Gallium-67-Citrate Scanning in Patients with Sarcoid Uveitis

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Gallium-67-citrate is useful for characterizing activity in patients with sarcoidosis. Gallium-67 uptake in bilateral symmetrical hilar lymphadenopathy and/or symmetrical salivary glands is typical of this clinical entity. Sarcoidosis is a systemic disease, and uveitis is considered the hallmark of ophthalmic sarcoidosis. We present two cases of ophthalmic sarcoidosis that shows uveal accumulation of 67Ga-citrate associated with clinical symptoms.


CASE REPORT

Case 1
A 63-yr-old Asian female was admitted to our hospital due to visual disturbance of her right eye. She had lost visual sense of her left eye 30 yr before. Her serum angiotensin-converting enzyme (ACE) and lysozyme were elevated.

Active posterior uveitis was observed, and bilateral hilar lymphadenopathy was remarkable on chest roentgenography. Conjunctivitis was not seen. Computed tomography of the thorax revealed peribronchovascular interstitial shadows with marked hilar and mediastinal lymphadenopathy. Hepatosplenomegaly was detected by ultrasonography. OKT 4/8 was elevated in the specimen of bronchoalveolar lavage. Noncaseating epithelioid cell granuloma was revealed histologically by transbronchial lung biopsy.

Before steroid therapy, 67Ga scintigraphy was done (Fig.1). In addition to the hilar and mediastinal uptake, circular accumulation in the eyes was seen.

On steroid therapy, the ophthalmic symptoms disappeared and the posterior uveitis healed. Repeat gallium scanning did not show the previous ocular accumulation. The mediastinal uptake decreased in intensity.

Case 2
A 55-yr-old Asian female had been medicated for three years for anterior uveitis associated with sarcoidosis. Mediastinal and hilar lymphadenopathy and pulmonary interstitial shadow had been observed on chest CT. The diagnosis of sarcoidosis was established by lung biopsy. The anterior uveitis was controlled by corticosteroid instillation therapy. Gallium scintigraphy in this phase showed bilateral symmetrical hilar accumulation and panda appearance (lacrimal and parotid gland uptake) (Fig. 2).

The patient complained of recurrent visual disturbance about 6 mo later. Ophthalmoscopic examination revealed papilledema and opacity of the vitreous, posterior uveitis. Fluorescein angiogram of the optic disk showed late hyperfluorescence. Gallium scintigraphy was done before intensive oral administrated corticosteroid therapy (Fig. 3). Circular accumulation of gallium in the region of the orbits was seen. On magnetic resonance imaging, no other abnormal findings were seen in the intraorbital extraocular region.

FIGURE 1. The anterior view of the upper body was acquired 74 hr after venous injection of 111 MBq of 67Ga-citrate. Jagged circular accumulations of isotopes in both eyes were apparent in the status prior to steroid therapy. In addition, intrathoracic lymph node gallium uptake (so-called lambda sign) and bilateral symmetrical salivary glands' uptakes were demonstrated.
DISCUSSION

Sarcoidosis is a multisystem disease of unknown etiology, previously defined according to clinical and histologic criteria. Noncaseating epithelioid cell granuloma is the histological characteristic.

The mechanism of \(^{67}\)Ga uptake to the sarcoid lesion is thought to be related to activated T- and B-lymphocytes and macrophages as opposed to epithelioid cells, which produce an excess of ACE, another important marker in the clinical evaluation of sarcoidosis (1,2).

This clinical entity often presents with bilateral hilar lymphadenopathy, pulmonary infiltration, and other lesions. Added to the characteristic immunological findings and bronchoalveolar lavage, \(^{67}\)Ga-citrate scanning is one of the least invasive diagnostic procedure to access the activity of sarcoidosis.

Gallium uptake is not specific for sarcoidosis. However, the simultaneous presence of an intense accumulation of gallium in the lacrimal and parotid areas together with increased pulmonary and mediastinal uptake is very suggestive of sarcoidosis (3–5). Accumulation in the spleen, liver, skin, bone, skeletal muscle, myocardium and nasopharyngeal region also may occur (6,7).

Except for lacrimal gland enlargement, orbital involvement is rare (8). The eyes are affected only in one-fourth of cases (9), and the majority of the lesions are asymptomatic, requiring appropriate examination techniques to be detected (10).

Ophthalmic changes detected in patients with sarcoidosis are variable. Uveitis is considered the hallmark of ophthalmic sarcoidosis. In gallium scintigraphy, elevated accumulation to the lacrimal glands is often seen (11).

In the two cases that we reported, ocular accumulation was seen in association with ophthalmic finding and medication. When the ophthalmic changes were limited to the anterior uvea, abnormal ring-shaped accumulation was not seen. However, when the posterior uveitis was present, a circular region of uptake around the orbit was seen. The ring-shaped uptake is presumed to be in the sarcoid choroiditis. Intraorbital extraocular sarcoid was not present on magnetic resonance imaging (8).

REFERENCES


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SELF-STUDY TEST

Gastrointestinal Nuclear Medicine

ANSWERS

The modified in vivo ("in vitro") technique of red blood cell labeling has been developed as a compromise between the in vivo method and the original in vitro method (which required a long incubation period, multiple handling steps, and written patient consent, because of its investigational status). When the "in vitro" technique is used, heparin is often used as the anticoagulant. Unfortunately, 99mTc heparin complexes can be excreted in the urine and accumulated in the bladder. For this reason, some investigators recommend that ACD solution be used as the anticoagulant, which yields a slightly higher labeling efficiency and reduced urinary activity.

References

For further in-depth information, refer to the syllabus pages in Nuclear Medicine Self-Study I.