

# Title Page: Corneal Hemangioma treated with photodynamic therapy

## Introduction

The hemangioma is a benign vascular hamartomatous lesion <sup>(1)</sup> that has been reported in different intraocular locations; choroid being the most common; there are two types: circumscribed and diffuse, although there aren't any reports of hemangioma of the ocular surface, if it has been reported in the conjunctiva or episclera. <sup>(2,3)</sup>

Various modalities of treatment have been reported for circumscribed choroidal hemangioma with decrease of visual acuity; including argon laser photocoagulation, cryotherapy, external beam radiotherapy, proton beam radiotherapy, episcleral plaque radiotherapy, and transpupillary thermotherapy (TTT).<sup>(4,5)</sup> All these techniques have been reported with varying degrees of success in stabilizing or improving visual acuity, but the major limitation with all these treatment modalities has been the risk of damage to the overlying retina.

Especially about Photodynamic Therapy (PDT) it is a non-thermal, photobiochemical procedure that offers site-specific vascular occlusion and tumour destruction with minimal damage to adjacent neural structures. It uses a photosensitizer molecule called "Verteporfin" (Visudyne; Novartis; Basel, Switzerland); the selective tissue damage is achieved by sequestration of the photosensitizer in the target tissue and focal activation of the photosensitizer by low energy directed light. <sup>(6)</sup>

PDT has been used extensively in the field of dermatology for a variety of inflammatory conditions and premalignant and malignant tumours including basal cell carcinoma (BCC).<sup>(7)</sup> The preliminary results suggest that PDT may be an alternative treatment for ocular surface squamous neoplasia, particularly with diffuse presentation.<sup>(8)</sup>

It has been used in different retinal tumors as we mentioned previously, it offers site-specific tumour destruction while sparing surrounding structures. The vascular effects of PDT may include remodelling of the vascular wall with reduced permeability rather than vascular occlusion.<sup>(9)</sup>

## Case Presentation with Illustrations

A healthy 42 year-old women presented to our ophthalmology institution complaining of 8 months of evolution of red eye and discomfort in left eye, without treatment. She had no previously ocular history or trauma.

Visual acuity in the right eye was 20/20 and in the left eye was 20/50; No anterior or posterior segment alterations on right eye. On left eye we find vascular tortuosity on temporal limbal conjunctiva and a vascularized tumor of 6.5 x 4 mm that involves all the corneal stroma, with the gonioscopic lens we can see how the descemet and endothelium has been displaced back to the anterior chamber because the tumor (fig.1 and fig. 2) ; the anterior chamber angle shows hematic stasis in the trabeculum; intraocular pressure was normal in both eyes

We find also on the left superior eyelid a superficial hemangioma (fig.3)

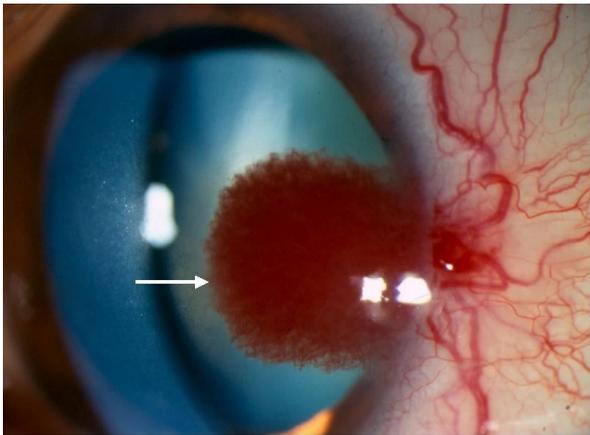


Fig.1 Vascularized tumor on temporal side of Left eye (white arrow)

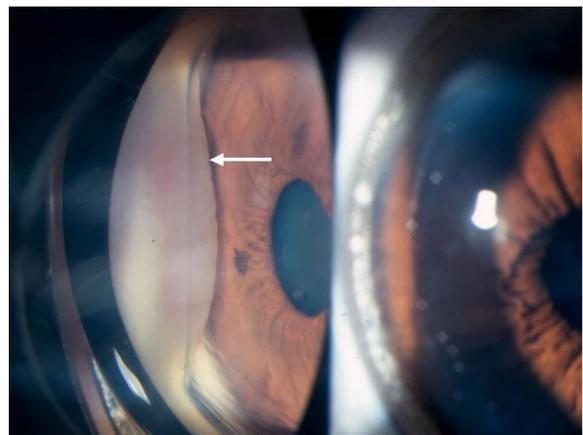


Fig.2 Gonioscopic lens examination of the tumor (white arrow)

