

3D Reconstruction with Spiral Computed Tomography in Choroidal Osteoma

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ABSTRACT

Choroidal osteoma (CO) is a rare, ossifying benign tumor originated in the choroid that typically occurs in otherwise healthy young women (1,2). It is characterized by a yellowish, well demarcated lesion in the juxtapapillary or macular area. The diagnosis is clinical and can be confirmed with the use of fluorescein or indocyanine angiography, optical coherence tomography, computed tomography or magnetic resonance imaging. Choroidal neovascularization or subretinal fluid, the main causes for vision loss, can be treated with laser therapy, photodynamic therapy or intravitreal anti-vascular endothelial growth factor therapy. We present a case of choroidal osteoma, showing the role of the high resolution 3D spiral computed tomography.

Keywords: Choroidal Osteoma; 3D Spiral Computed Tomography; Ultrasonography; Fluorescein Angiography

1. Case History

A 28-year-old woman complained of gradual decrease in visual acuity in her right eye, which was attributed to a macular lesion. Best-corrected visual acuity in this eye was 20/400. Funduscopy revealed a well-demarcated, slightly elevated, yellow-white to orange lesion located in the juxtapapillary and macular area of the right eye compatible with a choroidal osteoma (CO) (**Figure 1**).

Fluorescein angiography showed diffuse patchy hyperfluorescence with late-phase generalized tissue staining (**Figure 2**). B-scan ultrasonography and especially computed tomography (CT) were of particular value to confirm the diagnosis, by showing clearly demonstrable calcium densities in the posterior pole of the affected eye (**Figures 3 and 4**). A three-dimensional spiral computed tomography was also made to establish the diagnosis (**Figure 5**).

The patient was unsuccessfully treated with two intravitreal ranimzumab injections.

2. Discussion

Choroidal osteoma is a rare, ossifying benign tumor that originates in the choroid. It is usually unilateral and develops in the second or third decade of life, mostly in women [1,2]. Funduscopically, it is characterized by a well-demarcated, slightly elevated, yellow-white lesion



Figure 1. Fundus photograph showing a well-demarcated, slightly elevated, yellow white to orange lesion located in the juxtapapillary and macular area of the right eye compatible with a choroidal osteoma.



Figure 2. Fundus fluorescein angiography revealed a diffuse patchy hyperfluorescence with late-phase generalized tissue staining.

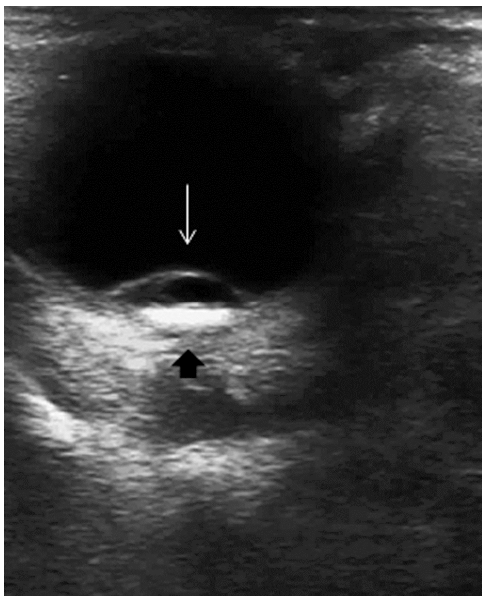


Figure 3. B-scan ultrasonography showing clearly demonstrable calcific densities in the posterior pole of the affected eye (black arrow) and an associated exudative retinal detachment.



Figure 4. Axial computed tomography (CT) scan reveals a characteristic, well defined, homogeneously radio-opaque plaque of bone density in the posterior wall of the right eyeball, corresponding to a choroidal osteoma (arrow).

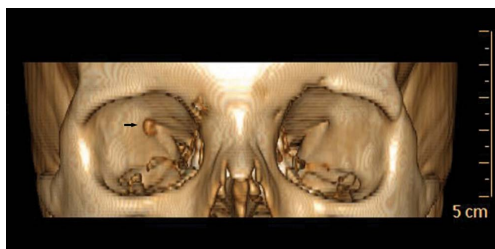


Figure 5. 3D reconstruction of CT scan demonstrating a clearer perception of the extent and location of the tumor (arrow).

located in the juxtapapillary or macular area. Fluorescein angiography usually shows diffuse patchy hyperfluorescence with late-phase generalized tissue staining. Optical coherence tomography demonstrates a highly reflective cavernous structure [1,2]. Orbital computed tomographic scan reveals a characteristic, well-defined, homogeneously radio-opaque plaque with the same density as bone at the level of the choroid. This finding enables to distinguish the CO from various dystrophic lesions: atypical or amelanotic malignant choroidal melanoma, metastatic carcinoma, leukemic or lymphomatous infiltrates, choroidal hemangioma, choroidal scars of the macula, and organized subretinal hemorrhage [3,4]. However, multiple diseases are associated with sclerochoroidal calcifications, occurring after inflammatory, infectious, and traumatic injuries to the eye in which there are significant secondary tissue atrophy, degeneration, and necrosis. Likewise, ocular calcification has been reported in hyperparathyroidism, acute and chronic renal failure, sarcoidosis, vitamin D intoxication, and hypercalcemia [5,6].

CT is the first-line imaging modality for orbital evaluation [5]. Nevertheless, conventional radiography has the problem of superimposition, and moreover it is a two-dimensional representation of a three-dimensional object. Spiral computed tomography (SCT) may be useful in assessing the size, shape, and location of a CO when compared to the routine CT scan, avoiding potential pitfalls in orbital image interpretation. Compared to CT scan, three-dimensional (3D) SCT is potentially more useful for the diagnosis of CO: a high resolution 3D view of the CO morphology in spatial relation to the surrounding orbital structures is achieved, providing with more details on its size and extension, as well as giving key information to differentiate it from other diseases associated with calcifications. It also helps in the follow-up of patients, by showing highly accurately, whether the CO has responded well to treatment. Disadvantages are its cost, elevated levels of radiation exposure and, to a lesser extent, time requirements and the size of the equipment.

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