Osteomyelitis of the pubis in childhood

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The pubic bones are rare sites for the development of osteomyelitis in childhood. We report an instance of osteomyelitis of the pubic bones (osteitis pubis) in a 7½-year-old boy to illustrate the somewhat unusual presentation, the tendency for physicians to be misled into suspecting hip disease, the importance of including the entire pelvis in initial roentgenography for suspected hip disease, and the occasional normal scintiscan in partially treated osteomyelitis.

Case report

Initial clinical course and findings

A 7½-year-old boy from St. Pierre, a French island off the coast of Newfoundland, was referred to our hospital. He had been well until 1 month previously, when a fever of 38 to 39°C developed and he began to complain of pain in the left groin along the inguinal ligament. There was no history of local trauma, though the boy had been taking judo lessons for some time.

The family physician noted that the boy experienced pain with both adduction and abduction of the left hip and, to a lesser extent, with movement of the right hip. He also noted bilateral inguinal lymphadenopathy. He prescribed sodium colistimethate, 500 000 U intramuscularly twice daily for 6 days, as well as oxyphenbutazone suppositories and nitroxoline (5-hydroxy-5-nitroquinolone).

The boy's temperature returned to normal, his pain disappeared and he was again able to walk normally. However, 1 week later his fever recurred, as did the pain in the left groin, which worsened with movement and was aggravated by straining at the end of urination or defecation.

The family history and past medical history were noncontributory.

When admitted to our hospital the boy was very apprehensive and showed marked voluntary guarding of the musculature around both hips and the pelvis. He was able to walk only with difficulty, exhibiting a broad-based, stiff-hipped, waddling gait. There was slight bilateral tender inguinal adenopathy. With reassurance and distraction it was possible to move the right hip through a full range of motion, but rotation of the left hip while it was flexed to 90° caused him acute pain. No localized bone tenderness, swelling, heat or redness was found. Curiously, when the legs were fully extended, either limb could be rolled from side to side on the bed without causing hip pain. Rectal examination was deferred.

Initial radiologic findings

Because an inflammatory process in the left hip joint was suspected initially, roentgenograms of the hips were obtained, but no abnormality of the bones or the soft tissues was reported (Fig. 1). Cystography and intravenous pyelography were then carried out because of his complaint of pain on urination: the kidneys and ureters appeared normal; however, the inferior surface of the bladder was slightly elevated above the pelvic floor, and the margins of the symphysis pubis showed irregular rarefaction extending into the bodies of the pubic bones (Fig. 2).

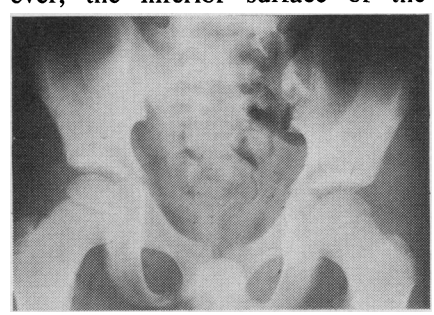

FIG. 1—Plain roentgenograms of hips, initially reported as showing no abnormality. With careful re-examination of this film the abnormality of the symphysis pubis, partly obscured by the genitalia, was seen.

These findings prompted a re-examination of the patient. The soft tissues over the symphysis now appeared a little full, and light pressure directly over the symphysis, applied both externally and per rectum, produced acute pain.

On the basis of these findings a diagnosis of probable osteomyelitis in the region of the symphysis pubis was established.

A bone scan was performed with technetium 99m methylene diphosphonate; however, no abnormality in the region of the symphysis pubis was demonstrated.

Laboratory findings

The hemoglobin level was 127 g/l, the blood leukocyte count 10.3 × 10^9/l (65% neutrophils, 12% band forms, 18% lymphocytes and 5% monocytes) and the erythrocyte sedimentation rate 38 mm/h. The serum levels of calcium, phosphorus, alkaline phosphatase, urea nitrogen, creatinine and electrolytes were all normal.

Urinalysis and urine culture gave negative results, as did tests for lupus erythematosus cells, rheumatoid factor and antinuclear antibody. An intradermal tuberculin test (with 5 tuberculin units of purified protein derivative) was positive, but the boy was known to have been vaccinated with bacillus Calmette–Guérin (BCG).

Further radiologic findings

Chest roentgenograms showed no abnormality. Posteroanterior tomograms of the symphysis pubis confirmed an ill-defined lytic process affecting the left pubic bone a little more than the right and involving the symphysis, with progressive widening inferiorly (Fig. 3). These findings were interpreted as most likely representing an inflammatory

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process, such as osteomyelitis or osteitis pubis. Ewing's tumour was considered much less likely because the lesion had already crossed the symphysis to the opposite side, and because there was relatively little soft tissue swelling and no periosteal reaction despite the extent of the bony involvement.

