Ocular Neoplasia

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Introduction

Neoplasia

Neoplasia may be defined as an accelerated proliferation of cells having no apparent relationship to growth and maintenance of body tissues, leading to development of a tumour.

Neoplasia usually begins in a single focus, although it may arise in several adjoining areas. Some neoplasia are systemic. In the reticuloendothelial system, for example, the bone marrow throughout the body affected giving rise to overproduction of leucocytes (leukemia).

Hyperplasia may be defined as an increase in size of an organ or tissue due to an increase in the number of its specialised constituent cells.

Neoplasia differs from hyperplasia in several important respects (Walter & Israel, 1967):

(a) Neoplasia usually arises spontaneously, but in those cases where he stimulus is known, it is abnormal, e.g., ionising radiation or chemical carcinogen. By contrast, hyperplasia is usually produced by the excessive action of a normal stimulus.
(b) The growth of hyperplasia is directly related to the degree of stimulation, while neoplasia, once started proceeds irrespective of the stimulus
(c) Once the stimulus is removed, hyperplasia regresses. Neoplasia on the other hand, proceeds unabated.

Cancer may be defined as a cellular malignancy whose unique characteristic – loss of normal controls – results in unregulated growth, lack of differentiation, and ability to invade local tissues and metastasise (The Merck Manual, 1987).

Classifications

There are a number of ways of classifying neoplasia.

Histogenic classification

This classification utilises the cell-type of origin. One difficulty with his type of classification is that some tumours are so poorly differentiated that they are extremely difficult to recognise.

Histological classification

This classification is useful when the tumour is so undifferentiated as to defy recognition of its site of origin (Walter & Israel, 1967).

Classification according to behaviour

The tumours are classically divided in to two groups, ***benign*** and ***malignant***. However, it should be understood that intermediate types of behaviour exist which do not fall properly into either of these categories.

Benign (or simple or innocent) tumours show no tendency to directly invade the surrounding tissues. The excessive accumulation of cells produces an expanding lesion which causes pressure and atrophy of neighbouring tissues. The stoma which remains forms a capsule, which is a characteristic feature of benign tumours situated in a solid organ or tissue (Walter & Israel, 1967).

Benign tumours are well differentiated (that is, specialised in form, character, or function) and may well perfectly reproduce the structure of their tissue origin. They proliferate slowly, and usually show little evidence of mitosis.

As mentioned above, despite its name, benign or simple tumour is significant because of the pressure exerted as it grows. Benign tumours cause death infrequently compared to malignant neoplasia. Death occurs because of accident of position, for example, a tumour in cranial cavity or a tumour affecting glandular tissue producing secondary disease due to hormone overproduction. An example of the latter is an adrenal adenoma.

By contrast, no matter where a malignant tumour, or cancer, grows, if neglected it usually kills by

- Destroying tissues
- Interfering with physiological function
- Causing haemorrhage or ulceration in infected areas
- Or producing secondary starvation

A malignant tumour always invades the surrounding tissues. In most cases malignant tumours also spread by ***metastasis***, that is embolic spread via the blood and lymph vessels. Local invasion and embolic spread are the two characteristics of malignant tumours. The power to spread and invade combined with the capacity for progressive growth make the term “malignant” particularly suitable for this type of tumour.

Malignant cells tend to de-differentiate (that is\, lose specialisation and revert to a more primitive form). They may be pleomorphic (varying in size and shape) and the faster the cell growth, the more primitive are the cells.

However, some malignant tumours are so well differentiated as to be almost indistinguishable from normal tissue. This can make differential diagnosis difficult.

In conclusion, no single classification of tumours is entirely satisfactory (Walter & Israel, 1967). Tissue of origin, behaviour pattern and histological description all contribute to the overall description of the tumour type.

Growth

Benign tumours grow by extension and are often surrounded by a capsule of compressed tissue. Tumours with capsules are always benign but not all benign tumours have capsules.

Malignant tumours grow by invasion. They compress and penetrate surrounding tissues, move into intracellular spaces and eventually destroy and replace normal cells.