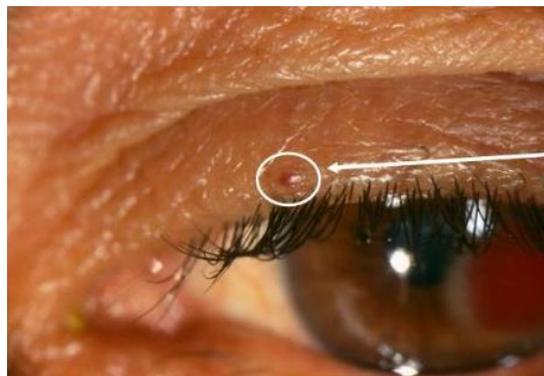


Fig.3 Superficial hemangioma on eyelid (white arrow)

## Imaging studies

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We realized an ultrabiomicroscopy (UBM) of the left eye. This is an echography of high resolution with a high frequency of 50 MHz that allows us to study the anterior segment of the eye showing us at stromal level in the III o'clock meridian the homogeneous lesion with high density, between Bowman and Descemet layer that extends up to 5 mm in the sclera with corneal thickness of 3.95 mm (fig.4), and with the standardized A scan we can see the high internal reflectivity and no signs of vascularity (fig.5)

Also we can see at the same meridian the irregularity in the limbal surface because the presence of nutritional conjunctival vessels (fig.6).



Fig.4 UBM of III o'clock meridian

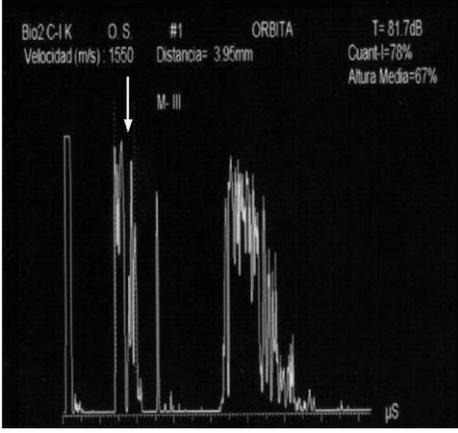


Fig.5 Standardized A Scan



Fig.6 UBM of III o'clock meridian

In the angiography with fluorescein of the anterior segment we can see the presence of blood vessels that stain in late stages at corneal level and escleral nutritional vessels (fig.7, 8).

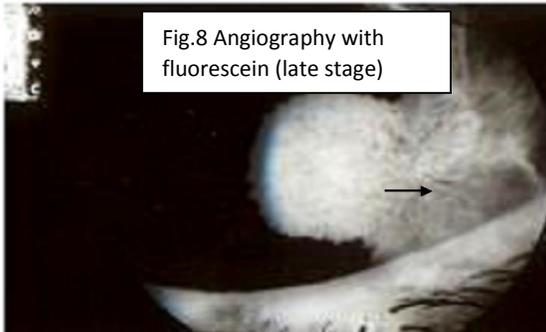
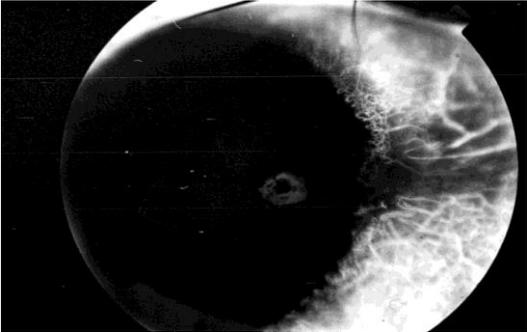


Fig.8 Angiography with fluorescein (late stage)

With the imaging studies it was diagnosed as a corneal hemangioma and we decided to treat with photodynamic therapy .

## Treatment

The patient is treated with photodynamic therapy with Verteporfin. We apply 5.4 milligrams and give 4 spots of 86 seconds with no effect adverse (Fig.9). The dose was calculated with the weight of 77 kilograms and the height of 1.54 metres and a body surface area of 1.82 square meters .

