

Radiological Case Report / Caso Clínico

An Incidental Finding in Body Scintigraphy with [⁶⁷Ga] Gallium Citrate for Assessment of Osteomyelitis

Um Achado em Cintigrafia Corporal com [⁶⁷Ga] Citrato de Gálio para Avaliação de Osteomielite

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Abstract

Malignant external otitis (MEO) is an infection of the soft tissues of the external auditory canal that can be complicated by osteomyelitis of the skull. Body scintigraphy with [⁶⁷Ga] gallium citrate can be used in the evaluation of this disease. The authors describe a clinical case of MEO evaluation performed with body scintigraphy with [⁶⁷Ga] gallium citrate with imaging findings of a neoformative lesion in the ascending colon.

Keywords

Osteomyelitis; Malignant otitis externa; Body scintigraphy with [⁶⁷Ga] gallium citrate; 3-phase bone scintigraphy with [^{99m}Tc] Tc-MDP.

Resumo

A otite externa maligna (OEM) é uma infecção de partes moles do canal auditivo externo que pode complicar-se por osteomielite da base do crânio. A cintigrafia corporal com [⁶⁷Ga] citrato de gálio pode ser utilizada na avaliação desta doença. Os autores descrevem um caso clínico de avaliação de OEM cintigrafia corporal com [⁶⁷Ga] citrato de gálio com achado imagiológico de uma lesão neoformativa no cólon ascendente.

Palavras-chave

Osteomielite; Otite externa maligna; Cintigrafia corporal com [⁶⁷Ga] citrato de gálio; Cintigrafia óssea de 3 fases com [^{99m}Tc] Tc-MDP.

Introduction

Malignant otitis externa is an infection of the soft parts of the external auditory canal that penetrates the skull and can reach the temporal bone and other components of the base of the skull. *Pseudomonas aeruginosa*¹ is the etiological agent present in up to 98% of the cases.

The progression to osteomyelitis at the base of the skull, reaching temporal bone, occipital bone and other bones, although rare, causes great morbidity and mortality.²

Gallium body scintigraphy with [⁶⁷Ga] gallium citrate is a diagnostic method that can be used to evaluate this disease.³

Clinical Case

The authors present a case report of a 92-year-old man who was referred to the Otorhinolaryngology consultation due to complaints of left auricular pain, hearing loss and otorrhea, with a subsequent decrease in left hemi-face mobility. He was medicated with antibiotics and reevaluated about 1 month later for persistence of complaints. He performed magnetic resonance imaging (MRI), which evidenced: otitis media and left otitis externa with extension of the inflammatory process along the petrous bone to the clivus, compatible with osteitis and the infiltrative aspect of the soft parts adjacent to the exocranial surface of the skull base infiltrating the left extensor (*longus coli* and *longus capiti*) muscles, deletion of the Rosenmuller pit and deletion of the tubal orifice on the same side; involvement of the left carotid space below the base, involving the carotid and internal jugular; slight lesional progeny

at the left cerebellar point angle without conditioning mass effect on the cerebellum or trunk; changes suggestive of malignant external otitis.

He was again medicated with antibiotic therapy, having returned to the Emergency Room 4 days later for persistence of the complaints and was hospitalized with the possible diagnosis of osteomyelitis of the skull base as a complication of malignant otitis externa vs infiltrative tumor lesion of the skull base.

He performed biopsies of the clavis through endonasal endoscopic and myringotomy with collection of middle ear exudate that confirmed the diagnosis of osteomyelitis of the base of the skull and excluded the possibility of tumor. In the microbiological study, vancomycin-sensitive *Staphylococcus epidermidis* was isolated and treatment was started.

He presented clinical improvement, having performed body scintigraphy with [⁶⁷Ga] gallium citrate for imaging evaluation of the observed evolution, after 11 days of antibiotic therapy.

Body scintigraphy with [⁶⁷Ga] gallium citrate (Figure 1) demonstrated moderate to intense hypercapture of the radionuclide in the left mastoid region and in the internal region of the homolateral temporal suspected of inflammatory/infectious process (osteomyelitis) of these regions, correlating with bone scintigraphy. It also showed the presence of intestinal uptake (ascending colon), with characteristics that do not allow excluding the presence of neoformative lesion (vs inflammation/diverticulitis?), to be correlated with colonoscopy.

