

Intradiploic Meningioma in the Lateral Orbital Wall: A Case Report

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Abstract

Orbital wall tumor and intradiploic meningioma are rare tumors. Magnetic resonance imaging and nuclear medicine findings in the cases of orbital intradiploic meningioma have rarely been reported. A 46-year-old man presented with gradually appearing exophthalmos. MR and nuclear medicine findings revealed intradiploic tumor on the lateral orbital wall. The patient underwent total tumor resection and final pathological diagnosis was benign meningioma. This case highlights the importance of pathological conformation before performing extensive surgery. Thallium single-photon emission computed tomography is a valuable technique for distinguishing intradiploic benign meningioma from other malignant tumors.

Keywords: Intradiploic meningioma, Orbita, SPECT.

Orbital wall tumor is rare, but a variety of primary and secondary tumors involving the orbital wall have been reported [1,2]. Intradiploic meningioma is another rare tumor [3,4]. We treated a rare case of intradiploic meningioma in the lateral orbital wall.

A previously healthy 46-year-old man presented with gradually appearing exophthalmos and tearing in the left eye. The patient had no remarkable personal or family history. Although he had left exophthalmos, he showed full eye movement and normal visual acuity. Computed tomography (CT) revealed an intradiploic low-density tumor in the lateral orbital wall (Figure 1A). MRI revealed an iso-T1, high-T2 homogeneous tumor inside the lateral orbital wall (Figure 1B). The tumor showed homogenous enhancement (Figure 1C). Thallium-201 single-photon emission computed tomography (TI SPECT) showed mild uptake into the tumor in an early image and washout in delayed image (Figure 2A, B). Technetium-99m Bone scintigraphy revealed hot uptake only in the tumor (Figure 2C).

We conducted a biopsy of the tumor before extensive surgical removal. Pathological diagnosis of the biopsy samples revealed that the tumor was psammomatous meningioma. Three weeks later, the patient underwent total tumor resection under general anesthesia. The periorbita, dura, and orbital contents were all intact and preserved. The lateral orbital wall was reconstructed using a titanium plate. The patient's postoperative course was uneventful, and the exophthalmos disappeared. Postoperative MRI and CT scans confirmed total removal of the tumor. The final pathological diagnosis of the resected tumor was also benign psammomatous meningioma. No recurrence has been observed to date.

Crawford *et al.* reviewed 36 reported cases of intradiploic

meningioma. Orbital and frontoparietal regions are the most common locations of intradiploic meningioma [3]. Spheno-orbital meningiomas are intraosseous meningiomas at the base of the anterior and middle cranial fossa, involving the sphenoid wing and orbit associated with a intracranial carpet-like, soft tissue component [5,6]. In our case, the tumor located only in lateral orbital wall. And the tumor has no intracranial carpet-like soft tissue component. Classic triad of spheno-orbital meningiomas are ptosis, visual impairment and ocular paresis. In our case these symptoms were not observed. So the tumor in our case is not spheno-orbital meningioma. A literature review revealed that only 8 cases of intradiploic meningioma of the orbital wall have been reported in English literature [7-13] (Table 1). In all the reported cases of orbital intradiploic meningioma, except the present case, the tumor originated at the orbital roof.

All the tumors were surgically removed, and no recurrence has been reported. The reconstruction methods have been mentioned only in 2 reports [10,11]. In these studies, the researchers used free calvarial bone flap graft for orbital reconstruction. Our case is the first reported case involving the use of a titanium plate for orbital reconstruction after intradiploic meningioma removal. The use of titanium plates has been associated with the risk of infection and deformity. Autologous bone transplantation necessitates another skin incision and removal of normal bone. In the case of malignant tumors, there is a possibility of recurrence and repeat surgery. We discussed with the patient and selected titanium plate reconstruction. The cosmetic and medical outcomes were satisfactory.

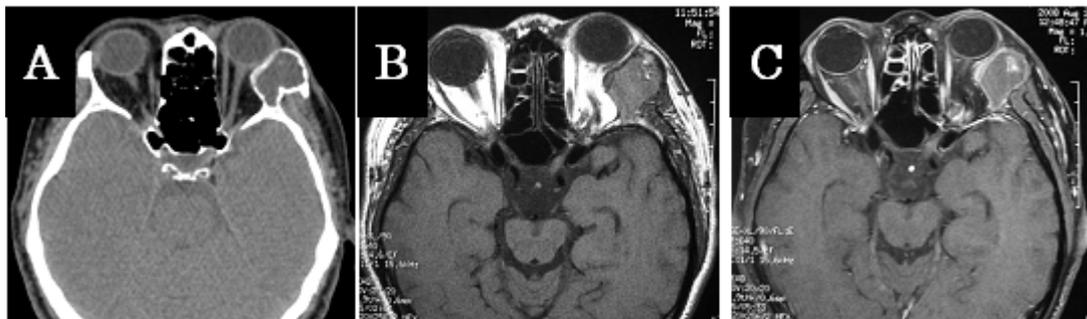


Figure 1. Preoperative computed tomography (CT) (A). T1-weighted non-enhanced (B) and gadolinium-diethylenetriamine pentaacetate (Gd-DTPA)-enhanced (C) T1-weighted magnetic resonance (MR) images.