Metastasis

Invasion of blood and lymphatic vessels by malignant tumours leads to neoplastic cells being transported elsewhere in the body. This type of spreading is termed metastasis. Metastatic growth always indicates that the tumour is malignant although not all malignancies metastasise. Benign tumours do not metastasise.

Eyelid tumours

Lid malignancies of they eyelid are relatively common and most often develop in sun-exposed older men. 25% of all malignancies involve skin and 9-15% of these cutaneous malignancies involve the eyelid. 40% of all skin neoplasia are basal cell carcinomas which account for some 90% of eyelid tumours (Char, 1989).

Malignant lid lesions can mimic a number of benign conditions. It is very difficult for an optometrist to be certain about the nature of a skin lesion and certainly, growing lid tumours should be referred for biopsies to determine their nature. Char (1989) states that, as a general rule, any growing lid lesion, recurrent stye, or chronic rodent ulcer should be biopsied. Other clinical signs suggestive of lid malignancy include localised loss of lashes, a pearly ptelaniectatic change in an area of cutaneous disturbance, a new, enlarging pigmented lesion, an area of diffuse induration, and rarely, a scirrhous (hard to the touch) retracted area.

Basal cell carcinoma

As mentioned previously, basal cell carcinoma, or *rodent ulcer,* is the most common malignant neoplasia of eyelid. It presents with a history of a slow-developing, non-resolving lesion. There is usually a history of UV exposure and there is an Increasing frequency in elderly. The incidence is highest in outdoor workers, sportsmen and sunbathers. It is more prevalent in fair skinned patients.

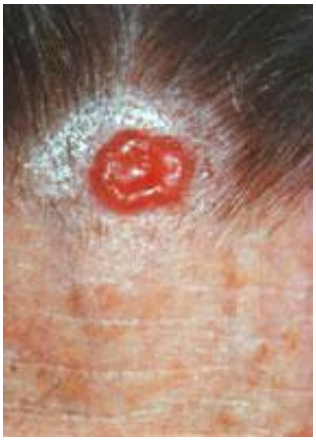


Figure 1. Basal call carcinoma, umbilicated with pearly border

A previous history of skin cancer is common.

There are a number of forms of basal cell carcinoma. They may appear as small, shiny, firm nodules; ulcerative, crusted lesions; flat scar-like indurated plaques; or lesions difficult to differentiate from psoriasis or localised dermatitis. Most commonly the carcinoma begins as a small papule, enlarges slowly, and after a few months, shows a shiny pearly border with ptelangiactasis, and a central dell or ulcer (The Merck Manual, 1987).

Figure 1 shows a basal carcinoma with typical shiny pearly edges. Figures 2 to 4 illustrate other possible appearances.

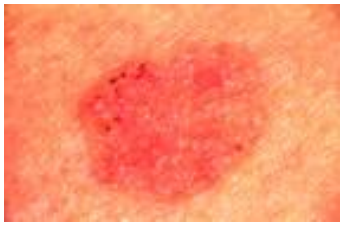


Figure 2. Superficial form

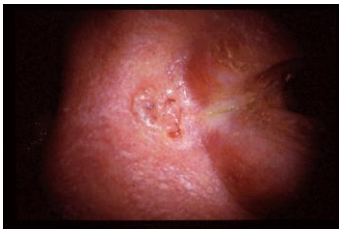


Figure 3. Ulcerative form

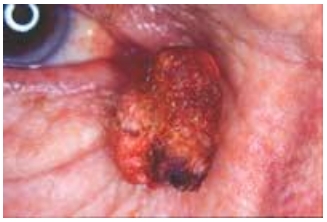


Figure 4. Nodular form

Recurrent crusting and/or bleeding are not unusual and the lesion continues slowly to enlarge.

