

# Nevus of Ota: clinical-ophthalmological findings

## *Nevo de Ota: achados clínicos e oftalmológicos*

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### ABSTRACT

**Objective:** To analyze the clinical and ophthalmological findings of patients with nevus of Ota. **Methods:** Retrospective analysis of patients' charts with nevus of Ota. We registered the demographic data, location of the nevus and date of appearance, family history of similar spots, biomicroscopic, gonioscopic, tonometric, ophthalmoscopic and perimetric findings. **Results:** We included 14 patients, six (43.0%) men and eight (57.0%) women, with a mean age of 21.7±17.5 years. Ten (71%) were mulatto, three (21.4%) white and one (7.1%) black. Twelve (85.7%) patients presented the spots at birth and two in puberty. Nine patients presented conjunctival and episcleral pigmentation in the right eye and five in the left eye. According to Tanino's classification, five (35.7%) nevi were class 1, eight (57.1%) class 2 and one (7.1%) class 3. Heterochromia iridis was found in eight (57.1%) patients. Anisocoria was present in three (21.4%) patients. Five (35.7%) patients presented a suspected glaucomatous cup disc ratio ( $\geq 0.7$ ); six (42.9%) presented a cup disc ratio  $\leq 0.5$  and three (21.4%), no cup disc. We found two curious and remarkable findings: a nevus of Ota on the palate of one patient and other on the optic disc associated with a pigmentary mottling of the fundus in another patient. The pigmentary mottling of the fundus was also seen in four more eyes. **Conclusions:** The nevus of Ota was frequently present at birth, in mulattos, and classified as Tanino's class 1 and 2. Heterochromia iridis was a common finding. Anisocoria was present in a small percentage of eyes. No patient developed glaucoma or malignancy.

**Keywords:** Nevus of Ota; Glaucoma; Melanosis/congenital; Melanocytes/pathology; Nevus pigmented

### RESUMO

**Objetivo:** Analisar os achados clínico-oftalmológicos de portadores de nevo de Ota. **Métodos:** Análise retrospectiva dos prontuários de pacientes com nevo de Ota. Foram registrados dados demográficos, localização do nevo e época do seu aparecimento, história familiar de manchas similares, olho acometido, achados ectoscópicos (classificação de Tanino), biomicroscópicos, fundoscópicos e campimétricos. **Resultados:** Foram incluídos 14 pacientes, seis (47,0%) homens e oito (53,0%) mulheres com média de idade de 21,7±17,5 anos. Dez (71%) pacientes eram feodérmicos, três (21,4%) leucodérmicos e um (7,1%) melanodérmico. Doze (85,7%) pacientes apresentaram manchas ao nascimento e dois relataram seu surgimento após o nascimento. Três pacientes relataram manchas compatíveis com nevo de Ota em consanguíneos. A melanose conjuntivo-episcleral foi reconhecida no olho direito em cinco pacientes e em nove no olho esquerdo. Pela classificação de Tanino, cinco (35,7%) dos nevos eram da classe 1, oito (57,1%) da classe 2 e um (7,1%) da classe 3. Presença de heterocromia da íris em oito (57,2%) pacientes. Anisocoria ocorreu em três pacientes. Disco óptico suspeito de glaucoma (relação escavação/disco  $\geq 0,7$ ) foi observado em cinco pacientes (35,7%); seis apresentaram escavação fisiológica e três não apresentavam escavação. Dois achados curiosos e raros: um nevo de Ota no palato de um paciente e outro no disco óptico de outro paciente associado com pigmentação difusa no polo posterior retiniano. Essa pigmentação foi também vista em mais quatro olhos. **Conclusão:** O nevo de Ota foi mais comumente presente ao nascimento, em feodérmicos e nas classes 1 e 2 de Tanino. Heterocromia iriana achado comum. Anisocoria foi diagnosticada num percentual pequeno de pacientes. Nenhum paciente desenvolveu glaucoma nem tumor maligno.

