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Obturator externus abscess in a 9-year-old child

A case report and literature review

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Abstract

Rationale: Obturator pyomyositis is a rare condition in children. Diagnosis is often delayed because of its rarity, and the vagaries of its presentation cause it to be easily be missed. Physicians should therefore familiarize themselves with this condition and consider it as a possible differential diagnosis in patients presenting with an acutely painful hip. Inflammatory syndrome is also frequent among sufferers and the MRI is a very sensitive diagnostic tool for obturator pyomyositis. Additionally, joint fluid aspirations and blood cultures are also useful in identifying the pathogen. The appropriate antibiotic therapy provides a rapid regression of symptoms during the early stage of pyomyositis. In cases of MRI-confirmed abscess, surgical treatment is indicated.

Patient concerns: Our report focuses on a case of obturator pyomyositis in a 9-year-old boy. The child was febrile for 5 days and could only manage to walk a few steps. His hip range of motion was restricted in all directions. In addition, the patient had presented pain and swelling of his right elbow for a day, with a restriction of motion in the joint. There was a clear inflammatory syndrome. A diagnosis of hip and elbow septic arthritis was suspected, and the child underwent joint aspiration of the both cited joints. The aspiration of the elbow returned pus. Conversely, no effusion was found in the hip aspiration. The administration of empiric intravenous antibiotherapy was started.

Diagnoses: An MRI revealed an osteomyelitis of the ischio-pubic area associated with a subperiosteal abscess.

Interventions: Subsequently, 3 days after elbow arthrotomy, a surgical treatment was performed on the patient's right hip in order to evacuate the subperiosteal abscess and muscular collection because of the persistence of the patient's symptoms and inflammatory syndrome despite susceptible intravenous antibiotics. Postsurgery the patient showed steady improvement.

Lessons: Such cases demonstrate how diagnosis can be difficult because pelvic pyomyositis is often mistaken for more common pathologies such as septic arthritis, osteomyelitis, or appendicitis. This may delay the diagnosis or refer misdiagnosis. We discuss this rare infection in light of the literature with particular reference to its incidence, clinical features, bacteriological etiology, biological, and radiological presentation, and above all, its treatment.

Abbreviation: MRI = magnetic resonance imaging.

Keywords: magnetic resonance imaging, obturator externus muscle, pyomyositis

1. Introduction

Pyomyositis is defined as a bacterial infection of the muscle tissue which first leads to localized inflammation, then abscess formation. The infection can affect any skeletal muscle, but most often infects the largest muscle groups such as the quadriceps or gluteal muscles.[1–3] Pyomyositis of the pelvic musculature is a condition rarely seen in temperate climates. The diagnosis of obturator pyomyositis is often delayed because of its rarity and the vagaries of its clinical presentation. In fact, most children with obturator pyomyositis consult with fever, and either hip, thigh, or even abdominal pain, and often with an associated limp. As a result, pelvic pyomyositis is often mistaken for more common pathologies such as septic arthritis, osteomyelitis, or appendicitis.[4] Magnetic resonance imaging (MRI) is the imaging modality of choice in the workup of musculoskeletal infections.[5–7] It has increased sensitivity in the diagnosis of osteomyelitis compared with that of bone scans and plain radiographs, and has the ability to detect pyomyositis.[8] Pyomyositis is most frequently caused by *Staphylococcus aureus*. We present a rare case of obturator pyomyositis in a child, and our aim is to remind to the general practitioner of the risk of misdiagnosis, and highlight the usefulness of MRI in the diagnosis of osteoarticular infection. We discuss this rare infection in light of the literature with particular reference to its incidence, clinical features, bacteriological etiology, biological, and radiological presentation, and above all, its treatment.

2. Case report

A 9-year-old boy was brought to the emergency department of our hospital because of a 5-day history of fever, vomiting, and

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right hip pain localized to the anterior and medial aspect of his right hip. He was examined and received a diagnosis of flu and viral gastroenteritis. His right hip pain was attributed to sportive activities without trauma, and the patient was discharged with symptomatic treatment. The family returned to the emergency department twice more in the following 3 days because of his worsening symptoms. Four days after the onset of the fever, a reduction in the range of motion of the child's right elbow appeared, in addition to vomiting and limping.

