

Case Report

Paraspinal muscle abscesses in children – A case report and review of the literature

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ABSTRACT

Background: Few pediatric cases with myositis and abscesses of the paraspinal muscles have been previously reported.

Case Description: We herein report on a 3-year-old patient who developed an epidural abscess in a paraspinal muscle abscess, after a complication of infectious impetigo due to atopic dermatitis. The child improved through the administration of an antibacterial drug. The median age of seven patients with a history of paraspinal muscle inflammation and muscle abscess was 12 years old (3–15-years-old), few of which had underlying diseases, with methicillin-sensitive *Staphylococcus aureus* being the main causative agent. Although the prognosis was well in many cases following the administration of antibacterial agents, there were also cases in which extensive lesions were found and neurological sequelae remained.

Conclusion: The current case was the youngest case ever reported of a paraspinal muscle abscess. Although pediatric cases are rare, in the episode of a fever of unknown origin and difficulty walking, paraspinal muscle abscesses should be cited as a differential diagnosis and appropriate early diagnostic imaging and treatment should be performed.

Keywords: Abscess, Epidural abscess, Low back pain, Paraspinal muscles

INTRODUCTION

Pyomyositis often develops in the tropics, with approximately 30% of such cases being children.^[4] Adult cases have been reported to be caused by immunodeficiency, diabetes, leukemia, chronic renal failure, and injuries.^[6] The causative bacteria are mainly *Staphylococcus aureus* and Group A β -streptococcus.^[4] The affected lesion has been reported mostly the quadriceps muscle, iliopsoas muscle, and buttocks.^[5] Of these, myositis and abscesses that occur in the erector spinae muscles covered with hard fascia are rare and in the event, the epidural abscess is complicated, drainage or laminectomy may be required.^[2] The clinical course progresses in the order of the invasive stage, suppurative stage, and late stage. The invasive stage is a state in which myositis is generated and spread, the suppurative stage is a state in which a muscle abscess is formed, and the late stage is a state in which bacteria are systemically disseminated.^[3] This paper reports on an infant case of paraspinal muscle abscess with an epidural abscess and reviews the previous reports of pediatric cases including the our case.

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CASE DESCRIPTION

A 3-year-old boy born to healthy Japanese parents. He has been suffered from atopic dermatitis and bronchial asthma. He had no history of repeated and severe infectious diseases. He had been suffering from infectious impetigo on both legs and his trunk since 1 month before admission. Five days before, infectious impetigo worsened in his right knee fossa and 3 days before, he complained of back pain in his right lower back and difficulty walking. Because he developed a fever of 38°C on the day of admission, he was referred by a local doctor and thus was admitted to our hospital.

His consciousness was clear at the time of admission. His body temperature was 37.8°C, but there was no respiratory distress or tachycardia. Impetigo was scattered throughout his right popliteal fossa, limbs, and trunk. Although the psoas sign was positive, there was no spinal strike pain. There were no abnormalities in other physical findings. The results of a clinical examination found 19,200/ μ L of leukocytes, of which 85.4% were neutrophils. Fibrinogen increased to 1,027 mg/dL, D-dimer increased to 2.31 μ g/dL, and C-reactive protein (CRP) increased to 16.48 mg/dL. Despite the increase of Immunoglobulin E (IgE) 595 IU/mL, the rest was normal with Immunoglobulin G (IgG) 834 mg/dL, Immunoglobulin A (IgA) 168 mg/dL, Immunoglobulin M (IgM) 67 mg/dL, CD4 32.1%, and CD8 36.8%. Because he had asthma, a computed tomography (CT) examination was performed without contrast, thus indicating no ascite retention and no high absorption areas in the organs.

The administration of meropenem was initiated and he underwent a simple lumbar-pelvic magnetic resonance imaging (MRI) scan on the 6th day of illness. The T2-enhanced image indicated hyperintensity of marginalization at 2 cm in the right erector spinae muscle, while the diffusion-enhanced image indicated hyperintensity in the posterior to the spinal canal from L4 vertebral body to the sacral region [Figures 1a and b]. He was diagnosed with an epidural abscess and the right paraspinal erector spinae muscle abscess.

