Primary pyomyositis of the paraspinal muscles: a case report and literature review

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Abstract A case of non-tropical pyomyositis in a healthy, adolescent, 13-year-old boy, affecting the paraspinal muscles is presented. Computerised axial tomography scan (CT scan) of the spine provided valuable information on the nature, extent of the disease and helped to plan successful surgical management. None of the reported cases of such severity of paraspinal pyomyositis had involvement of quadratus lumborum muscle or compression on retroperitoneal organ as in our case.

Keywords Pyomyositis · Paraspinal muscles · Quadratus lumborum · Tropical disease · Infection

Introduction

Pyomyositis is primary pyogenic infection of the skeletal muscles, has predilection for the large muscle masses of the body, with no obvious local or adjacent source of infection.

Because stripped muscle tissue is normally resistant to bacterial infection, pyomyositis is very rare [16]. Patel et al. [24] quoted Scriba as the first who described pyomyositis in 1885. It is predominantly a disease of tropical countries, and thus is referred to as tropical pyomyositis [12, 15, 23].

On the other hand, there have been reports from Europe, America, Japan and other nontropical countries [10, 11, 17, 24, 31].

Early recognition of this condition with prompt surgical intervention is important as failure to recognize this clinical entity can lead to diagnostic delay and inappropriate management [13, 17].

We would like to present a case of extensive primary pyomyositis of the paraspinal muscles with extension of infection to quadratus lumborum muscle and compression on retroperitoneal organ as the kidney to highlight the existence of such tropical disease even for this uncommon location. Eight reported localized cases of paraspinal pyomyositis in children over the past 35 years in the English literature are summarized (Table 1).

Case report

A 13-year-old previously healthy boy was referred to our hospital complaining of painful back swelling and inability to walk for the previous 2 weeks. His painful swelling started and progressed gradually and interfered with his daily activity and sleep.

Physical examination revealed an acutely ill-looking boy in extreme pain. Breathing sounds were clear and heart sounds were normal. At the time of admission the patient had a temperature of 39.8°C, pulse rate of 120/min, respiratory rate was 26/min, and his blood pressure was 90/60 mmHg. Laboratory investigation revealed that haemoglobin level was 10.2 gm%, white blood count (38,000 mm³) with marked shift to the left, significant elevation of erythrocyte Sedimentation rate (ESR 95 mm/h), and C-reactive protein was 55 mg/dl. Serum glutamic oxalacetic transaminase, serum glutamic pyruvic transaminase, serum alkaline phosphatase, serum albumin and renal function tests were within normal limits. Urine analysis and culture were normal.

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Table 1 Literature summary of pyomyositis of the paraspinal muscles in children

Author	Age (year)/sex	Delay in treatment (days)	Temperature (°C)	WBCs/mm ³	Associated disease	Causative organism
Christin and Sarosi [11]	10/M	9	40.3	22,300	–	<i>Staphylococcus aureus</i>
Tucker et al. [32]	15/F	60	37.3	7,800	–	<i>S. aureus</i>
Sirinavin and McCracken [29]	7/M	5	38.8	16,000	–	<i>S. aureus</i>
Raphael et al. [27]	0.3/M	7	37.6	14,700	HIV	<i>S. aureus</i>
Armstrong et al. [4]	14/F	6	37	16,500	Diabetes mellitus	<i>S. aureus</i>
Lee et al. [24]	2/M	10	38.4	18,600	–	<i>S. aureus</i>
Liew et al. [22]	6/M	7	36.6	18,500	–	<i>S. aureus</i>
Spiegel et al. [30]	12/F	5	39.8	14,200	Upper resp. tract inf.	<i>S. aureus</i>
Our case	13/M	14	39.8	38,000	–	<i>S. aureus</i>

Local examination of the back revealed prominent paraspinal swelling on the right side, which extends from mid thoracic spine down to the sacrum. No redness, scars, or sinuses were present. Positive fluctuation test revealed severe tenderness and there was no neurological deficit in the lower limbs. No other swellings were found in the body. There was no primary or distant septic focus in the body that could be identified. Aspiration of the swelling showed frank pus fluid. Gram stain showed neutrophils with gram-positive cocci while tissue culture revealed coagulase positive *Staphylococcus aureus*, sensitive to (Ampicillin, Flucloxacillin, Methicillin, Gentamycin, Erythromycin, and Vancomycin). Acid-fast bacilli were not detected and culture for tuberculosis revealed negative growth after few weeks.

Computerised axial tomography scan of the thoracic and lumbosacral spine showed large hypo dense, rounded swelling replacing almost all the paraspinal muscles on the right side, extending from the fifth thoracic spine to the third sacral spine. All paraspinal muscles (Multi fidus, Longissimus, Ilio costalis) and the retroperitoneal quadratus lumborum muscle were involved (Fig. 1). The quadratus lumborum swelling causing compression of the right kidney with no evidence of communication with it (Fig. 1). No rib or lung involvement was identified. There was no evidence of spinal element involvement. Surgical drainage was performed under general anaesthesia through paramedian posterior incision.