Upon admittance to our hospital, the child was febrile, and could only manage to walk a few steps without supports, with an important antalgic gait. The spontaneous rest position of his hip was in slight flexion with external rotation. His hip range of motion was restricted in all directions, but predominantly in internal rotation. In addition, the patient presented pain and swelling of his right elbow, with a restriction in motion of the joint.

The patient's laboratory results showed a white blood cell count of 17,100 cells/mm^3 with 86% neutrophils, C-reactive protein to 200 mg/L, and erythrocyte sedimentation rate 65 mm/h. A conventional radiograph of the hip and the elbow showed no significant abnormality and a diagnosis of hip and elbow septic arthritis was therefore suspected, and the child underwent aspiration of both the cited joints. Aspiration of the elbow returned 7 mL of pus, and thus drainage and irrigation of the joint were performed using a lateral approach. Conversely, no effusion was found in the hip aspiration. The patient was immediately started on empiric intravenous antibiotics (clavulanic acid/amoxicillin). The following day, an MRI of the hip was performed in order to explain the pain and range of motion restriction of the right hip, which were unusual since the hip aspiration was normal. The MRI revealed an osteomyelitis of the ischio-pubic area associated with a subperiosteal abscess (Fig. 1). A 0.6 × 3 cm low attenuation mass with an enhancing rim within the right obturator externus muscle was also identified

Figure 1. Coronal T2 fat sat magnetic resonance imaging (MRI) showing bone involvement in the pubic area with ischium subperiosteal abscess, and enhancement rim of the externus obturator.

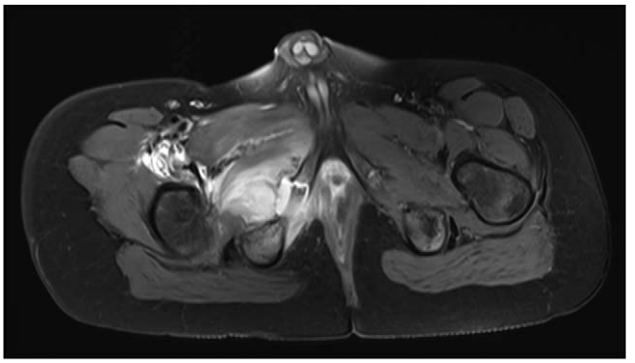

Figure 2. Axial T2 fat sat weighted magnetic resonance imaging (MRI) with enhancing rim within externus obturator, internus obturator, and levator ani muscle.

(Fig. 2). Scintigraphy was performed to eliminate other septic localizations.

Streptococcus pyogenes (group A) was cultivated from the joint fluid of the elbow, whereas the blood and urine cultures remained negative. Three days after the elbow arthrotomy, a surgical treatment was performed on the patient's right hip in order to evacuate the subperiosteal abscess and muscular collection because of the persistence of the patient's symptoms and inflammatory syndrome despite effective intravenous antibiotics. An incision and drainage was performed through the medial approach. This revealed bloodstained pus of the ischiopubic area. The right elbow was also examined again during this operation. Clavulanic acid/amoxycillin therapy was continued intravenously for a further 2 weeks, then the boy was switched to an oral treatment for 4 additional weeks. The patient showed steady improvement, his temperature returned to normal within 24 hours, along with a gradual improvement of his hip and elbow pain. All the patient's biological parameters returned to normal within a week.

3. Review of the literature

We searched the MEDLINE database, the Cochrane Library, and the Google Scholar search engine without date restrictions for all literature published up to December 31, 2015. The keywords we used were "pyomyositis" and "obturator." The title and abstract of each article identified by the above search terms were examined, and if the article appeared potentially eligible for inclusion, we then examined its full text. The reference list of every included article was searched for additional relevant articles, which were also subjected to the same screening process.