**Descritores:** Nevo de Ota; Glaucoma; Melanose/congênito; Melanócitos/patologia; Nevo pigmentado

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## INTRODUCTION

**N**evus of Ota (“nevus fusco-coeruleus ophthalmomaxillaris” or ocular dermic melanocytosis) is a clinical condition characterized by blue-dark pigmentation, green-blue, violet, or tan spots in the eyes and/or on the face’s skin and lids. Very often, nevus of Ota occurs unilaterally in blacks and oriental women (4.8:1).<sup>(1,2)</sup> The nevus is caused by melanocytes that have not migrated completely from the neural crest to the epidermis during the embryonic phase. Consequently, the melanocytes enter the ophthalmic and maxillary branches of the trigeminal nerve creating spots on the nervous regions.

Normally, the nevus of Ota appears at birth but can also occur in puberty or during pregnancy.<sup>(3)</sup> In the ocular region, the spots with the aforementioned colorations can be found on the conjunctiva and episclera, sclera, cornea, iris, choroid, retina, extra ocular muscles, retrobulbar fat and periostium.<sup>(3)</sup> Nevus of Ota can be associated with various ocular abnormalities such as congenital glaucoma, Duane’s syndrome and melanoma.<sup>(4,6)</sup> For some authors, glaucoma is frequently associated with nevus of Ota in blacks.<sup>(7,8)</sup> Malignant alterations may occur in nevus of Ota with the appearance of melanoma affecting the skin, orbit, iris, ciliary body, choroid and brain.<sup>(4,6)</sup>

In literature, nevus of Ota has been classified in various manners.<sup>(8-10)</sup> In 1939, Tanino<sup>(8)</sup> proposed a histological classification of the nevus of Ota into five types based on the locations of the dermal melanocytes. They are either (1) superficial, (2) superficial dominant, (3) diffuse, (4) deep dominant, and (5) deep. Other authors<sup>(10)</sup> have classified the nevus of Ota according to the distribution of the dermal melanocytes into five types: superficial (type S), superficial dominant (type SD), diffuse (type Di), deep dominant (type DD) and deep (type De). Recently, a new classification of nevus of Ota based on the response to laser treatment has been determined.<sup>(10)</sup> This new classification allows for the prediction of the clinical outcome of laser treatment.<sup>(10)</sup>

The aim of this study is to assess the clinical and ophthalmological findings of a series of consecutive patients with nevus of Ota.

## METHODS

We retrospectively evaluated the data from all patients’ charts with nevus of Ota from the Glaucoma Service of the São Geraldo Hospital – Hospital das Clí-

nicas, UFMG. We analyzed the demographic data, including any possible Asian ancestry as well as the exact location where the nevi were found. We registered results of the following exams: ectoscopy, biomicroscopy, Goldmann applanation tonometry, gonioscopy, funduscopy and visual field data. The nevi were categorized according to Tanino’s classification<sup>(8)</sup> based on the locations of the dermal melanocytes, which are (1) superficial, (2) superficial dominant, (3) diffuse, (4) deep dominant, and (5) deep. In a small number of suspected glaucomatous patients (cup disc ratio $\geq$ 0.7) we performed the daily curve of intraocular pressure (DCPo). This consisted of seven measurements of the intraocular pressure (IOP) taken at 9:00 a.m., 12:00, 3:00, 6:00 and 9:00 p.m. and 12:00 a.m. with the Goldmann applanation tonometer and the following day at 6:00 a.m. with the Perkins tonometer, in bed and darkness in a supine position before the patient had stood up. In these DCPo’s we calculated the average of the intraocular pressure (Pm) and the standard deviation (SD) of the seven measurements. We compared the Pm and SD values with the normal superior limits (average + two standard deviations) of Pm and SD of normal patients from the same age group calculated from the Calixto’s data<sup>(11)</sup> (Table 1). The statistical analysis was descriptive and done with the SPSS16.0 software.

## RESULTS

The number of patients with nevus of Ota was 14: six (43.0%) men and eight (57.0%) women with an average age of 21.7 $\pm$ 17.5 years. Ten (71.0%) patients were mulatto (Figure 1), three (21.4%) white and one (7.1%) black. Twelve (85.7%) out of 14 patients presented nevus of Ota at birth and two patients (14.3%) reported their appearance in puberty. Only two patients (14.3%) had a family history of the disease (Table 2).

