

# Symptomatic primary iris cysts treated with frequency-doubled Nd:YAG laser photocoagulation

## *Cistos irianos primários sintomáticos tratados com fotocoagulação a laser de Nd:YAG de dupla frequência*

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### ABSTRACT

*We report the case of a 31-year-old woman who presented with a nine-month history of blurred vision in her left eye. Slit-lamp examination and optical coherence tomography showed four cystic masses hanging at the pupillary margin of the left eye. Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) laser photocoagulation was used to rupture the wall (cystotomy), drain the cyst content and shrink the remnants of the pigment epithelium, using laser parameters at the lowest effective levels. The patient's best corrected visual acuity improved significantly after treatment. Despite the increase of pigment at anterior chamber angle, no complication was observed during 6 months of follow up. This is the first report to describe frequency-doubled Nd:YAG laser (532 nm) photocoagulation as a therapeutic option for patients with symptomatic primary IPE cysts at pupillary margin.*

**Keywords:** Iris neoplasms; Photocoagulation; Eye neoplasms; Laser therapy; Iris/pathology; Case reports

### RESUMO

Relatamos o caso de uma mulher de 31 anos com queixa de visão turva no olho esquerdo. Exame em lâmpada de fenda e tomografia de coerência óptica mostraram quatro lesões císticas nas margens da pupila esquerda. O laser do tipo Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) de dupla-frequência foi o tratamento de escolha para romper a parede (cistotomia), drenar o conteúdo do cisto e encolher os remanescentes do epitélio de pigmentar utilizando os menores parâmetros efetivos. Após o tratamento do olho comprometido, sua acuidade visual melhorou consideravelmente. Apesar do aumento da pigmentação no ângulo da câmara anterior, nenhuma complicação foi observada durante 6 meses de acompanhamento. Este é o primeiro relato que descreve o laser de Nd:YAG de dupla frequência (532 nm) como uma opção terapêutica para pacientes com cistos irianos primários do epitélio pigmentar sintomáticos na margem pupilar.

**Descritores:** Neoplasias da íris; Fotocoagulação; Neoplasias oculares; Terapia a laser; Iris/patologia; Relato de casos

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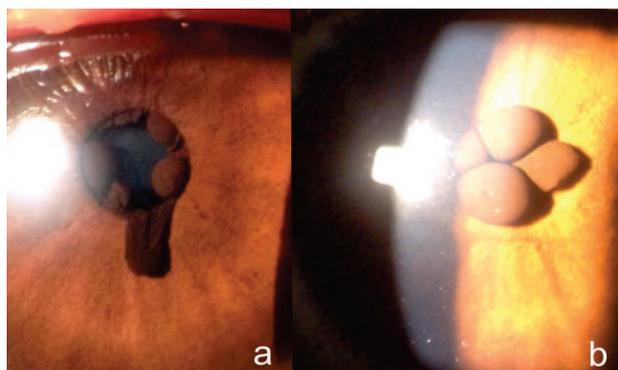
## INTRODUCTION

Primary cysts of the iris pigment epithelium (IPE) are uncommon lesions. They are defined as benign dark brown structures that arise in the posterior iris layer<sup>(1)</sup>. These benign cysts tend to be bilateral and multiple and affect females more commonly than male<sup>(1,2)</sup>. IPE cysts can be classified into categories, based on their position in relation to the iris: central, at the pupillary margin; midzonal, between the pupillary margin and the iris root; peripheral, at the iridociliary sulcus; dislodged, in the anterior chamber or the vitreous cavity. The vast majority (76%) is peripheral<sup>(2)</sup>.

This paper describes a rare case of bilateral symptomatic primary central IPE cysts leading to visual impairment. The lesions were treated with frequency-doubled Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) laser, which has some known advantages over traditional surgical excision, such as lower risk of infection and surgically induced astigmatism. We described the laser parameters and technique used to rupture the wall (cystotomy), drain the content and shrink the remnants of the pigment epithelium.