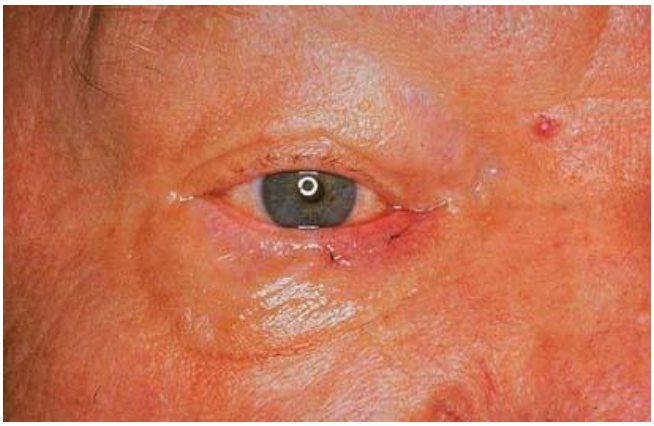


Figure 5. Basal carcinoma of the lower eyelid

The lower eyelid is the most commonly affected lid region (60%) (Figure 5) followed, in order of prevalence, by the medial canthus, upper lid and lateral canthus.

There can be varying amounts of pigment. Secondary infections or inflammation of lesion can occur with surrounding erythema or ulceration. These carcinomas can mimic other types of tumour such as melanoma (Figure 6).

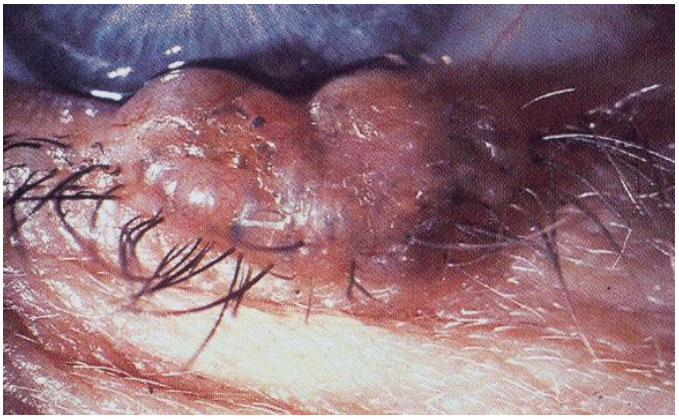


Figure 6. *Basal cell carcinoma mimicking a melanoma (Char, 1989)*

They are slow growing, so generally referral is not urgent. However, inner canthus lesions extend deeply more quickly.

Management is by referring for biopsy with subsequent surgical excision and repair. Most basal cell carcinomas of the lid can be eradicated with preservation of ocular function and good cosmesis.

Metastases from basal cell carcinomas are exceedingly rare.

Sebaceous gland carcinoma

Sebaceous gland carcinoma is one of the most dangerous eyelid tumours for four reasons (Char, 1989). Firstly, it often masquerades as a recurrent chalazion, stye or chronic blepharoconjunctivitis. So much so that correct diagnosis may often be delayed until tumour has metastasised.

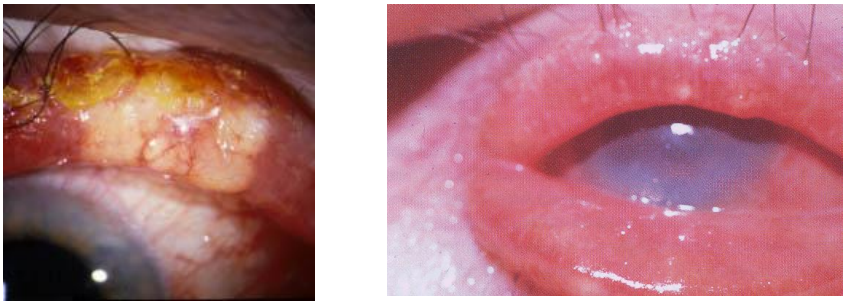


Figure 7 & 8 Sebaceous cell carcinomas masquerading as chalazion or blepharoconjunctivitis (Char, 1989)

Secondly, the incidence of metastasis is high (around 40%) although earlier diagnosis results in decreased tumour-related mortality.

Thirdly, because sebaceous gland carcinoma may have either intraepithelial pagetoid spread and/or a multicentric pattern, delineation of tumour margins can be difficult.

Lastly, even histologically the tumour can be misdiagnosed.

