



Osteitis or osteomyelitis of the pubis ? A diagnostic and therapeutic challenge : Report of 9 cases and review of the literature

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Osteitis pubis is a noninfective inflammation of the symphysis pubis, without distinct aetiology. It has often been reported after urological or gynaecological procedures, and is also associated with trauma, rheumatic disorders, pregnancy and parturition. Symptoms mostly resolve spontaneously. On the other hand, osteomyelitis of the pubis is a classical infective inflammation of bone. The differential diagnosis between both entities may be difficult. The most common complaint in both inflammatory diseases is pain under load, either local or pseudoradicular in nature. The biochemistry is normal or slightly inflammatory in osteitis pubis, but frankly inflammatory in osteomyelitis. A 3-phase bone scan may be positive in the mineralisation or delayed phase in case of osteitis, and in all three phases in case of osteomyelitis. Aspiration is the ultimate diagnostic test : in case of osteomyelitis pubis, culture of the aspirate will usually lead to the diagnosis, sometimes even after antibiotic therapy.

Keywords : osteitis ; osteomyelitis ; pubis ; symphysis pubis.

INTRODUCTION

The symphysis pubis is an amphiarthrodial joint, allowing for minimal mobility as the opposing surfaces of bone are connected by fibrocartilage. It is non-synovial and is situated at the confluence of the two pubic bones (12). Inflammation of the symphysis can either be non-infectious or infectious.

Osteitis pubis, the noninfectious variant, was first described by Beer in 1924 (2). Osteomyelitis pubis, the infectious variant (17, 41), was described later on under various names such as infectious osteitis pubis (15), pubic osteomyelitis, and septic arthritis of the symphysis pubis (32).

Several aetiological factors have been described, for osteitis pubis as well as for osteomyelitis pubis : low grade infection (13), direct trauma (23), athletic exertion (5, 6, 11, 18, 25, 27-29), pregnancy, spontaneous origin (10), urological or gynaecological manipulation (40), cardiac catheterisation (21), surgery, and impaired venous circulation in the pubic veins (8, 9, 16, 35, 36).

Both entities start with pain in the groin. The diagnosis is often delayed : coxarthrosis, inguinal hernia or spasms of the adductor muscles are

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Table I. — Current series (n = 9) (osteitis pubis cases in bold letters)

no	gender, age	osteitis = o osteomyelitis = om	assoc. factors	duration before diagnosis (weeks)	CRP	pathogen	source of pathogen	surg. treatment	med. treatment	improv. after ... weeks	fig
1	f 44	om	pregnancy	1	16.4	Staph. aureus	biopsy	yes	antibiotics	8	1
2	m19	om	athletics	24	15.7	Staph. aureus	biopsy	yes	antibiotics	6	2
3	m36	om	tooth abscess	8	13.9	Staph. aureus	puncture	yes	antibiotics	20	3
4	m78	om	prostate cancer	52	1.1	none	biopsy	yes	antibiotics	4	
5	m49	o	rheumatic disease	10	0.3	none	puncture	no	antibiotics	4	
6	f72	om	vesico-urethral suspension	6	27.8	Staph. aureus	biopsy	yes	antibiotics	8	4
7	m78	om	prostate cancer	26	14.8	Pseud. aeruginosa	puncture	yes	antibiotics	20	
8	f77	om	diabetes	2	29.1	Staph. aureus	puncture	yes	antibiotics	16	
9	f44	o	soccer, urinary inf., rheumatic disease	4	6.4	none	puncture	no	NSAID	6	5

wrongly suspected (29, 30). If some inflammation is present, a trial antibiotic treatment is sometimes given without any specific diagnosis. Even under such conditions, an aspiration may still allow bacterial growth, in case of osteomyelitis.

There is a frequent delay of several weeks or months before the correct diagnosis is finally made (1, 30).