We conducted a full-text review of a total of 37 articles, and 12 of these were discarded because of irrelevant or noninterpretable content. The full text of each of the remaining 25 articles was then assessed in greater detail (Table 1). They were considered relevant with respect to identifying pyomyositis of the external obturator, the age of the patients, causative organisms, biological and bacteriological investigations, and treatment.[2,4,9–31] The total number of patients included in this review, including our own cases, is 80. The study represented level-4 evidence according to the CEBM classification, and this evidence yielded only a grade-C recommendation on both the centre for evidence-based medicine and strength of recommendation taxonomy scales.

Table 1

Clinical findings, biology, imagery, bacteriology, treatment of 80 children with obturator pyomyositis, based on recent reviews of literature.

	White et al[30]	Tharmarajah et al[28]	Menge et al[23]	Slade et al[26]	Chong et al[13]	Amari et al[9]	Khoshhal et al[19]	Kosuge et al[21]
Year	2015	2015	2014	2014	2014	2014	2013	2013
Numbers of patients	5	1	10	1	1	1	1	1
Patients								
Mean age	NR [2–10]	7	6.5 [1.3–13]	6	4	10	1	5
Gender	3M/2F	1M/0F	8M/2F	1M/0F	1M/0F	1M/0F	1M/0F	0M/1F
Clinical feature								
Temperature, °F	NR [100.5–104.6]	NR	110.7 [98.1–103.3]	104	NR	100.4	102.2	104
Pain/limp	5	1		1	1	1	1	1
Predisposing factors	1	1		1	0	0	1	0
Biology								
ESR, mm/hour	NR [18–113]	NR	51.5 [13–87]	96	73	NR	135	55
PCR, mg/L	NR [1.3–26.5]	62	94.2 [7.7–204]	180	114	34	4,6	111
Imagery								
US		1		1	1	1	1	
X-ray					1	1	1	1
CT								
MRI	5	1	8	1	1	1	1	1
Bone scintigraphy								
Bacterio								
Blood culture	5	1	8			1	1	1
Aspiration fluid	3		7					
Pathogen								
MSSA	2		6				1	1
MRSA	3		1			1		
Streptococcus group A		1						
Staphylococcus epidermidis								
Muscles involved								
Externus obturator			2	1				
Internus obturator	5	1	2			1		1
Both			6		1		1	
Antibiotherapy, days			14 – 56					
Intravenous	6–14	21		2	7	4	7	7
Oral				45	35	12	15	14
Incision and drainage	4		7			1		1

	Garcia-Mata et al[15]	Bertrand et al[11]	Klein-Kremer et al[20]	Duthie et al[14]	Scillia et al[4]	Nikolopoulos et al[24]	Mitsionis et al[2]
Year	2012	2011	2010	2010	2010	2009	2009
Numbers of patients	5	8	1	1	1	1	4
Patients							
Age	9.2 [6–11]	12.9 [6–18]	10	9	9	16	10. [2 7–14]
Gender	3M/2F	4M/4F	1M/0F	1M/0F	0M/1F	1M/0F	4M/0F
Clinical feature							
Temperature, °F	102.2 [100.4–102.2]	100.4 [96.8–104]	102.2	NR	100.4	100.4	3
Pain/limp	5	8	1	1	1	1	
Predisposing factors		0	1	0	1	0	4
Biology							
ESR, mm/hour	43.2 [9–111]	76 [30–133]	74		71	32	84.5 [55–110]
PCR, mg/L	11.6 [4.4 -19.9]	13.9 [4.4–38.8]	101		187	168	124 [1–302]
Imagery							
US	5			1		1	
X-ray	5	5	1		1	1	4
CT	1	4	1		1		
MRI	4	3	1	1	1	1	4
Bone scintigraphy	3		1			1	
Bacterio							
Blood culture	5	7	1			1	4
Aspiration fluid		2			1		
Pathogen							
MSSA	4	4	1		1	1	2
MRSA		2					
Streptococcus group A		1					
Staphylococcus epidermidis							
Muscles involved							
Externus obturator							1
Internus obturator	5	5		1	1		1
Both							
Antibiotherapy, days							
Intravenous	10		45		21	21	14
Oral	21	4				30	15
Incision and drainage				1	1		

