Computerized Tomography in the Evaluation of the Soft Tissue Component of Bony Lesions of the Pelvis

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Abstract. Three cases are presented in which lesions of the bony pelvis with extraosseous soft tissue components are evaluated using computerized tomography. In each instance, computerized tomography provided precise anatomic localization of bony lesions and clearly depicted the extent of associated extraosseous masses. In all cases, the clarity of anatomic detail obtained suggests that computerized tomography represents an important new methodology for evaluation of the soft tissue component of bony lesions of the pelvis.

Key words: Computerized tomography — Pelvis — Neoplasia.

Lesions of the bony pelvis frequently have a soft tissue component which is difficult to detect radiologically. Extraosseous soft tissue masses blend in with the pelvic soft tissues and are notoriously elusive on plain roentgenography. Displacement of the bladder, the ureters, or the pelvic colon may provide indirect evidence of the presence of an extraosseous mass. Standard tomography often provides details of the soft tissue component, particularly, if the mass contains a cartilaginous or osteoid matrix. However, we have had disappointing experiences with the unexpected detection by the surgeon of a large non-calcified soft tissue component of a chondrosarcoma or other primary neoplasm arising within the pelvic skeleton. We have recently employed computed tomographic (CT) scanning in the examination of a series of patients with osseous lesions of the pelvis and we have been pleased by the fine delineation of soft tissue detail provided by the examination. The purpose of this communication is to illustrate three such cases.

Case Reports

Case 1

J.H., a 69-year-old white male presented in August 1972 with a three month history of increasingly severe pain in his left hip. Initial radiologic evaluation revealed a solitary lytic lesion in his left ilium. A plasmacytoma was diagnosed by open biopsy. The patient received orthovoltage radiotherapy (3600 rads). He did well until September 1974, when a bone marrow biopsy showed an increased percentage of plasma cells. Treatment was reinstituted with monthly doses of Alkeran and prednisone. The patient remained asymptomatic until February 1977 when he suffered a pathologic intertrochanteric fracture of his left femur. This was treated by a total hip replacement. A skeletal survey showed a new destructive process in the left ilium in the area of his primary plasmacytoma. Repeat left iliac crest bone biopsy again demonstrated poorly differentiated plasma cells. Chemotherapy was reinstituted. In August 1977, he again noted the onset of left hip pain in association with paresthesias of the left leg. These symptoms persisted resulting in the present admission in November 1977. Physical examination showed a soft tissue mass overlying the left iliac crest and mild diffuse edema of the left leg. Laboratory examination showed trace Bence-Jones proteinuria, and a 1 gram/100 cc spike in the gamma region. An IVP was normal except for a minimally enlarged prostate. Ultrasonography showed a large mass arising from the left ilium posteriorly, and an ill-defined mass anterior to the left iliac crest. Computerized tomography was performed to determine the extent of tumor in the pelvis. A tumor mass in contiguity with the lytic lesion in the iliac bone was clearly demonstrated (Fig. 1). A radiotherapy treatment portal was designed to incorporate the total extent of the tumor mass in the iliac region, and the inferior portion of the retroperitoneum.

Case 2

I.K., a 65-year-old white male physician with known Paget's disease, first noticed dull pain in his right hip after playing tennis in August, 1977. The pain persisted, radiating to the posterolateral...
Fig. 1A-C. A Intravenous urogram. There is a large lytic lesion in the superior portion of the left ilium with minimal sclerosis around its medial border. The left hip has been replaced by a prosthesis. 
B CT scan. 5 mm thickness, 125 KV, 20 MA, transverse section 8 cm above the symphysis pubis through the L5-S1 disc space. On the right (normal) side the iliacus muscle is closely adherent to the ilium and anterio-medially, the psoas muscle is well defined. Posterior to the ilium is the gluteus medius muscle. On the left side there is a large mass involving the psoas and iliacus muscles. There is a markedly destructive lesion of the left iliac wing with extension of a soft tissue mass posteriorly to involve the gluteus muscle which appears moderately thickened. 
C A transverse section 4 cm superior to the symphysis pubis through the iliac wings and sacrum. The iliac wing is intact. The iliopsoas muscle is thickened due to infiltration by the tumor (compared to normal side). The gluteus medius and minimus muscles are larger than the contralateral side suggesting involvement by tumor.

aspect of the thigh and extending to the calf and ankle. In September, 1977 he sought orthopedic consultation and was admitted to Johns Hopkins Hospital in early October. There was radiologic evidence of Paget’s disease of the spine and pelvis. Electromyography and nerve conduction velocity tests showed a peripheral neuropathy involving both posterior tibial nerves. Myelography demonstrated a ventral extra-dural defect at the L4-5 level compatible with chronic discogenic change. Surgery was recommended, but the patient refused. He was discharged in late October following conservative therapy. One week later his pain recurred, this time associated with paresthesias and swelling of his right leg. He was re-admitted, and at surgery was found to have a herniated disc. Exploration showed no evidence of tumor. After surgery, however, his pain and swelling failed to resolve. He was noted to be increasingly anemic, and began developing daily fever spikes. In early November the patient was transferred to the Medical Service, where reevaluation led to the discovery of a soft tissue mass in the right side of the pelvis eroding the lateral third of the sacrum. Biopsy revealed a very cellular, pleomorphic, anaplastic sarcoma with numerous mitoses. The nature of the origin of the neoplasm was uncertain until computerized tomography showed that the mass in the pelvis was in contiguity with the lytic destructive lesion in the pelvis (Fig. 2). It was concluded that the entire process represented a sarcoma, a malignant fibrous histiocytoma, arising within an area of Paget’s disease of bone. Computerized tomographic display of the extent of the lesion was used in radiotherapy treatment planning.

Case 3

E.P., a 49-year-old white male was admitted to Johns Hopkins Hospital in January 1978 for evaluation of pain in his groin. Three and one-half years prior to this admission, he had undergone resec-