CASE REPORTS

Between February 1998 and December 2003 two patients with osteitis pubis and 7 with osteomyelitis pubis were seen in our institution (table I). The male/female ratio was 1/1 and 4/3, respectively. The average age was 46.5 years in the first group (range : 44 to 49) and 57.7 years in the second group (range : 19 to 78).

Both patients with osteitis pubis were known as suffering from rheumatoid arthritis since years ; they had been treated with corticosteroids. In one of them excessive daily athletic exercise may have played a role. The diagnosis was made after

4 weeks in one case, after 10 weeks in the other. The average C-reactive protein level (table I) was 3.35 mg/l (range : 0.3 to 6.4). The average white blood-cell count (table II) was 10,800/mm³ (range : 9,900 to 11,700). The average erythrocyte sedimentation rate was 37 mm after the first hour (range : 20 to 54). Aspiration was performed in both cases, as the diagnosis was uncertain, but yielded no bacterial growth. A biopsy was not done. The diagnosis of osteitis pubis was accepted, as cultures remained sterile, no osseous destruction was demonstrated (fig 5), and there was only a mild CRP elevation. Conservative treatment was decided. The condition of the two patients improved after an average period of 5 weeks (range : 4 to 6).

In the 7 patients with osteomyelitis pubis, a possible association was found with previous urological surgery in 3 and with pregnancy, athletic exertion, tooth abscess and diabetes mellitus in one each. The diagnosis was made after an average delay of 17 weeks (range : 1 to 52). The average C-reactive protein level was 17.0 mg/l (range : 13.9 to

Table II. — White blood-cell count (per mm³) and erythrocyte sedimentation rate (osteitis pubis cases in bold letters)

no	1	2	3	4	5	6	7	8	9
WBC × 1000	10.0	15.0	11.7	6.9	11.7	14.2	9.6	17.7	9.9
ESR	10/34	43/86	50/76	41/72	20/58	93/∞	61/82	77/∞	54/79



Fig. 1a. — Case 1. Osteomyelitis pubis in a 44-year-old pregnant woman. Coronal MRI (T2-weighted inversion-recovery-sequence) shows an abscess in the symphysis pubis. Note head of the fetus.

29.1), distinctly higher than in the osteitis group. The average white blood-cell count (table II) was 12,150/mm³ (range : 6,900 to 17,700), slightly more than in the osteitis group. The average erythrocyte sedimentation rate was 53 mm after the first hour (range : 10 to 93), slightly higher than in the osteitis group. Aspiration was performed in 3 patients, biopsy in 4. Bacterial growth was obtained in 6 of the 7 cases. The main causative organism was *Staphylococcus aureus*, isolated in 5 patients. In one patient *Pseudomonas aeruginosa* was found. In one patient (case 4) the cultures remained negative, probably because previous antibiotic treatment had masked the infection ; the diagnosis was made later on, when fistulisation occurred. A flaw of this study is the fact that 7 out of 9 patients had received antibiotic treatment for one to 28 days before admission to the hospital, without a specific diagnosis. Following surgical curettage, lavage and specific postoperative anti-