Subsequent treatment and clinical course

Eight days after the boy's admission to hospital the symphysis pubis was explored through a Pfannenstiel-type incision (by J.C.H.). The dissection was carried down adjacent to the rectus abdominis sheath and the bone was entered. No pus was encountered, but the bone appeared soft and distinctly abnormal.

A Gram-stained smear of material from the lesion showed gram-positive cocci, and culture yielded a light growth of *Staphylococcus pyogenes* and diphtheroids. The *Staphylococcus* was sensitive to cloxacillin, so this drug was given intravenously (1.0 g every 6 hours) for 15 days, then orally (250 mg every 6 hours).

Microscopic examination of fragments of bone tissue from the lesion showed segmental areas of suppuration between and around trabecular bone spicules. Some of the neutrophils showed intracytoplasmic bacteria. There were no distinctive features of neoplasia. The tissue diagnosis was acute osteomyelitis of the pubis.

The boy remained afebrile and the local pain disappeared during the ensuing week. His gait gradually returned to normal, and he was discharged on his 21st day in hospital, to continue his oral antibiotic therapy at home. The erythrocyte sedimentation rate had fallen from 38 to 24 mm/h by the time of discharge, and the blood leukocyte and differential counts were normal.

Follow-up roentgenography 1 month after discharge showed evidence that the bone lesion was healing.

Discussion

Osteomyelitis at various locations in the bony pelvis has been reported to account for between 3% and 8% of cases of osteomyelitis in childhood.[1] However, involvement of bone adjacent to the symphysis pubis is rare. The ilium is the pelvic bone most frequently involved, followed by the ischiopubis and then by the sacroiliac joint. Sequestrum formation is rare. Osteomyelitis of the pelvic bones tends to occur more commonly in children over 7 years of age. Usually there is a history of fever at the onset of the illness. However, as in our patient, the child may become afebrile as a result of either antibiotic treatment or effective host defence mechanisms.[2]

Osteomyelitis of the pubic bones used to be reported as occurring frequently in adults after trauma, particularly pelvic surgery. It is also well known to radiologists as a condition occurring at various intervals post partum. (In some cases the condition resolves, with restoration of the pubic bones to a normal roentgenographic appearance; in others it may progress to ankylosis.) Caffey,[3] quoting Alperin and Bender,[4] described rare instances of "osteitis pubis" in childhood with roentgenographic findings similar to those in our patient.

In 1951 Lavalle and Hamm[5] described an 18-year-old man with a 1-year history of symptoms that developed after he had run on an indoor track. He complained of lower mid-abdominal pain radiating to the upper medial thighs and had a waddling gait and fatigue. He was afebrile. Abduction of the hips caused severe pain. Roentgenographic examination showed a destructive lesion in the bone adjacent to the symphysis pubis.

Other instances of "osteitis pubis" or of "osteochondritis of the symphysis pubis" have been described in young adults, usually in association with a history of excessive exertion or direct trauma.[6-9] In virtually all the cases in which bacteriologic studies of tissue from the lesion have been performed a pathogen has been isolated, most commonly *S. aureus*.

In 1978 Greenstone and Greensides[10] reported on three children with osteomyelitis of the pelvis among all such patients seen at the Children's Hospital of Denver between 1943 and 1977, and emphasized the difficulty of making the diagnosis on the basis of clinical findings.

In 1979 Heldrich and Harris[11] described another three children with osteomyelitis of the pubis, a

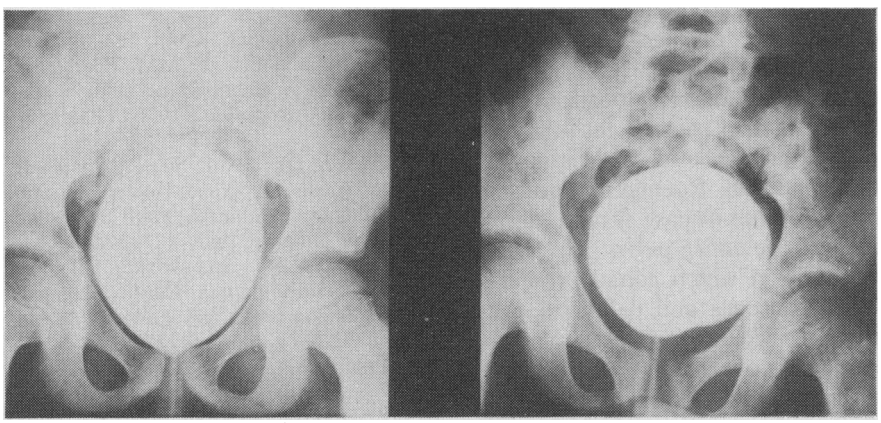

FIG. 2—Left: cystogram of 7½-year-old boy, showing normal pubic bones and normal bladder. Note density and distinct margins of pubic bones, normal width of pubic symphysis and normal position of inferior aspect of bladder. Right: cystogram of 7½-year-old patient, showing widening of symphysis, irregular rarefaction of margins of pubic bones, particularly on the left, and slight elevation of bladder due to local soft tissue swelling.

