Early Diagnosis of Disc-Space Infection Using Gallium-67

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A 4-year-old boy had had progressive central lumbar pain and hamstring spasm. He had a normal lumbar-spine x-ray except for minimal L-5, S1 spondylolysis, but gave an abnormal gallium-67 scan in the region of the low lumbar spine. Eight weeks following intensive antibiotic therapy, confirmation of the diagnosis of disc-space infection was established by roentgenographic studies that demonstrated narrowing of the L 4-5 intervertebral disc space. A technetium-99m diphosphonate bone scan, performed concurrently with the gallium-67 study, was normal.

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One of the more difficult diagnoses to establish in pediatric orthopedics is that of early disc-space infection. Leg pain or abnormal pain may be the presenting symptom (*1*) and x-ray changes are rarely present before 3 wk. In one series, 9 weeks of symptoms had been present before the diagnosis was made (*2*). Some authors maintain that "disc-space infection" is not really an infection at all, but an inflammation or a fracture (*3*). Others do not distinguish between disc involvement and involvement of the adjacent vertebral body (*4*). The following is a report of the diagnosis of disc-space infection by use of a gallium-67 scan. Of added significance is the positive gallium scan in the presence of a normal Tc-99m diphosphonate bone scan.

CASE REPORT

A 4-year-old boy was well until 4 wk before admission when he developed a gastrointestinal upset ascribed to "flu." At the end of that course, he developed central lumbar pain that increased progressively, and 2 days before admission he stopped walking. Upon admission, he complained of diffuse abdominal pain without change in bowel habits. Radiographs performed by his pediatrician showed a spondylolysis at L5-S1.

Admission temperature was 100°F, and there was mild hamstring spasm. Neurologic examination was normal. There was no local tenderness over the spine. The laboratory results were as follows: WBC 6,800, 33% P, 54% L, 8 M, 4 E, and 1 B. The urinalysis showed 0–1 WBC, the ESR was 50–54, alb/glob was 4.4/3.2, Ca was 10.4, and alkaline phosphatase was 8.2. The tomogram showed a spondylolysis at L5-S1. A chest radiograph was normal. A PPD (intermediate strength) was negative. ASLO titer, blood cultures, latex fixation, *Brucella* and *Salmonella* titers, and urine culture were all negative.

Following i.v. injection of 1.5 mCi of Ga-67 citrate, a scan was performed with a large-field-of-view Anger camera, the energy windows bracketing three photopeaks (Fig. 1). It showed increased lumbar-spine uptake that persisted and increased in intensity in sequential images taken over 72 hr. A bone scan using 10 mCi of Tc-99m diphosphonate, performed 24 hr after the completion of the Ga-67 study, was normal.

The patient was treated with i.v. oxacillin for 4 wk; his sedimentation rate returned to normal and his pain disappeared. On a followup study at 3 mo he had remained afebrile and asymptomatic and his ESR had dropped to 12. Two months later, radiographs showed narrowing of the L4-5 intervertebral disc space without evidence of bone involvement,

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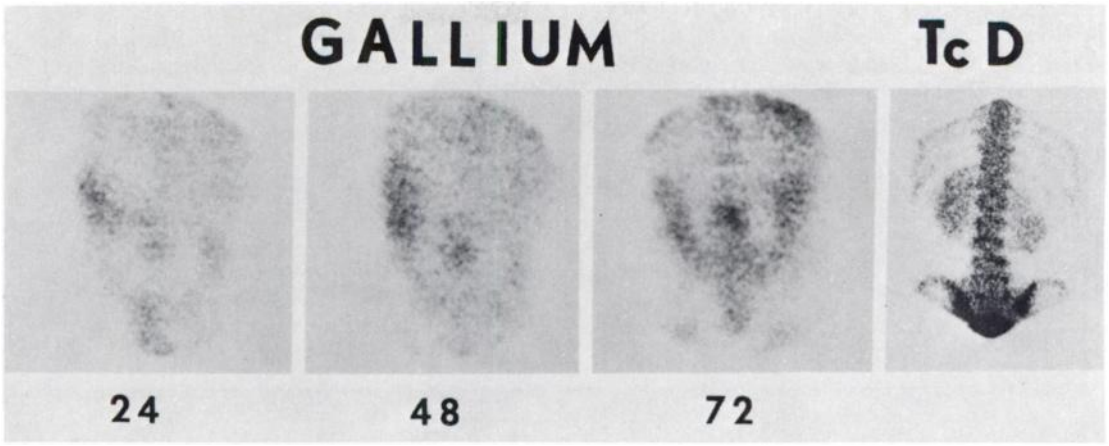

FIG. 1. Three Ga-67 citrate images are shown, performed 24, 48, and 72 hr after an injection of 1.5 mCi, and a Tc-99m diphosphonate bone scan performed 2 hr following i.v. injection on the day after gallium scans were completed. Bone scan is normal in region of low lumbar spine, where there is focal accumulation of activity on Ga-67 study. Gallium-positive region becomes relatively more intense with passage of time, increasing likelihood of underlying pathologic process in that area.

confirming the diagnosis of disc-space disease (Fig. 2A and B).

DISCUSSION

The diagnosis of disc-space infection was made by Ga-67 citrate scanning before x-ray and Tc-99m bone-scan changes occurred. The x-ray features of disc-space infections are distinctive, although the changes may not be present until months after the onset of the symptoms (*5*).

Gallium-67 citrate localizes in pyogenic abscesses and has been used previously in the diagnosis of osteomyelitis (*6*). Technetium-99m diphosphonate has also been used in the diagnosis of osteomyelitis and has been shown to be positive as early as 2 days after the onset of the disease (*7,8*). Our case, with its normal Tc-99m bone scan, suggests that bone was not involved at all, thereby helping to establish disc-space involvement as an independent entity (*6,9*). Since vascular channels into the disc have been found present as late as age 20 or 30 (*10,11*), bone involvement is not necessary.

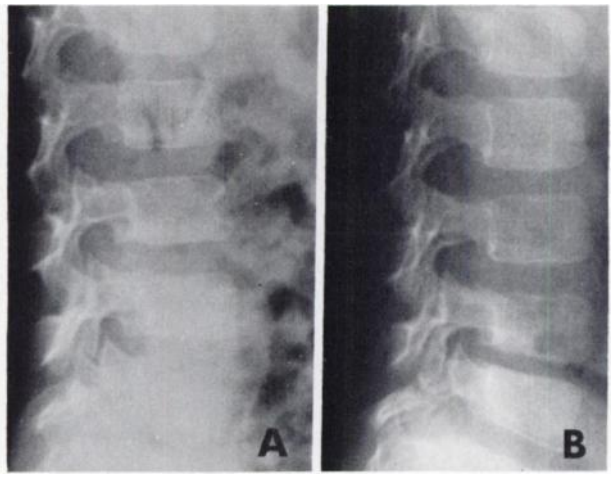

FIG. 2. Lateral radiographs of lumbar spine taken at time of admission to hospital (A), and 3 mo later (B). Shrinkage of L4-5 interspace on later radiograph is consistent with diagnosis of disc-space infection.

CONCLUSION

In this patient a diagnosis of disc-space infection was made on the basis of a Ga-67 scan where a negative Tc-99m scan suggested the absence of concomitant bone involvement.

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