(*Continued*)

Table 1

(Continued)

	Gonzalez Moran et al[16]	Bansal et al[10]	Bodart et al[12]	Kumar et al[22]	Karmazyn et al[18]	Iyer et al[17]	Wong-Chung et al[31]
Year	2009	2008	2008	2008	2007	2005	2004
Numbers of patients	11	1	2	1	6	1	2
Patients							
Age	9.3 [2.9–16]	12	12.5 [12–13]	12	10.3 [5–15]	11	4 [3–5]
Gender	5M/6F	1M/0F	2M/0F	1M/0F	4M/2F	1M/0F	0M/2F
Clinical feature							
Temperature, °F	100.4 [98.6–102.2]	100.4	102.2	100.4	NR	102.2	100.4 [98.6–102.2]
Pain/limp	9	1	2	1	6	1	2
Predisposing factors	3	0	2	0	0	1	1
Biology							
ESR, mm/hour	63.9 [32–110]	42	32	78	47.8 [21–82]	NR	37.5 [30–45]
PCR, mg/L	10.1 [1.1–25]	119	6.7 [5.5–8]	228	NR	28	NR
Imagery							
US	9	1	1	1		1	1
X-ray					2		
CT	9		1				
MRI	8	1	1	1	6	1	2
Bone scintigraphy			2				
Bacterio							
Blood culture	11	1	2	1		1	
Aspiration fluid							1
Pathogen							
MSSA	4		2	1	5	1	2
MRSA							
Streptococcus group A							
Staphylococcus epidermidis							
Muscles involved							
Externus obturator	3		2	1	3		
Internus obturator	4	1	2		4	1	1
Both							
Antibiotherapy, days	21						
Intravenous		15	15	21		6	
Oral		30	15	21		15	
Incision and drainage	5			1			

	Orlicek et al[25]	Spiegel et al[27]	Viani et al[29]
Year	2001	1999	1999
Numbers of patients	4	3	7
Patients			
Age	9.75 [8–11]	8.3 [4–16]	8 [6–14]
Gender	3M/1F	3M/0F	5M/2F
Clinical feature			
Temperature, °C	102.3 [101–104.5]	101.7 [100.4–103]	102.2 [102.2–104]
Pain/limp	4	3	7
Predisposing factors	3	3	3
Biology			
ESR, mm/hour	62.75 [40–72]	45 [28–57]	61.1 [33–94]
PCR, mg/L	NR	NR	NR
Imagery			
US			
X-ray	2		
CT	4		4
MRI	1	3	3
Bone scintigraphy	2		
Bacterio			
Blood culture	3	3	7
Aspiration fluid	4		
Pathogen			
MSSA	4	2	5
MRSA			
Streptococcus group A			2
Staphylococcus epidermidis		1	
Muscles involved			
Externus obturator	2		
Internus obturator	4	3	7
Both			
Antibiotherapy, days		30	5–28
Intravenous	4–14		
Oral	7–45		
Incision and drainage	3	2	3

CRP = C-reactive protein, CT = computed tomography, ESR = erythrocyte sedimentation rate, MRI = magnetic resonance imaging, MRSA = methicillin-resistant *Staphylococcus aureus*, MSSA = methicillin-sensible *Staphylococcus aureus*, NR = not reported, US = ultrasound.

4. Discussion and review of literature

Pelvic pyomyositis is relatively uncommon in pediatric patients. Accurate diagnosis is frequently delayed due to nonspecific clinical presentation, poorly evident signs of infection, and above all, to the lack of awareness of this condition among children by general practitioners. Thus, this infection remains difficult to diagnose, and often it is mistaken for other causes of low hip pain.