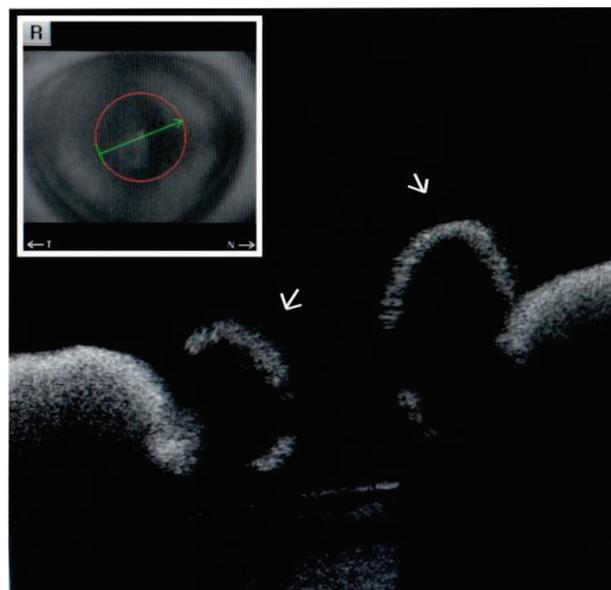
## CASE REPORT

A 31-year-old woman presented with a nine-month history of blurred vision in her left eye. The patient has no trauma history, ocular surgery or previous ocular disease. No similar family history was mentioned. Systemic studies were negative and included blood count, chest radiograph, purified protein derivative (PPD), fluorescent treponemal antibody absorption test (FTA-ABS), herpes simplex virus (HSV) serologic test and HLA-B27. Under photopic condition, her best corrected visual acuity (BCVA) was 20/20 in right eye and 20/400 in left eye. Under low light condition (scotopic), her BCVA was 20/20 in right eye and 20/25 in left eye. Slit-lamp examination showed, in the right eye, three homogeneously pigmented masses hanging at the pupillary margin of the iris at 1, 5 and 9 o'clock and remnants of a spontaneously ruptured cyst at 6 o'clock (Figure 1a). In the left eye, the examination showed four apparently cystic masses hanging at the pupillary margin at 3, 6, 9 and 12 o'clock, obstructing the visual axis (Figure 1b). Gonioscopy showed normal angular structures in both eyes. The intraocular pressure measured with Goldmann applanation tonometer was 16 mmHg in both eyes. Fundoscopy was normal in both eyes.



**Figure 1.** Slit lamp examination. (a) Right eye: three homogeneously pigmented masses hanging at the pupillary margin of the iris at 1, 5 and 9 o'clock and remnants of a spontaneously ruptured cyst at 6 o'clock. (b) Left eye: four apparently cystic masses at 3, 6, 9 and 12 o'clock, obstructing the pupillary aperture

Anterior segment optical coherence tomography (AS-OCT) was performed using a Spectral-Domain OCT (SDOCT, Copernicus, Optopol Technologies, Zawierci, Poland) with additional adapter provided with the device. A total of seven well-delineated cystic lesions at pupillary margin with different diameters (mean diameter = 1.7 mm), highly reflective walls and cystic content were observed in both eyes (Figure 2). A cystotomy was indicated in the left eye due to the visual symptoms.

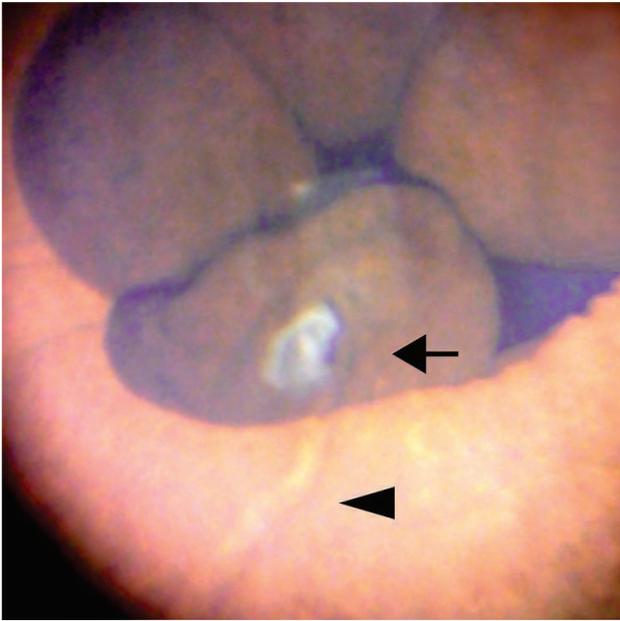


**Figure 2.** Anterior segment optical coherence tomography showing cystlike lesions at pupillary margin, right eye.

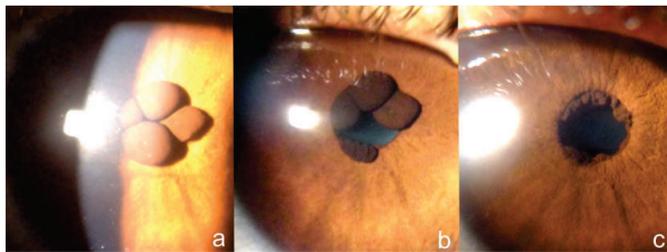
A 532 nm frequency-double Nd:YAG laser (Vitra Monospot, Quantel Medical, Clermont-Ferrand, France) was used to rupture the wall (cystotomy), drain the content and shrink the remnants of the pigment epithelium. In order to avoid an inadvertent injury to the lens, macula and optic disc, a Goldman three-mirror lens with 2% methylcellulose (Ophthalmos, São Paulo, Brazil) was chosen to treat the cysts using the smallest mirror set at 59°. One drop of 0.2% brimonidine (Allergan, California, USA) was administered 30 minutes preceding each session. Topical anesthesia with 0.5% proparacaine (Alcon Laboratories, Texas, USA) eye drops was used.