Due to possible development from impetigo, he additionally received vancomycin, targeting methicillin-resistant *Staphylococcus aureus* (MRSA), on the 9th day of illness. His fever receded and his back pain improved the following day. Because the blood culture and the culture of the impetigo site were negative, it was considered that the possibility of MRSA was low, so his treatment was changed to cefazolin. He was discharged from the hospital on the 33rd hospital day, following the intravenous injection of antibacterial agents for a total of 4 weeks and a change to the oral administration of ampicillin and clavulanic acid. Subsequently, he progressed without any sequelae such as walking and neurological abnormal findings. A simple MRI of the lumbar spine to pelvic was taken on the 13th day of onset, confirming the

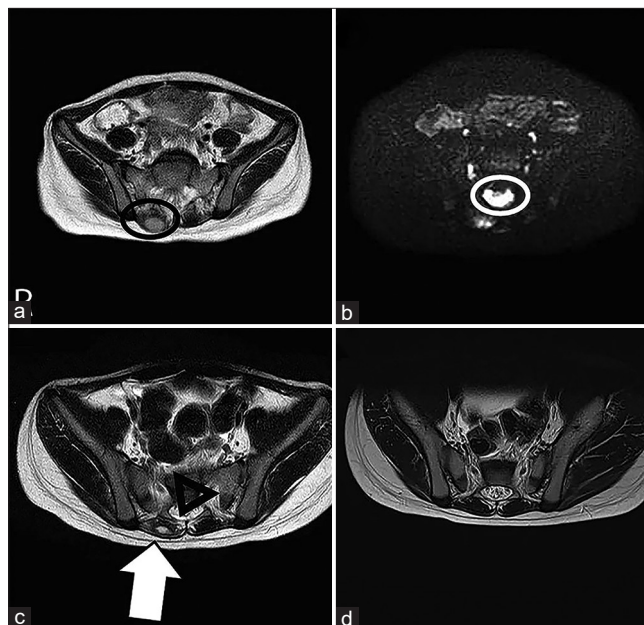


Figure 1: Lumbar to pelvic simple MRI images were taken of (a) and (b) on the 6th day of illness, (c) on the 13th day of illness, and (d) 1 month after discharge. (a) T2-emphasized image: A hyperintensity of marginalization is observed at 2 cm in the right erector spinae muscle (black circle). (b) Diffusion-weighted image: hyperintensity is observed in the posterior to the spinal canal from L4 vertebral body to the sacral region (white circle), (c) T2-enhanced image: paraspinal muscle abscess (white arrow) and epidural abscess (black triangle) tend to shrink, and (d) T2-emphasized image: it is confirmed that the abscess has completely disappeared.

reduction of the abscess [Figure 1c]. One month after discharge from the hospital, another simple MRI of the lumbar spine to pelvic was performed, which confirmed the disappearance of the abscess [Figure 1d].

DISCUSSION

This paper describes a paraspinal muscle abscess in an infant with an epidural abscess. While the causative bacteria were not identified, the illness improved with antibacterial agents.

Because the causative organisms of pyogenic myositis and muscle abscesses are *S. aureus* and Group A beta-streptococcus and beta-lactamase inhibitor combination penicillin and first- and second-generation cephalosporins are generally the drugs of choice as empirical therapy.^[12]

However, in this case, epidural or muscle abscess was also raised as a differential diagnosis due to unexplained fever and back pain, but it was difficult to differentiate it from other diseases until MRI imaging, and since the lesion and causative organism were unknown, meropenem, a broad-spectrum antibacterial agent, was used. Because of the possibility that the disease could have developed

Table 1: Summary of paraspinal muscle abscesses and myositis in children.

Patient	Age	Sex	Underlying disease	Pus culture	Blood culture	Antibiotics	Treatment start date	Antibiotics duration	Epidural abscess	Neurological findings before treatment	Surgery drainage	Sequelae
The current case	3	M	Atopic dermatitis	Unknown	Negative	MEPM→MEPM+VCM→CMZ →AMPC/CVA	Day 4	6 weeks	L4-Sacral	None	None	None
Renoux et al., 2006 ^[8]	5	F	None	SpA	Negative	CTX+FOM→AMPC	Day 4	5 weeks	L5-S1	None	None	None
Bowlyana et al., 2010 ^[2]	11	M	None	MSSA	Negative	VCM+NFPC	Day 3	Unknown	C3-T8	Quadriplegia and rectal disorders	Laminoplasty of the abscesses	Bladder and rectal disorders
Seno et al., 2018 ^[10]	12	F	Restless legs syndrome	MSSA	Negative	CTX→MEPM+VCM →SBT/ABPC→AMPC/CVA+AMPC	Day 12	4 weeks	L4-Sacral	None	Drainage	None
Simizu et al., 2012 ^[11]	12	F	Atopic dermatitis	MSSA	Negative	CEZ	Unknown	5 days	Unknown	Unknown	Unknown	None
Boulyana and Kilani, 2014 ^[1]	13	M	None	MSSA	Positive	OX→AMPC/CVA	Unknown	5 weeks	L4-S1	Lasegue sign	Drainage	None
Saito et al., 2012 ^[9]	15	M	None	Unknown	Negative	CTX→CTX	Day 4	6 weeks	None	None	None	None