According to Tanino’s classification, five (35.7%) of nevi were class 1, eight (57.1%) class 2 and one (7.1%) class 3. Five (35.7%) patients presented only conjunctival melanocytosis. Eight (57.1%) patients had conjunctival melanocytosis associated with nevus on the periorbital lower lids and extracutaneous involvement of the face. One patient (7.1%) had conjunctival and episcleral pigmentation associated with nevus on the forehead and extracutaneous involvement of the left face, gum and ear. We found conjunctival and episcleral pigmentation in the right eye of nine patients and in the left eye of five patients (Figure 1). Heterochromia iridis (Figure 2) was found in eight (57.2%). Three (21.4%) patients presented

Table 1

Normal superior limits (average + two standard deviations) of Pm and SD of the DCPo in normal patients according to their age calculated from the Calixto's data<sup>(11)</sup>

Age Group (Years)	n	Pm	SD
15 to 25	24	14.62	2.28
26 to 35	22	15.93	2.28
36 to 45	20	16.66	2.63
46 to 58	20	16.92	2.22

DCPo: diurnal curve of intraocular pressure; Pm: average intraocular pressure; SD: standard deviation; N: number of eyes.

Table 2

Demographic data and biomicroscopic findings in patients with nevus of Ota

Number of patients	Age (years)	Race M/B/W	Gender	Main biomicroscopic findings	Familial history of spots
14	21.7±17.5	10/3/1	Male: 6 (43%) Female: 8 (57%)	HI: 8 (57.2%) Anisocoria: 3 (21.4%)	Positive: 2 (14%) Negative: 10 (86%)

M: mulatto; B: black; W: white; HI: heterochromia iridis

anisocoria with a smaller pupil diameter in the eye with heterochromia iridis. No patient with heterochromia iridis presented glaucoma or malignancy.

The gonioscopic exam of eight eyes with heterochromia iridis revealed intense pigmentation on the external wall of the angle. Figure 3 shows a gonioscopic image of the same patient in figure 1. In this patient the intense pigmentation on the external wall of the angle prevented the observation of other structures.

We found a suspected cup disc ratio ( $\geq 0.7$ ) in five (35.7%) patients who presented a normal visual field. In these patients we performed the DCPo and found a Pm and SD of  $13.9 \pm 1.7$  and  $1.5 \pm 0.4$  and  $13.7 \pm 2.6$  and  $1.7 \pm 0.5$  respectively for the right and left eyes. These values were normal when they were compared with the normal values of the same age group.<sup>(11)</sup> A physiological cup disc ratio ( $\leq 0.5$ ) was found in six (42.9%) patients (Figure 4). In three (21.4%) patients, there was no excavation of the optic disc. Two curious and remarkable findings in this paper were the presence of a nevus of Ota (melanocytosis) on the palate (Figure 4) of one patient and a nevus of Ota on the optic disc associated with a pigmentary mottling of the fundus (Figure 4). The pigmentary mottling of the fundus was also seen in four more eyes.

## DISCUSSION

Nevus of Ota is a non-hereditary circumscribed ocular and/or skin melanocytosis. However, it is congenital, being present at birth or appearing during the first year of life in 50-60% of cases, with a second peak occurring during adolescence. In this paper, the presence of nevus of Ota at birth was found in 12 (85.7%) out of 14 patients and appeared in puberty in two (14.3%).

Nevus of Ota primarily affects people of Asian<sup>(1)</sup> and African descent. Among white patients it is uncommon and has been rarely studied, although some studies report an estimated rate of about 0.038% of all the dermatological out-patient cases.<sup>(3)</sup> In the present study nevus of Ota was present in ten (71%) mulatto, however we did have three (21.4%) white. This demonstrates a great difference in relation to the prevalence of nevi of Ota in Brazilians in comparison with people of Asian or African descent. Incidence is higher in females, with a reported rate of 5:1 in Japan. In the present study in which no oriental patient was examined, the occurrence of nevi of Ota showed a small difference between genders (eight women/six men). Nevus of Ota is localized in the region of the first and