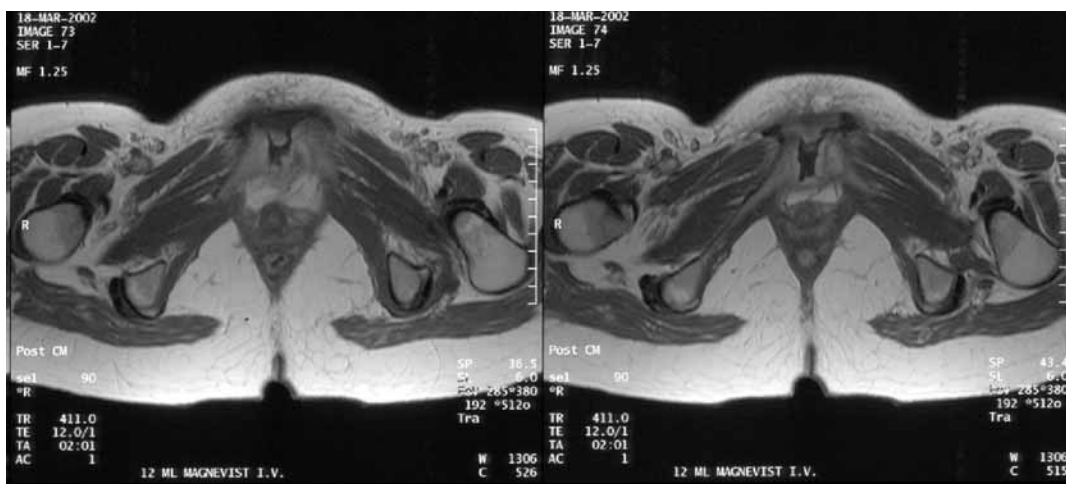
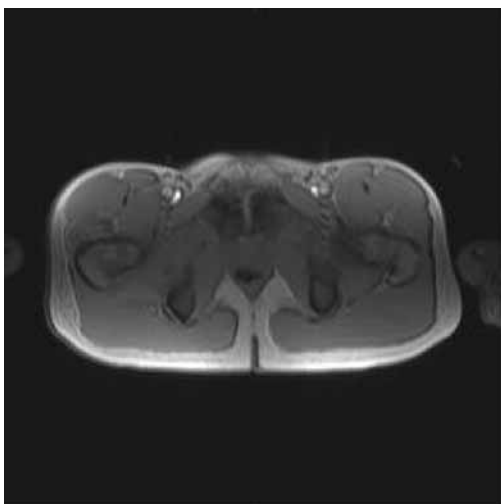


Fig. 1b. — Case 1. Osteomyelitis pubis. Transverse MRI, 3 months postoperatively, reveals no more signs of an abscess

biotic therapy, a rapid improvement manifested in all 7 osteomyelitis patients. After an average of 21 days (range : 11 to 38) the C-reactive protein level was normalised (<0.5 mg/l). Clinical improvement was obtained after an average of 11.7 weeks (range : 4 to 20).



Fig. 2a. — Case 2. Osteomyelitis pubis in a 19-year-old student physical education, after athletic exertion. Plain A-P radiograph of the pelvis shows osteomyelitis pubis with osseous destruction.



Figs. 2b-c. — Case 2. Osteomyelitis pubis. MRI of the pelvis : b (T1-weighted transverse), c (T2-weighted coronal) : osseous destruction, fluid in the symphysis e.g. pus.

DISCUSSION

Aetiology

The aetiology of osteitis pubis, or non-infective inflammation of the pubis, is unknown. It is often associated with rheumatic disease, exertion (31), pregnancy, and urological or gynaecological manipulation or surgery (37, 38). The problem is that osteomyelitis pubis may also be associated with some of these factors. Moreover, systematic studies are rare (14, 19), as most publications dealing with osteitis pubis or osteomyelitis pubis are case reports or review studies.

The pathogenesis of osteomyelitis pubis is unclear. Most authors assume haematogenic dissemination following abdominal, urological or gynaecological surgery. Extension of a local infection would also be possible. However, attempts to produce osteomyelitis pubis in dogs by injecting a bacterial suspension into the symphyseal joint remained unsuccessful (4). Diabetics and heroin users have a higher risk to develop osteomyelitis pubis. There is always a causative organism, although it is often difficult to reveal. Nevertheless, we noted that, in all but one of our osteomyelitis cases, cultures revealed the causative organism, even when antibiotics had been administered



Fig. 3a. — Case 3. Osteomyelitis pubis due to *Staphylococcus aureus*. Plain A-P radiograph shows mottled radiolucencies throughout inferior pubic rami and symphysis pubis.



