary Spinal Cord Abscesses In Children

Similar to the management of pyogenic brain abscess, a combination of medical and surgical therapies is recommended for the treatment of intramedullary spinal cord abscess. A collaborative approach involving specialists in neurosurgery, neuroradiology, and infectious diseases is recommended. Prompt surgical drainage of the abscess with appropriate antibiotic therapy is mandatory since the natural course of the disease has a very unfavourable outcome. Intramedullary tuberculoma, which is a rare entity, must be considered in the differential diagnosis of intramedullary spinal cord abscess to avoid unnecessary surgery. Medical therapy remains the mainstay of the treatment of intramedullary spinal cord tuberculoma, but when confronted with progressive neurological deficit and in the case of medical treatment failure, the lesion may be removed by using microsurgical treatment.

Medical Management

Steroids to combat swelling and antibiotics for long periods are indicated. As with any abscess treatment with antibiotics alone is not sufficient, and pretreatment with antibiotics before surgery may not be
beneficial. The concomitant antibiotic therapy contributed significantly to the reduction in mortality and morbidity in children with intramedullary spinal cord abscesses. Early broad-spectrum antimicrobial therapy, covering Gram-positive and Gram-negative organisms as well as anaerobes, should be the first choice of management. Given the wide range of microbes cultured from intramedullary spinal cord abscesses, initially broad-spectrum antibiotic combinations such as intravenous vancomycin, cefotaxime and metronidazole to cover Staphylococcus spp. Streptococcus spp., enteric Gram-negative bacilli and anaerobes should be used until identification of organisms and sensitivities are available. In 2009, Kurita et al. suggested that surgical treatment can be adopted for patients with a larger abscess or with congenital neuroectodermal abnormalities, whereas nonsurgical treatment is better for patients with a smaller abscess (as long as two or three vertebral bodies) or without congenital abnormalities.

**Surgical Management**

Once the diagnosis of intramedullary spinal cord abscess is made, early surgical exploration and drainage within 5 days from presentation and postsurgical antibiotic use are critical in reducing the significant mortality and long term neurologic deficits associated with this condition. In children, limited laminectomy with myelotomy focused above the most bulbous segment of the spinal cord for drainage of the abscess and adequate antibiotics is the treatment of choice. It is unnecessary and dangerous to dissect and remove the wall of the abscess cavity. Exploration of the dermal sinus alone does not appear to be adequate and laminectomy with intramedullary spinal cord abscess drainage, and complete excision of the dermoid sinus tract should be the surgical procedure of choice. In cases of extensive abscess; gentle advancing of inside catheter rostrally through the limited myelotomy, to communicate the septated cavities and to drain the abscess, can be achieved effectively with remarkable results. In this way we may protect the child from unnecessary extensive laminectomy and its subsequent orthopedic complications. For some authors, local wound irrigation with antibiotics is useful and the dura mater can be left open in case of severe edema of the spinal cord to allow drainage and expansion.

**Adjuvant Medical Therapy for Intramedullary Spinal Cord Abscesses in Children**

The optimal duration of antimicrobial therapy is not well defined. A minimum of 4–6 weeks of parenteral antibiotic therapy is recommended. An additional 2–3 months of oral antimicrobial therapy may be considered. Duration of antibiotic administration postoperatively was not correlated with a significant difference in outcome, but most cases in recent years were treated successfully with intravenous antibiotics for at least 6 weeks.

**Complications Of Therapies For Intramedullary Spinal Cord Abscesses In Children**

**Surgery**

Intramedullary spinal cord abscesses may recur and require a second operation.

**Medical**

Medical treatment alone is not suitable, especially in neurologically compromised patient. The relatively local avascularity of the spinal cord and high mechanical pressure locally from the abscess formation within a non-expansible space is believed to be the cause of the devastating spinal cord damage, which could be irreversible, if left untreated (not decompressed mechanically) for a longer time.

**Follow-Up After Surgery for Intramedullary Spinal Cord Abscesses in Children**

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Spinal intramedullary abscesses may recur and require a secondary operation. Therefore, regular follow-up by clinical examination and magnetic resonance imaging study during the first year after surgery is recommended\(^{(19,30)}\).

**Outcome of Therapies for Intramedullary Spinal Cord Abscesses in Children**

Mortality and morbidity rates of pediatric intramedullary spinal cord abscesses are higher than pediatric epidural and subdural abscesses and adult intramedullary spinal cord abscesses\(^{(7,34,35,36)}\). Prognosis is often unfavorable, if diagnosis is delayed. Since a significant part of the tissue injury results from the space-occupying nature of the lesions, decompression/evacuation of the lesion should be urgently performed; this may limit the neurological injury\(^{(7)}\). Rapid surgical drainage is a critical prognostic factor for effective management of spinal cord abscess\(^{(25)}\). The analysis of the data of 38 pediatric intramedullary spinal cord abscess cases, that were identified between 1875 and 2001, showed that 20% of cases died, 60% had residual neurologic deficits and only 20% recovered without sequelae. The most significant variable on outcome has been found to be timely surgical intervention, followed by appropriate antibiotic administration\(^{(36)}\). It was also suggested that a patient's outcome may be related to the rapidity of onset of signs. Patients with signs for less than 4 days have a mortality rate of 90%, whereas those with signs lasting more than 7 days have a mortality rate of 67%\(^{(39)}\).

**CONCLUSION**

*Key Points for Intramedullary Spinal Cord Abscesses in Children*

- Intramedullary spinal cord abscess in children is a rare entity.
- In children, unlike adults, intramedullary spinal cord abscesses are associated with preexisting congenital defects in spinal cord development. Inadequate exploration and incomplete removal of the dermoid sinus tract can cause recurrent cyst formation and subsequent intramedullary spinal cord abscess in children.
- Prevention of intramedullary spinal cord abscesses resides largely in the early recognition of congenital defects of the spine, especially dermoid sinuses.
- The diagnosis of intramedullary abscess should be considered and aggressively ruled out in any patient with a dermal sinus who presents with symptoms of a partial or complete transverse myelitis or meningitis. Immediate contrast MRI at the region of dermal sinus is a useful step.
- In children hematogenous spread from a variety of sources does occur, but the largest source of probable hematogenous spread has been shown to be from a urogenital tract source.
- Progressive sensory and motor loss are the clinical picture, and pain is often absent. The signs and symptoms depend on the location of the lesion; thoracolumbar segments and midthoracic segments are the most commonly areas involved.
- Systemic signs of sepsis, fever, and leukocytosis may be absent. The diagnosis of intramedullary spinal cord abscess in infants and children may be difficult and delayed until significant neurologic deficits become apparent because of their indolent presentation, often without fever or elevated peripheral WBC count.
- Suspicion of spinal cord abscess should be raised in patients with dermal sinus and rapid progressive weakness in particular those who develop febrile illness.
- Magnetic resonance imaging with gadolinium contrast is the gold-standard of investigation before surgical planning. Whole spine should be scanned to show the location and extension of the abscess.
- The most significant variable on outcome is timely surgical intervention, followed by appropriate antibiotic administration.
- Rapid treatment is essential for satisfactory neurological recovery.
• Prognosis is often unfavorable, if diagnosis is delayed.
• Prevention of intramedullary spinal cord abscesses resides largely in the early recognition of congenital defects of the spine, especially dermoid sinuses.
• MRI scan of the spine, surgical exploration and complete excision of the sinus before 6 months of age may reduce this infectious complication and its significant neurologic morbidity.

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