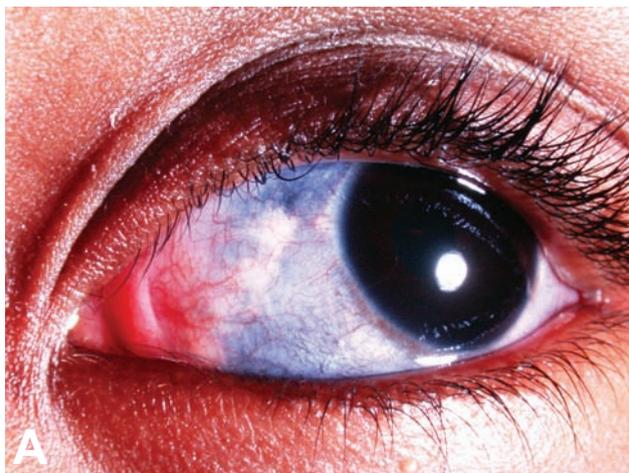


Figure 1: A) Nevus of Ota (conjunctival melanocytosis) on the left eye of a mulatto patient (Tanino class 1); B) presence of intense pigmentation in the external wall of the angle

second branches of the trigeminal nerve and is bilateral in 5% of cases. The lesion is usually stable with no tendency to increase with time. In this paper, the majority of nevi of Ota were classified in class 1 and 2 of Tanino.<sup>(8)</sup> We did not have bilateral case of nevus of Ota. Nine (64.3%) patients presented combined dermal and ocular involvement which was similar to the percentage of similar series of other authors.<sup>(10)</sup> The colour of the lesions depends upon the depth of involvement and the race. The deeper lesions appear blue in color due to the Tyndall effect whereas the more superficial lesions are slate grey in colour. In one patient of our series we found an intense bluish pigmentation in the episclera (Figure 1A). This blue colour that can also be found in the skin occurs because of the Tyndall effect in which all but the blue end of the light spectrum penetrates into the deep sclera or the deep dermis and is absorbed by melanin.<sup>(10)</sup>

One important finding in this study was the presence of heterochromia iridis (Figure 2) in more than a half (57.2%) of the patients with nevi of Ota. The heterochromia iridis seemed to be simple and congenital. It did not trigger the development of glaucoma in any patient of this study, even in that patient whose gonioscopy showed an intense pigmentation in the angle (Figure 1B).

Two curious and remarkable findings in this paper were the presence of a nevus of Ota (melanocytosis) on the palate (Figure 3) of one patient and a nevus of Ota on the optic disc (Figure 4) associated with a retinal pigmentary mottling. The retinal pigmentary mottling was also seen in four more eyes. In these cases, the chorio-retina is darker than that of the contralateral eye. In literature, there are few reports of palatal pigmentation in patients with nevus of Ota.<sup>(12-</sup>



Figure 2: Heterochromia iridis (darker iris in the right eye than in the left eye) in one patient with nevus of Ota



Figure 3: Nevus of Ota (melanocytosis) on the palate (green arrow); (same patient in figure 1)

<sup>14)</sup> Hence, a detailed systemic examination along with ophthalmological and oral examination is required in all cases of nevus of Ota. Therefore, in this paper we have reported the fourth case of palatal pigmentation in nevus of Ota in literature. More recently, another author<sup>(15)</sup> observed a pigmentary mottling of the fundus but without optic disc pigmentation. In relation to optic disc pigmentation, many years ago, a Brazilian paper<sup>(16)</sup>

