Positive Indium-111 Leukocyte Scan in Nocardia Brain Abscess


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We report a case of clinically unsuspected nocardia brain abscess detected by \(^{111m}\)In-labeled autologous leukocytes. Clinical and computed tomographic findings supported the diagnosis of primary or metastatic tumor and the patient was treated with dexamethasone for 30 days prior to the leukocyte scan. Labeled leukocytes may provide a sensitive discriminator for brain abscess despite previous therapy with steroids.


The differential diagnosis of an enhancing lesion found on computed tomographic (CT) scan of the brain includes primary and metastatic tumor, brain abscess, cerebrovascular accident, and multiple sclerosis. Despite the potentially different clinical presentations, a correct diagnosis may be difficult, particularly in patients with a paucity of non-central nervous system (CNS) symptoms, with known non-CNS primary tumors, and with immunosuppression. The consequences of an incorrect diagnosis are grave, and operative intervention may depend on the preoperative diagnosis.

Since introduced by Thakur et al. in 1976 (1), indium-111- \(^{111m}\)In labeled leukocytes have been found to be highly sensitive and specific in the detection of pyogenic foci in humans (2,3). Most reports emphasize the value of leukocyte scanning in cases of suspected intra-abdominal sepsis and its superiority to gallium-67 in that regard (4,5). We report a case of nocardia brain abscess detected by labeled leukocyte scan in a patient clinically suspected to have a primary or metastatic brain tumor.

CASE REPORT

A 68-yr-old white male was admitted to another institution after experiencing a left-sided seizure, confusion, and both expressive and receptive aphasia. Past medical history and review of systems were negative, and the physical examination returned to normal after treatment with phenytoin and dexamethasone. Preliminary evaluation included a CT scan of the brain which revealed a solitary enhancing lesion in the right fronto-parietal area (Fig. 1). The initial and all subse-
quent chest radiographs were within normal limits. Angiography revealed normal vascularity in the area. Routine laboratory studies as well as a barium enema in search of a primary tumor were normal.

The patient was transferred to this institution after 30 days of steroid therapy for neurosurgical diagnosis and treatment.

There was a slight elevation of the leukocyte count (13.6 k/mm³) with a shift to the left (77% polymorphonuclear leukocytes, 11% band forms, 12% lymphocytes). After informed consent was obtained, a leukocyte scan was performed (Fig. 2A and B) which revealed marked leukocyte localization in the right fronto-parietal area corresponding to the lesion found on the CT study. In connection with a preoperative gated blood-pool scan, a blood-pool image of the head was made, which showed normal blood-pool activity in the area of the abscess (Fig. 2C).

Subsequently a repeat CT study was performed which demonstrated a significant increase in the size of the lesion compared with the previous study ~1 mo earlier (Fig. 3). The patient underwent right frontal craniotomy with biopsy and drainage of gelatinous material. No tumor was grossly evi-
dent. Gliosis, marked leukocyte infiltration, and nocardial elements were seen microscopically (Figs. 4 and 5). Bacterial cultures were negative. Fungal cultures and stains demonstrated nocardia and pathological examination showed an intense inflammatory cell response to the infection. No malignancy was present. The patient had normal immune response as determined by an anergy screen. No underlying illnesses predisposing to infection with nocardia were present, and the patient was afebrile throughout the course of observation.

DISCUSSION

Because of the absence of clinical signs of infection and the age of the patient, a presumptive diagnosis of brain tumor was made, and therapy was instituted with dexamethasone. This could have had disastrous consequences if continued indefinitely, if the patient had not been considered a surgical candidate, or if the lesion had been surgically inaccessible.

A recent report suggests that the leukocyte scan is both sensitive and specific in differentiating brain abscess from brain tumor (6). In that study patients with brain abscess had received steroid therapy for only 10 days or less before leukocyte scanning. It should be emphasized that the current study was positive even after prolonged (30 days) steroid treatment, a factor which could be expected to reduce the sensitivity of the study. A comparison of the leukocyte and blood-pool studies shows that the labeled leukocytes are not present on the basis of increased blood-pool activity. Furthermore, pathological examination confirms that an intense inflammatory cell response was present. These findings indicate that chemotaxis was not significantly impaired by steroid treatment.

We conclude that labeled leukocyte scan is helpful in the differentiation of brain abscess from brain tumor, and that prolonged steroid therapy does not preclude the possibility of accurate diagnosis and should not be a factor mitigating against the use of the leukocyte scan in this setting.

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REFERENCES