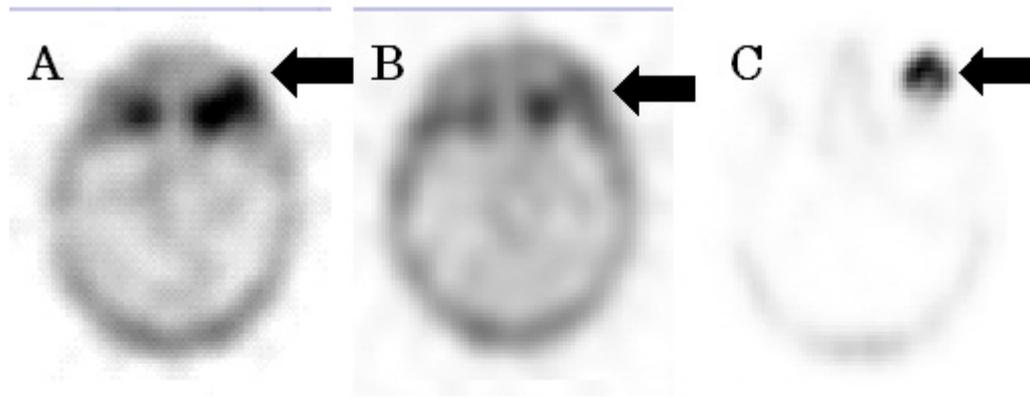


Figure 2. Thallium-201 single-photon emission computed tomography (TI SPECT) early image (A) and delayed image (B). Technetium-99m methylene diphosphonate (Tc-99m MDP) bone scintigraphy (C). The arrows indicate the tumor. Bifrontal hot uptakes in TI SPECT indicate physiological orbital uptakes.

Table 1. Intradiploic meningioma of orbital wall.

No	Author	Year	Patient	Age	Sex	symptom	location	CT	MRI	Nuclear Medicine	Pathology	Reconstruction
1	Reale	1978	Italy	19	M	exophthalmos	Rt roof	high, enhanced	-	-	Psammomatous	
2	Ko-bayashi	1980	Japan	10	M	exophthalmos	Lt roof	high, enhanced	-	Tc-pertechnate hot	meningothe-liomatous with psammoma	
3	Pompili	1983	Italy	40	M	exophthalmos	Lt roof	high, enhanced	-	-	Psammomatous	
4	Halpin	1991	UK, India	9	F	frontal mass	Rt roof	high, no enhance	high T1, high T2	-	transitional with psammoma bodies	
5	Cirak	2000	Turkey	12	F	exophthalmos	Rt roof	iso	-	-	Psammomatous	
6	Desai	2004	India	12	M	exophthalmos	Lt roof	high, no enhance	-	-	Psammomatous	calvarial bone graft
7	Borkar	2008	India	40	M	frontal mass	Lt roof	high, enhanced	-	-	transitional	calvarial bone graft
8	Our case	2010	Japan	46	M	exophthalmos	Lt lateral	low dense	iso T1, high T2, enhanced	TI SPECT hot, wash out, Tc-MDP hot	Psammomatous	Titanium plate

MRI was performed only in 2 patients. Nuclear medicine studies were conducted only in 2 patients. TI SPECT findings of orbital intradiploic meningioma have not been previously reported. TI SPECT is a functional imaging technique that facilitates diagnosis of tumor malignancy and activity [14]. An early TI SPECT image mainly shows tumor blood flow, and a delayed image mainly shows tumor malignancy and activity [15]. The TI SPECT findings in our patient were comparable to those of patients with benign meningioma showing high blood flow and low malignancy.

Rapidly growing skull tumors, such as chondrosarcoma, sometimes occur in the orbital wall [1,2]. Chondrosarcoma is an aggressive tumor with a high tendency for recurrence and is capable of distant metastasis. The orbital chondrosarcoma should be removed together with the eye ball and the orbital contents to prevent local recurrence. Our patient had normal visual acuity and eye movement. Pathological diagnosis of our patient's biopsy sample revealed that the tumor was an intradiploic meningioma. Therefore, eyeball removal was not required, and we could preserve his eye and normal vision.

Competing interests

The authors declare that they have no competing interests.

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