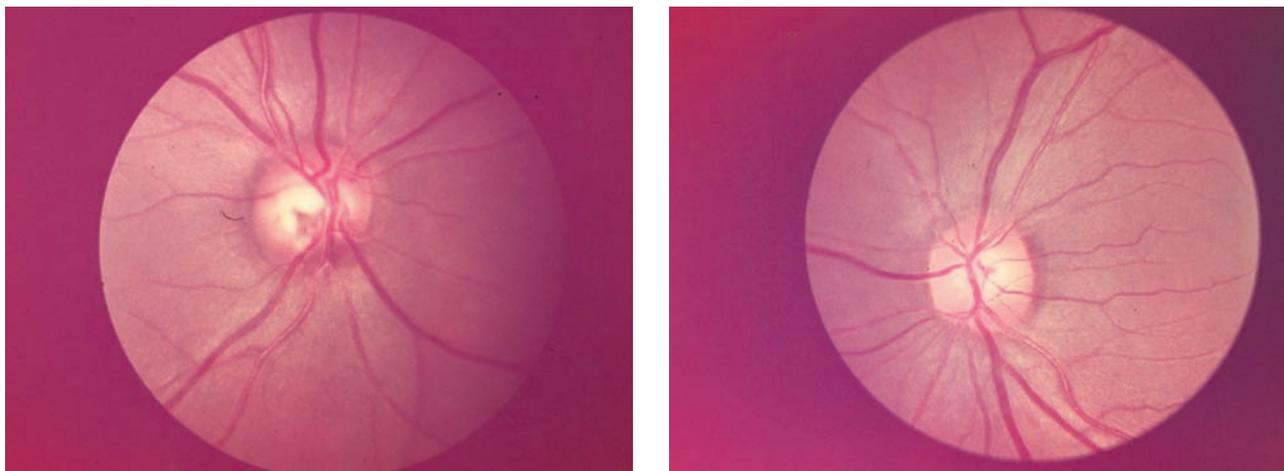


Figure 4: Nevus of Ota (melanocytosis) situated in the right optic disc (green arrow); Note that the right eye fundus is darker than the left eye

reported for the first time optic disc pigmentation associated with pigmentary mottling of the fundus in one patient with nevus of Ota. Thus, to the best of our knowledge, this is the second Brazilian report of this unusual optic disc pigmentation of nevus of Ota. A marked pigmentary mottling of the ocular fundus may have some significance. Malignant choroid melanoma is a potential ocular risk in oculodermal melanocytosis in Asian patients.<sup>(17,18)</sup> Increased numbers of melanocytes in hyperpigmented tissues may be the basis for the development of melanoma.<sup>(18)</sup> The risk gradually increases after the first decade of life and melanoma developing from a choroidal naevus within the area of hyperpigmentation has been described.<sup>(17)</sup> Again, we emphasize that detailed systemic examination along with ophthalmoscopic and oral examination is required in all cases of nevus of Ota. In this paper, six (42.9%) patients were followed from two to 17 years (average of 7.2 years) and none presented any signal of malignancy. The other eight patients abandoned the follow-up.

Glaucoma can also be associated with nevus of Ota.<sup>(16,19-21)</sup> For some authors,<sup>(16,19)</sup> glaucoma can bring as a result of the development of an infiltration of melanocytes in the iridocorneal angle. For other authors, glaucoma is frequently associated with nevus of Ota in blacks<sup>(7,8)</sup> In this paper, no patient developed glaucoma even in the eight eyes in which the gonioscopy revealed an external wall of the angle intensively pigmented (Figure 3). However, none of these patients was black. We can suppose that the angle pigmentation does not seem to trigger glaucoma in patients with nevus of Ota. Also, the DCPo performed in five patients with suspected glaucomatous C/D ratio ( $\geq 0.7$ ) showed normal values of

Pm and SD. However, taking into account the possibility of nevus of Ota developing malignancy locally or in another region of the ocular globe<sup>(4)</sup> and its association with glaucoma, patients with nevus of Ota require periodic examinations by ophthalmologists and dermatologists in order to detect these complications earlier. Besides this, clinical differential diagnoses include facial café-au-lait patches, nevus spilus, and acquired bilateral nevus of Ota-like macules.<sup>(22)</sup>

## CONCLUSION

In this paper, nevi of Ota occurred more frequently in mulatto women. It was present at birth and belonged to Tanino's class 1 or 2. Heterochromy iridis was present in 57.2% of the eyes. Familiar inheritance and anisocoria were rare. No patient developed glaucoma or melanoma. For the fourth time in literature, we report the presence of Nevus of Ota on the optic disc and on the palate. In Brazilian literature, this is the second report of Nevus of Ota on the optic disc and the first report for presence on the palate.

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