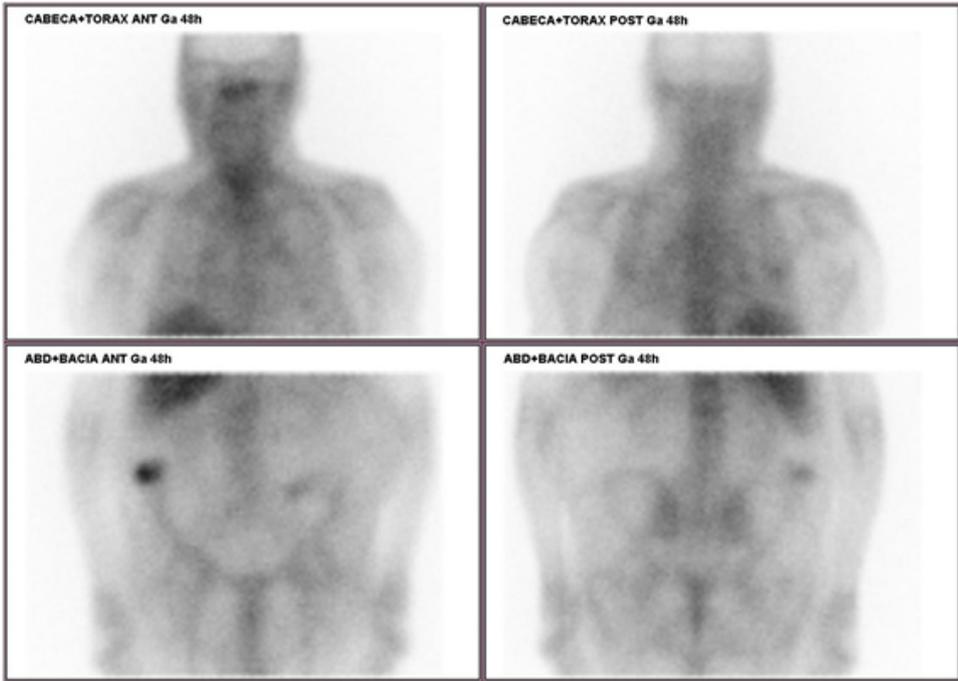


Fig. 1- Body scintigraphy with $[^{67}\text{Ga}]$ gallium citrate at 48 hours.

A 3-phase bone scintigraphy with $[^{99\text{m}}\text{Tc}]$ Tc-MDP (Figure 2), complementary with the study with body scintigraphy with $[^{67}\text{Ga}]$ gallium citrate showed increased vascularization in the initial phase of the study, as well as increased osteoblastic activity in the left mastoid region and in the internal region of the homolateral temporal region, slightly less intense when compared to capture in the body scintigraphy with $[^{67}\text{Ga}]$ gallium citrate, favoring the diagnosis of infectious process (osteomyelitis). Subsequently, he underwent a colonoscopy that showed at the level of the proximal ascending colon extensive sessile lesion ($> 30\text{mm}$), $> 50\%$ of the circumference of the fold. In the descending/sigmoid colon, a synchronous but more advanced lesion was observed, extensive, involving 2 folds

in continuity and $> 50\%$ of the circumference. There were also 4-5 sessile polyps between 6-7 mm throughout the colon. Biopsies of the two largest lesions were performed. The anatomic-pathological report refers to the presence of superficial fragments of tubulo-villous adenoma with low grade dysplasia in both. He repeated colonoscopy for eventual endoscopic excision that could not be performed. Due to the old age and the presence of multiple comorbidities, it was decided not to perform a surgical procedure in the patient, and it was stable at the last follow-up visit.