Large amount of foul smelling yellow fluid about 1,500 ml was drained, all the loculi including quadratus lumborum collection was evacuated. Necrotic tissues were excised and irrigation was carried out with 6 L of normal saline. Muscle biopsy revealed foci of abscess associated with severe active and chronic inflammation surrounded by prominent inflammatory granulation tissue. The surrounding muscle fibers shows degenerative changes, with no evidence of granulomatous or malignant cells seen

Fig. 1 Computed tomography scan, showing hypo dense lesion involving all the para spinal muscles including quadratus lumborum muscles pressing on the right kidney with preserved fascia around it

(Fig. 2). The blood culture grew *Staphylococcus aureus*. The patient was admitted to intensive care unit for 24 h, was started on intravenous Flucloxacillin 1 g every 6 h for 2 weeks, temperature came to normal 48 h after surgery, and white blood count dropped to normal after 72 h. The patient was discharged home after 2 weeks on oral Flucloxacillin 500 mg every 6 h for another 1 week after normalization of C-reactive protein, continued to be a febrile, normal white blood count, and devoid of symptoms and signs of infection. The patient was followed-up regularly in the outpatient clinic for the first few months and the ESR normalized by the sixth week. The patient was followed-up yearly for 5 years without recurrence or residual deformity.

Discussion

Pyomyositis can affect any age group [10, 11, 17, 21, 30] *Staphylococcus aureus* is responsible for 70–95% of cases

Fig. 2 Histological examination of the lesion revealed foci of abscess surrounded with marked inflammatory granulation tissue and degenerating muscle fibres

of pyomyositis which is mostly Penicillin resistant. [2, 10, 13, 17, 21, 29, 31]. Other more rare bacterial causes of pyomyositis include group A β -hemolytic streptococci, α -hemolytic streptococci and non hemolytic streptococci, *Peptostreptococcus*, *Streptococcus pneumonia*, *Staphylococcus epidermidis*, *Staphylococcus pyogens*, *Streptococcus pyogens*, coliform, *Fusobacterium*, *Haemophilus influenza*, *Escherichia coli*, *Neisseria gonorrhea*, *Citrobacter freundii*, *Klebsiella*, *Yersinia enterocolitica*, *Pasteurella species*, *Pseudomonas species*, *Salmonella typhi* and tubercle bacilli [1, 5, 8, 17, 20, 29, 33]. Twelve to 40% have multiple lesions [23], and 25–70% had history of trauma [23, 30]. Pyomyositis accounts for 1–4% of hospital admissions in some tropical areas [18]. Increased susceptibility to infection occurs in diabetics, prednisolone therapy, AIDS patients, aplastic anaemia, Leukaemia, Hodgkin's, and Heroin addicts [9, 19, 25, 28]. Thirty to 54% affecting the thigh muscles [17], while the paraspinal muscles form the least incidence in tropical zones <4% [10].

In the last 35 years eight cases of localized pyomyositis of the paraspinal muscles in children have been described in non tropical zones [4, 11, 21, 22, 27, 29, 30, 32], three had associated diseases and five had no predisposing factors. None of the reported cases had associated quadratus lumborum muscle involvement or pressure on retro peritoneal organ as in our case. In our case it was an extensive type extending from mid thoracic region down to sacral region without evident predisposing factor.

All reported cases of paraspinal pyomyositis were due to *Staphylococcus aureus*, and needed surgical drainage and antibiotic therapy except one in the invasive stage treated by antibiotics (Table 1). Usually the infections occur deep

within the skeletal muscles, with intact skin and the subcutaneous tissue due to strong muscle fascia [23]. Our case had favourable outcome in spite of the severity of muscle involvement. Pyomyositis in the limbs is misdiagnosed as haematoma, deep venous thrombosis, tumors, arthritis, muscle spasm, muscle rupture, cellulitis, or osteomyelitis [3, 7, 11, 17, 19, 26]. Ancillary measures to the diagnosis of pyomyositis including high sedimentation rate and Leucocytosis $>10,000 \text{ mm}^3$. Ultrasound, Computerized Axial Tomography scan (CT scan), and Magnetic resonance imaging, either single or combined, have been reported with very specific findings [6, 14]. Gallium 67 scan is very sensitive and valuable in early detection and localization of occult lesions [21].

Although the Magnetic resonance imaging is considered the gold standard in delineating the lesions of the spine, we were forced to use the CT scan to define the extent of the lesion and to exclude any bony involvement as our patient has claustrophobia. Treatment of pyomyositis depends on the stage of the disease; in the invasive stage, anti-staphylococci antibiotic should be given for 2–4 weeks [4]. In the suppurative stages and in extensive involvement, the classical treatment for accessible lesions is surgical drainage, while in non-accessible lesions aspiration either under Ultrasound or CT scan followed by antibiotic coverage is recommended [10, 14, 17]. Mortality rate is <1.5%, which is explained by absence of substantial bacteraemia and rarity of metastatic infection, but it increases in neglected and late cases to 15% [23]. This case represents another example of staphylococcal non-tropical pyomyositis of the paraspinal muscles with involvement of quadratus lumborum muscle, causing pressure on the kidney in retroperitoneal space.

Computerised axial tomography played a key role in the diagnosis, localization and determination of the extent and the involvement of the quadratus lumborum muscle where no such severity and combination of non-tropical pyomyositis could be found in the literature. This highlights the existence of such disease in children in non-tropical regions, even for such uncommon location. Surgical drainage and appropriate antibiotics resulted in the permanent cure of the patient, with no recurrence or residual deformity even after 5 years of follow up.

Conflict of interest statement None of the authors has any potential conflict of interest.

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