Since we did not find accurate information in literature upon the technique and parameters used to treat IPE cysts with frequency-doubled Nd:YAG laser, we intended to use lower laser parameters in comparison to laser parameters reported with argon laser photocoagulation. To disrupt the pigment epithelium, a single burn at 280 mW for 0.2s and with a 50 micrometers spot was placed at the lower part of each cyst (Figure 3). Other two sessions were executed to shrink the remnants of the pigment epithelium using a total of forty burns at 490 mW power for 0.2s, with a 50 micrometers spot size.

All cysts of the left eye were treated after 3 sessions (Figure 4). Under usual lighting condition, the new BCVA improved to 20/20 in the left eye. Despite the increase of pigment at anterior chamber angle, no complication was detected and after 6 months of follow-up the IOP remained 16 mmHg, the shape of the anterior chamber and the reaction of the pupil to light were normal. The patient was evaluated every three weeks during 6 months and no recurrence was detected during follow-up.



**Figure 3.** Burn site to perform the cystotomy at the lower part of the lesion (arrow). Cystic content draining from the cyst (arrowhead).



**Figure 4:** (a) Left eye before treatment; (b) The cyst at 6 o'clock was ruptured using a single burn at 280 mW for 0.2s and with a 50 micrometers spot (c) Four weeks later showing final appearance after all cysts drained and remnants of the pigment epithelium shrunk using laser coagulation.

## DISCUSSION

Primary IPE cysts at pupillary margin (central primary IPE cyst) are rare clinical occurrences. Lois et al. classified primary IPE cysts and found central primary IPE cysts in 6 patients (3%), midzonal in 50 patients (21%), peripheral in 170 patients (73%), and dislodged in 8 patients (3%)<sup>(2)</sup>.

Studies suggest that the origin of IPE cysts may be hereditary with an autosomal-dominant pattern, hereditary alteration connected to sex, spontaneous and acquired<sup>(3-5)</sup>. The etiology of primary central IPE cysts is not clear.

Diagnosis and monitoring of iris and ciliary body require the imaging of structures not always visible with a slit lamp. Anterior segment optical coherence tomography (AS-OCT) and ultrasonic biomicroscopy (UBM) may help to differentiate cystic from solid tumors, follow their course and promptly intervene if surgery is required. The high reflectivity of their wall is attributed to the epithelial cells, while their hyporeflexive core is compatible with a fluid content. Although the AS-OCT enables the investigation of IPE cysts, the poor signal strength posterior to the iris interferes in showing all features of the iris cyst, so UBM is still the best

useful tool in the investigation of posterior chamber tumors<sup>(6)</sup>. This paper reports pupillary IPE cysts successfully detected, assessed and measured by the AS-OCT.

The differential diagnosis of IPE cysts includes iris stromal cysts and some iris solid tumors, which are divided in melanocytic and nonmelanocytic lesions. The melanocytic iris tumors include freckle, nevus (including melanocytoma), Lisch nodule, and melanoma. The nonmelanocytic iris tumors are relatively uncommon and included categories of choristomatous, fibrous, vascular, neural, epithelial, myogenic, metastatic, lymphoid, leukemic, secondary and non-neoplastic simulators<sup>(7)</sup>.

Various forms of management have been proposed for congenital or acquired IPE cysts. Congenital and asymptomatic IPE cysts generally require no treatment. When the visual axis is compromised, surgical excision or laser application remain the most commonly employed treatments<sup>(8)</sup>. Laser has some advantages over traditional surgical excision, such as the simplicity of the procedure and the absence of infection and surgically induced astigmatism. Some potential risks related to iris photocoagulation include corneal burns, pupil distortion, lenticular opacities, marked pigment dispersion, sudden rise in intraocular pressure, and retinal burns<sup>(9)</sup>.

Few papers report the use of argon or diode laser photocoagulation to treat IPE cysts<sup>(10,11)</sup>. A recently published case report related a case of epithelial inclusion cyst of the iris 7 years after radial keratotomy that was treated with double-frequency Nd:YAG laser (532 nm)<sup>(12)</sup>. To our knowledge this is the first paper to describe the use of frequency-doubled Nd:YAG laser (532 nm) photocoagulation as a therapeutic option for patients with symptomatic primary IPE cysts at pupillary margin.

Leung et al.<sup>(11)</sup> reported the parameters used to treat IPE cysts with argon laser photocoagulation. Burns at 500 mW power were used to rupture and shrink the cysts. In our presented case with frequency-doubled Nd:YAG laser, one burn of 280 mW power was sufficient to rupture each cyst and 490 mW power was adequate to shrink the remnants of the pigment epithelium. This can be attributed to thin layer of iris pigment epithelium. We consider that using laser parameters at the lowest effective level in addition to the laser beam angled at 59° was essential to minimize risks of ocular structures injury.

The accurate diagnosis of symptomatic central IPE cysts and intervention with laser or surgery may result in improvement of visual symptoms. Frequency-doubled Nd:YAG laser may be an alternative treatment option in the management of those lesions, but further studies investigating the potential side effects and recurrence are required.

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