Fig. 3b. — Case 3. Osteomyelitis pubis. Transverse MRI 3 months after completion of antibiotic therapy reveals no fluid or abscess (arrow).

previously. Aspiration with ultrasound guidance should be one of the first steps in the clinical approach.

One might feel that strenuous activity would lead to osteitis pubis, while surgical insult would be at the origin of osteomyelitis pubis, but this is not true. Combs (6), in 1998, reported bacterial osteomyelitis pubis in a weight lifter without invasive trauma, although one would expect an athlete would develop osteitis pubis rather than osteomyelitis. Even after surgery the ensuing condition may be either



Fig. 3c. — Case 3. Osteomyelitis pubis. Plain A-P radiograph. Roentgenographic improvement lagged behind clinical improvement by several months : progressive osseous destruction of the left hemisymphysis.

infective or non-infective. In other words, careful history taking and questioning do not automatically lead to the correct differential diagnosis. The same causative factors have been described for both affections. Osteitis/osteomyelitis pubis thus remains an enigma. As mentioned, Beneventi and Spellman (4) in 1953 reported an unsuccessful attempt to produce the osteomyelitis variant in the dog, by local injection of bacterial material into the public symphysis. The “key” for the right approach is to exclude the infectious form, osteomyelitis pubis, by means of aspiration. Only then can a rational specific therapy be initiated.

Clinical findings

As a rule, all patients suffering from osteitis or osteomyelitis pubis complain of suprapubic pain, either locally or radiating to one or both groins. They bend forwards when standing or walking, because of rectus or adductor muscle spasm. In the beginning the pain increases under load and decreases at rest, but later on it becomes permanent. In osteitis pubis the pain remains at a low level, but in osteomyelitis it is steadily increasing. The clinical setting is however similar for both conditions in the early stages.

Laboratory studies

C-reactive protein level, erythrocyte sedimentation rate and white blood cell count are either

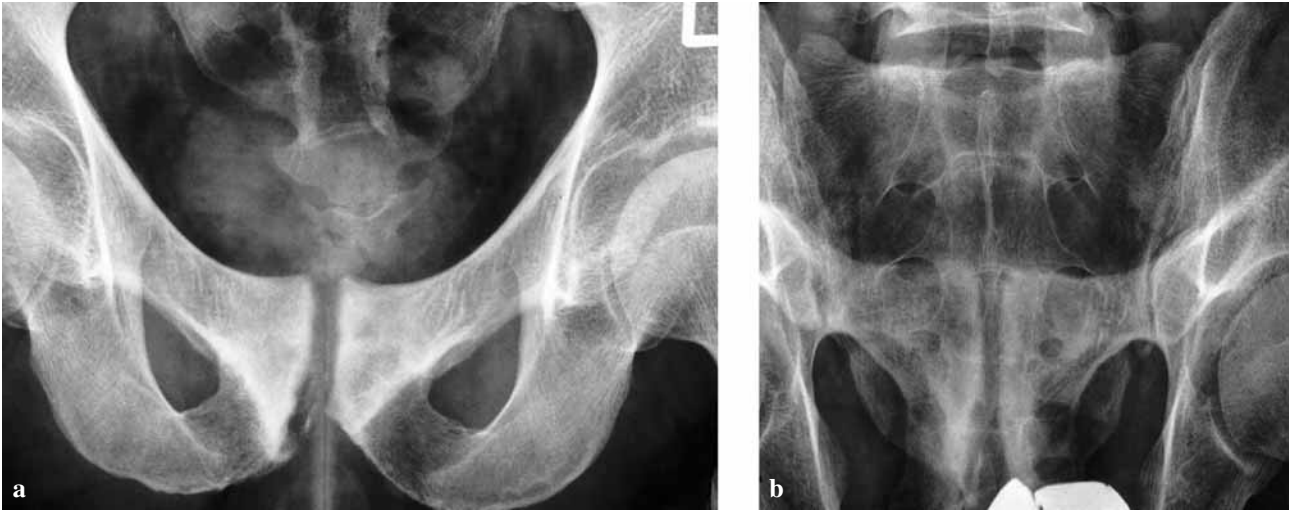


Fig. 4a-b. — Case 6. Osteomyelitis pubis caused by *Staphylococcus aureus*. a : plain A-P radiograph preoperatively, b : post-operatively. Note : widened symphysis pubis preoperatively as a sign of abscess formation in the symphysis.