Children with fever, refusal to bear, and an irritable hip represent a diagnostic challenge. When pyomyositis involves the pelvic musculature, diagnosis becomes even more difficult because the deep structures cannot be examined directly, and the chances of differential diagnosis increase substantially.

This case report firstly highlights how difficult it is to realize the appropriate diagnosis of pelvic pyomyositis. The correct diagnosis was established relatively late in the course of the disease in our patient (10 days). This delay in diagnosis is unfortunately consistent with other studies in which delays longer than 10 days have been reported. Zvulunov et al[32] report an average delay of 12 days which resulted in permanent disability in 3.4% of cases reviewed. Mignemi et al[33] found that pericapsular pyomyositis is twice as common as septic arthritis in children presenting with an acutely irritable hip. The same authors consider that clinical algorithms are incapable of differentiating these pathologies and suggest that both must be considered under the current diagnosis previously referred to as "presumed septic arthritis." However, septic arthritis should be excluded first, which if left untreated could have devastating functional consequences.

Uncontrolled pelvic pyomyositis can cause sequelae such as septic shock, the osteomyelitis of adjacent bones, and septic arthritis. Children who present with symptoms and signs suggesting hip effusion or musculoskeletal sepsis in the region of the hip should immediately have an ultrasound or even a synovial fluid aspiration of the affected hip. In our case, hip septic arthritis was the initial diagnostic hypothesis, and we considered that the elbow septic arthritis was consecutive to a secondary to hematogenous contamination. Our case report also suggests that a normal fluid aspiration of the hip – which definitively excludes the diagnosis of septic arthritis – represents an indication for MRI.[18,29]

Over the past several years, MRI has become the procedure of choice to diagnose pelvic pyomyositis in children. MRI is 97% sensitive and 92% specific in diagnosing acute musculoskeletal infection and discloses early soft tissue and marrow edema.[7] Some authors have outlined 3 stages of pyomyositis as a gradual progression from diffuse inflammation, (stage 1) to focal abscess formation, (stage 2) and finally to a septic state (stage 3).[34–37] It is also useful to define the extent of osseous and extraosseous lesions.[38] Trusen et al[39] recommend that MRI should be the imaging method of choice for the pelvis whenever possible.

In this review of literature (Table 1), methicillin-sensitive *Staphylococcus aureus* is the most often reported causative organism for pelvic pyomyositis in children (80%).[2,4,11,12,15–25,27,29–31] Methicillin-resistant *Staphylococcus aureus* (11.5%)[9,11,23,30] or *Streptococcus* group A (6.5%)[11,28,29] have also been implicated. However, Pannaraj et al[3] report the emergence of methicillin-resistant *Staphylococcus aureus* in pediatric musculoskeletal infections, especially in the United States, since 2000. In 80% of cases, blood cultures are usually sufficient to identify the pathogen.[2,9–12,15–17,19–25,27–30] In cases of negative blood cultures, classical isolation methods yield to pathogen identification in abscess specimens most of the time (22.5%).[4,11,23,25,30,31]

Pelvic pyomyositis can be successfully treated with empiric antibiotics; there are 2 indications for proceeding with surgical drainage and washout: an MRI-confirmed abscess with refractory antibiotics, and an abscess causing mass effects on solid organs and neurovascular structures.[23,40] Four treatment approaches are described in the literature. There are 2 traditional approaches, the ilioinguinal and Pfannenstiel approaches, which require lengthy incisions and extensive dissections.[41–43] Less invasive approaches have also been reported: Menge et al[23] with the Vanderbilt approach, and the transgluteal approach by White et al.[30]

In conclusion, our case study highlights the fact that hip pain and fever should not always be concluded a septic joint infection. The differential should include osteomyelitis, septic joints, and pelvic pyomyositis. Any delay in diagnosis can lead to complications. MRI is the most efficacious procedure of choice to confirm this rare infectious condition.

5. Consent

Written informed consent was obtained from the patient's legal guardian concerning publication of this manuscript and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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