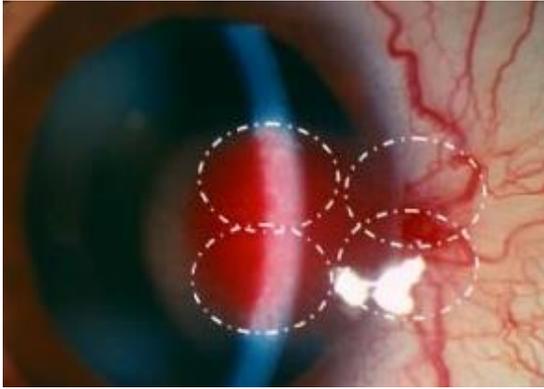


Fig.9 Localization of the spots of the photodynamic therapy.

## Evolution

At day 1. Visual acuity decrease to hand motion because an important corneal edema and absence of corneal epithelium in the region of the treatment, we can see how big was the edema with an ultrabiomicroscope of the region (fig.10), we give prednisolone acetate every hour, ofloxacin every four hours and sodium hyaluronate every 2 hours .

At 1 week the visual acuity improve to 20/400, the corneal edema was better, and we can only see hematic impregnation of the area and the absence of nutritional conjunctival vessels (fig. 11).



Fig.10 UBM of III o'clock meridian

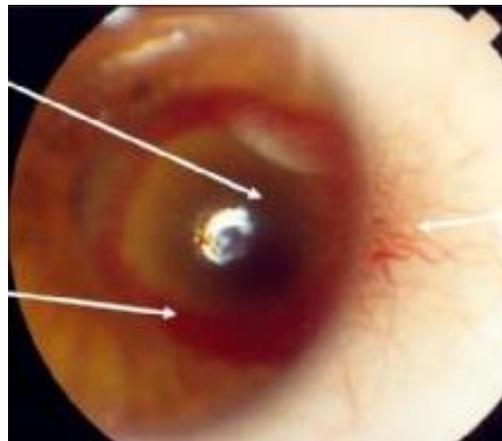


Fig.11 One week post photodynamic therapy

At one month visual acuity improve to 20/25 and we can only see some thin vessels on the surface of the cornea (fig.12); At UBM we can see the normal architecture of the cornea (fig.13).

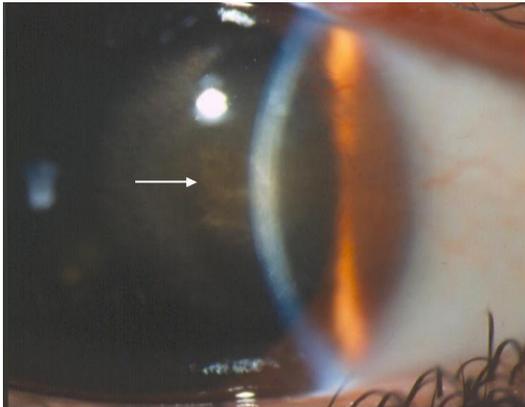


Fig.10 Clinical photo at one month of treatment



Fig.10 UBM of III o'clock meridian

## Discussion

The hemangioma type lesions are considered benign lesions, as mentioned in the introduction, can be found in different parts of the eye and orbit, in choroid they are treated only if they progress and cause exudation compromising the visual acuity. In our case it is a very atypical location that was causing low visual acuity due to growth being the cornea such important optical structure; for this reason it was necessary to treat it.

For choroidal hemangiomas the different treatments as argon photocoagulation and cryotherapy has been reported to have adverse effects to adjacent structures.

Its remarkable the inflammation caused by the application of photodynamic therapy, which was expected due to the application of a molecule as verteporfin and laser activation through a photochemical effect that would alter normal function of endothelial cells.

It is important to observe that treatment response was very favorable and that so far there has been no recurrence of the lesion, as already mentioned previously the use of photodynamic therapy has been most studied for choroidal hemangiomas, in which has had good results acting on the vascular endothelium respecting adjacent structures.

In the choroidal hemangiomas the goal of therapy is to stop the exudation that can spread to the macular area causing low visual acuity; and not to the disappearance of the tumor; although in this case the treatment causes the complete disappearance of all the hemangioma.

We know that these lesions are well treated with radiotherapy, but the hospital we work in is only ophthalmological, and is easier to have the antiangiogenic agent at the retina department rather than radiotherapy.

## Conclusions

At the moment it has not been reported any other case of corneal hemangioma in the literature, so this case report seems very important, and even we do not have the pathology report, the clinic picture and the response to treatment supports the diagnosis.

It is important to know the different types of treatment that we could have for different pathologies, because we can apply even if they are not in the area where they were initially described.

## References

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