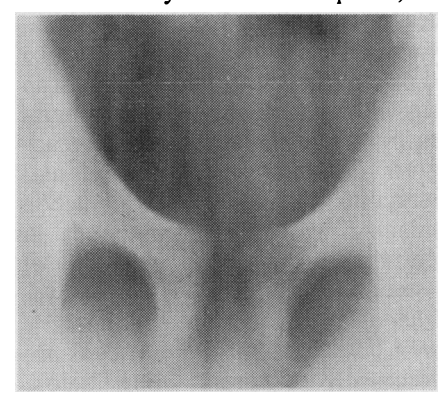

FIG. 3—Posteroanterior tomogram confirms the rarefaction, more marked on the left, and the irregular margins and widening of the symphysis pubis.

boy of 6½ years, a girl of 9 years and a girl of 7 years. All presented with fever, pain in the hip and limping. The initial clinical diagnosis in all three was septic arthritis of the hip. Like us, Heldrich and Harris noted that passive motion of the hip was reasonably well tolerated, while active motion and weight bearing were not. Following the experience with their first two patients they were led to suspect the diagnosis clinically in the third, and they demonstrated localized tenderness on palpation over the symphysis. In two of their patients roentgenographic evidence of the lesion did not appear until 7 and 22 days after admission. *S. aureus* was recovered from one patient, and group A β-hemolytic streptococci were cultured from another.

We too were initially misled clinically into believing that our patient had an inflammatory process in the hip. In retrospect, there were several clues to the pelvic condition: the aggravation of the pain by straining at the end of defecation or urination, the unusual gait and the localized tenderness that was not detected at the initial physical examination. We were unable to elicit any history of antecedent local trauma in the boy, although trauma appears to be a common etiologic factor in adults with the condition. Whether our patient's regular participation in judo caused him unrecognized or forgotten injury remains conjectural.

It is interesting that the bone scan in this patient showed no abnormality despite clear-cut roentgenographic evidence of an osteolytic lesion that proved to be inflammatory. This is a well known sequence during treatment, since the scan provides a measure of bone mineral turnover, whereas the roentgenogram depicts residual mineral and structure. The value of radionuclide imaging with ^{99m}Tc compounds in permitting an early diagnosis of osteomyelitis, including osteomyelitis of the pelvis, in childhood is well documented.[11-16] Scintiscans are frequently abnormal long before diagnostic roentgenographic changes of osteomyelitis are detectable. But despite the markedly superior diagnostic sensitivity of radionuclide imaging, there are occasional instances, as in our case, in which a scintiscan may show no abnormality despite unequivocal roentgenographic changes. Lisbona and Rosenthall[17] have pointed out that subtle lesions of osteomyelitis, especially those appearing next to growth plates, may be revealed more effectively by imaging with gallium 67; they emphasized that both types of radionuclide imaging are more fruitful than roentgenography in establishing the diagnosis.

The causative agent most frequently reported in osteomyelitis of the pelvic bones is *S. aureus*, the pathogen detected in our patient. Our experience underlines the value of surgical exploration in establishing the diagnosis and ensuring appropriate antibacterial therapy.

The lack of suppuration in our patient also concurs with previous experience with osteitis or osteomyelitis of the symphysis pubis.

In our patient the antibiotic was administered intravenously for 15 days and orally thereafter, with a good result. As Nelson[18] has pointed out, oral antibiotic therapy under appropriately monitored conditions can be entirely satisfactory for the management of selected serious infections (including osteomyelitis) and may offer significant advantages to the patient.

Conclusions

Our experience with this patient was instructive because it showed that more careful attention to the details of physical examination might have suggested the diagnosis, or at least the exact location of the lesion. It also showed that systemic manifestations may be minimal in this condition. Roentgenography for suspected hip disease should initially include the entire pelvis. This is one situation in which gonad protection would obscure and delay the diagnosis. Clear roentgenographic evidence of osteomyelitis is not always accompanied by a demonstrable abnormality in a bone scan, particularly if treatment has already been partially effective.

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