normal or slightly elevated in osteitis pubis. They are usually elevated in osteomyelitis pubis. This was confirmed in the current study (table I and II). The rheumatoid factor and other inflammatory parameters should also be determined (33).

Imaging

Initially, plain radiographs are unremarkable in both conditions: they show varying degrees of sclerosis and rarefaction. After a while they become more typical. In osteitis pubis blurred bony contours are seen (fig 5). There is also spotty demineralisation which progresses until the symphyseal gap appears widened. Periostitis would be typical. Over months remineralisation occurs. The symphysis may even become obliterated. In contrast, in osteomyelitis pubis (figs 1-4), radiological changes begin in one ramus, while the other is affected later on. Subsequently, osseous destruction takes place.

Bone scintigraphy and MRI are more sensitive than plain radiographs, especially in the early stages. Three-phase bone scan can be helpful in the differential diagnosis of osteitis and osteomyelitis (3). Increased uptake in all three phases pleads for osteomyelitis pubis, while increased

uptake in the mineralisation or delayed phase only is typical for osteitis pubis. In the very early stages of osteomyelitis pubis, the increased uptake may be limited to one side.

Aspiration and needle biopsy

In the authors' opinion aggressive diagnostic investigations are necessary to exclude osteomyelitis. Needle biopsy is requested (3, 22 39) if the diagnosis remains unclear after non-invasive diagnostic investigations and laboratory examinations. An ultrasound guided Jamshidi needle biopsy of the symphyseal space and of the osseous parts is to be preferred. Tissue specimens are used for tissue culturing (7), even when antibiotics have been administered, and for histological examination.

In osteitis pubis histological examination shows slight to moderate signs of inflammation. Plasma cells but also lymphocytes are found. In more severe cases polymorphonuclear leukocytes are seen, as well as local haemorrhage and ossification. In acute osteomyelitis pubis the histological features include granulation tissue, areas of necrosis (sequestra), exudates, lymphocytic infiltration and plasma cells. In chronic osteomyelitis pubis similar features are noted, but in addition decreased



Fig. 5a. — Case 5. Osteitis pubis. Plain A-P radiograph. Rarefaction of the inferior pubic rami and symphysis pubis is a typical early radiographic sign.



Fig. 5b. — Case 5. Osteitis pubis. MRI (T1-weighted transverse images after i.v. administration of contrast medium) reveals fluid in the symphysis and inflammatory signs in the inferior pubic rami.

vascularity and sclerotic new bone formation can be observed.

Treatment

The treatment of osteitis pubis is symptomatic, as the disease is considered to be self-limiting, with symptoms disappearing over weeks or months. It consists of rest, hot packs, physiotherapy, and anti-inflammatory medication, or even steroids. Anticoagulant therapy has been described for the treatment of osteitis pubis (1, 20, 24). Wedge resection and simple resection of the symphysis have been advocated for resistant cases, but late pelvic instability may necessitate arthrodesis of pubis and sacroiliac joints (26).

The treatment of osteomyelitis pubis is based on the intravenous administration of antibiotics, according to an antibiogram. If the disease is progressive in spite of specific antibiotic therapy, surgical debridement with curettage and jet lavage is indicated. Antibiotic impregnated beads can be implanted. After surgery, rest and intravenous antibiotic therapy are continued until normalisation of CRP. Subsequently, mobilisation and oral antibiotic therapy are started until normalisation of ESR. Repeat imaging is useful for follow-up.

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