MEPM: Meropenem, VCM: Vancomycin, CMZ: Cefmetazole, CTX: Cefotaxime, FOM: Fosfomicin, AMPC: Ampicillin, CTRX: Ceftriaxone, SBT/ABPC: ampicillin sulbactam, OX: Oxacillin, AMPC/CVA: Amoxicillin-clavulanate, SpA: Group A streptococcus, MSSA: Methicillin-susceptible *Staphylococcus aureus*

from impetigo, an additional dose of vancomycin targeting MRSA was administered. This case is also complicated by an epidural abscess. It is recommended that a broad-spectrum antimicrobial agent be the treatment of choice for epidural abscesses, and if MRSA is suspected, vancomycin may also need to be administered.^[7] Since drainage was not indicated and blood culture and the culture of the impetigo site were negative, the patient was presumptively not MRSA and was de-escalated to cefazolin.

The recommended treatment for muscle abscesses is antimicrobials alone for mild cases and incisional drainage in addition to antimicrobials for moderate cases. In addition to antimicrobial agents and incisional drainage, treatment for various complications is required for patients with severe cases.^[9] In addition, patients for whom surgical treatment of epidural abscesses is a priority are those with paralysis <72 h, weakness, incontinence, and/or spinal instability. In this case, the incisional drainage was judged to be difficult because of the viscous nature of the pus on MRI, and there were no neurological symptoms, so it was not performed.^[7]

Zheng *et al.* reported that myositis and abscesses of the paraspinal muscles account for 4–6% of pyomyositis even in adults.^[12] On researching this infant case in PubMed, an academic paper database, and Ichushi, a Japanese paper database, for “paraspinal muscle abscess,” “erector spinae muscle and/or myositis,” and “erector spinae muscle and/or abscess,” we found seven pediatric cases including the current case [Table 1].

The median age of these seven cases was 12 years old (range: 3–15-years-old), with this 3-year-old case being the youngest. Although there were few cases with underlying diseases unlike adults, there were two cases with atopic dermatitis, including the current case.^[11] This indicates that the causative bacteria may have invaded due to weakening of the skin barrier function caused by atopic dermatitis. A pus culture was carried out in five cases, four of which were methicillin-sensitive *Staphylococcus aureus* (MSSA) and one of which was Group A β -hemolytic streptococcus. Although there is no standard strategy of antibacterial agents, it cannot be diagnosed as a paraspinal muscle abscess by initial diagnosis and it is assumed that antibacterial agents with a relatively wide spectrum are administered as a fever of unknown origin. The median duration of administration was 35 days (5–42 days) in the six cases described, which did not differ from the duration of antibiotic administration for general muscular abscess/epidural abscesses.^[5,6] The median treatment start date was the 4th day of illness (3–12 days) in the five cases listed and treatment was initiated relatively early.

There were cases in which surgical treatment and sequelae remained even if early treatment was possible.^[2] Poor neurological prognostic factors in adults, lesions above 6.5 vertebral bodies, spinal cord disorders, and pretreatment complete paralysis, with the neurological prognosis of a

narrow epidural abscess, confined to the thoracolumbar spine, considered good.^[12] The neurological prognosis was well after performing either antibacterial administration or combined drainage, probably because four cases, including this case, had an epidural abscess in the narrow area from the lumbar spine to the sacral spine.^[1,8,10] However, the case reported by Bowen *et al.*^[2] acknowledged quadriplegia, bladder, and rectal disorders before the treatment, so it is presumed that surgical intervention and neurological sequelae were left behind, as the range of epidural abscess was also a wide range from the cervical spine to the thoracic spine, compared with other cases.

This review of the literatures has a limitation. The reason why there were 4 out of 7 Japanese cases may be due to the research being conducted in Japan. It is possible that research could not be conducted on domestic limited journals of other countries. On the other hand, it is possible that there are many cases of diagnosis due to the medical environment in Japan which allows MRI examinations to be performed quickly. Despite this limitations, this is the first report summarizing the clinical features of paraspinal muscle myositis and muscle abscesses in children.

CONCLUSION

In the seven cases of paraspinal muscle myositis and muscle abscess, while there were few underlying diseases and MSSA was high in pus cultures, it seemed to be difficult to detect the causative bacteria in blood cultures. Furthermore, the neurological prognosis of narrow epidural abscesses confined to the thoracolumbar spine was well, similar to reports in adults. The current case is the youngest of a paraspinal muscle abscess ever reported. While pediatric cases are rare, infants might not be able to complain of lower back pain. For this reason, muscle abscesses should be distinguished from medical history including trauma history, fever without fracture, and difficulty walking. Furthermore, paraspinal muscle abscesses are more likely to be associated with epidural abscesses and may have possible to lead neurological complications, so early diagnosis and treatment should be performed.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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