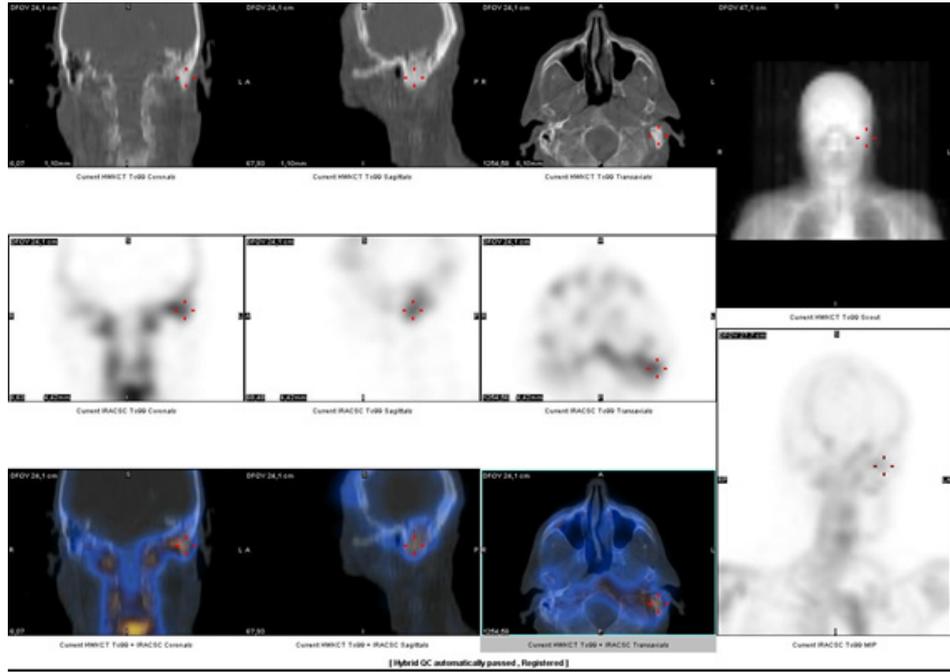


Fig. 2 - Body scintigraphy with $[^{99\text{m}}\text{Tc}]$ Tc-MDP - Tomographic study.

Discussion

⁶⁷Gallium is a radioisotope that can be used for imaging, as well as infectious/inflammatory processes. It is a group IIIA metal that has a relevant utility for the image of several neoplasias, particularly lymphomas, in the investigation of acute inflammatory conditions, sarcoidosis, in the evaluation of patients with fever of unknown origin and in cases of external malignant otitis, presently more used in centers that do not have the PET/CT technique.³

With the exception of the liver, the sensitivity for detection of primary malignant lesions of the gastrointestinal tract is low, the colon being about 20-40%.⁴

In general, for the diagnosis of osteomyelitis, a joint evaluation of the scintigraphy with [⁶⁷Ga] gallium citrate and bone scintigraphy with [^{99m}Tc] Tc-MDP is performed.⁵ Body scintigraphy with [⁶⁷Ga] gallium citrate can be used for the follow-up and measurement of the response to therapy, since radionuclide does not deposit in the bone, but has a high affinity for the acute phase proteins, marking the foci of acute infections with fidelity.⁶

In this clinical case, the usefulness of this utility was demonstrated, particularly in the evaluation of external otitis externa, having shown active infection during the course of antibiotic therapy, which motivated the continuation of treatment.

Gallium body scintigraphy has the advantage of being able to evaluate the whole body and can demonstrate the existence of other possible infectious/inflammatory foci, as well as other findings, especially oncology. This case clearly expresses the usefulness of body scintigraphy with [⁶⁷Ga] gallium citrate in the detection of neoformative lesion, of which there was no clinical suspicion.

Although scintigraphy with [⁶⁷Ga] gallium citrate has been largely superseded by PET/CT with [¹⁸F] FDG for evaluation of both the oncological and infectious situations,⁷ with this case the authors want to demonstrate the current utility of this study, especially in centers that do not have other techniques, namely PET/CT.

Received / Recebido 14/02/2018

Acceptance / Aceite 30/10/2018

Ethical disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

Financing Support: This work has not received any contribution, grant or scholarship.

Suporte financeiro: O presente trabalho não foi suportado por nenhum subsídio ou bolsa.

Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Proteção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

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