The cell of origin in these tumours is not certain in around half of all cases. In the remainder the tumour arises most commonly from the meibomian glands anterior to the grey line or from either the glands of Zeiss or Moll (Boniuk & Zimmerman, 1968).

The tumour is more common in oriental than occidental races. Sebaceous gland carcinoma accounts for 0.5% to 5% of lid carcinomas in USA and 28% of lid carcinomas in China. It appears to have a higher prevalence in females and is most common in older patients, with a mean age at diagnosis in the mid-sixties. However, it has been described in children as young as 3.5 years old (Straatsma

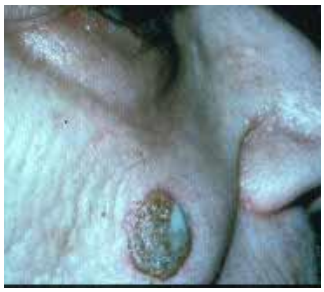
1956). Unlike basal cell carcinoma, there is a predilection for upper lid and 50% present as pseudo-chalazion or a chronic blepharoconjunctivitis.

The tumour commonly presents either as a chalazion or a chronic blepharoconjunctivitis.

The tumour spreads by extensive growth and metastasis via lymph and blood vessels. Tumours less than 6 mm generally have good prognosis. Patients with metastases often have been observed and diagnosed for > 4years (Char, 1989).

Squamous cell carcinoma

This is relatively uncommon accounting for 1% of lid malignancies. There is no pathonomonic clinical presentation. However, the appearance of a cutaneous horn or extensive keratinisation is most consistent for this neoplasm (Figures 9 & 10).



Figures 9 squamous cell carcinomas with keratinisation

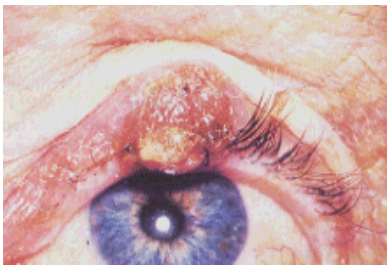


Figure 10 squamous cell carcinomas with keratinisation (Char, 1989)

It has a slightly more malignant course than basal cell carcinoma and spreads by extension to regional nodes, by direct invasion or by perineural invasion into the central nervous system, the latter being the most common cause of death.

Malignant melanoma

Melanomas account for approximately 1 percent of eye lid tumours (Garner et al, 1985).

There are four main types of cutaneous melanoma. These are nodular, which account from some 50 percent of eyelid melanomas; superficial spreading (40 percent) with acral lentiginous and lentigo maligna accounting for the remainder.

All except nodular have a radial (horizontal) growth phase component.
Signs that a pigmented lesion may be a malignant melanoma include variegated pigmentation, often with inflammation, development or spread of pigmentation, tumour thickness (rather than being relatively flat). Some 40 percent of lid melanomas are non-pigmented (Figure 11). Occasionally, the eyelid may be secondarily involved in a conjunctival melanoma.

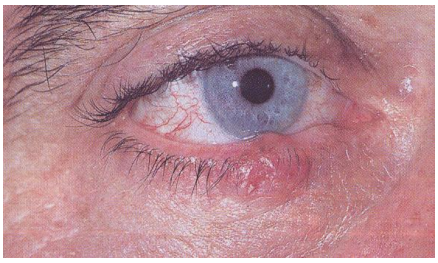


Figure 11Amelanotic melanoma (Char, 1989)

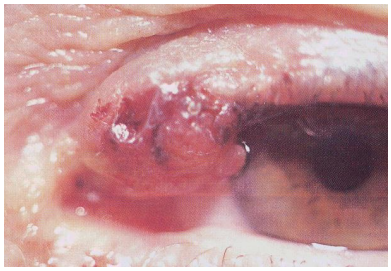


Figure 12 Sparsely pigmented melanoma (Char, 1989)

In melanomas less than 0.85 mm thick there is < 1% tumour related mortality whereas in lesions > 3.65 mm thick mortality rate is62% over 8 years. Early diagnosis of melanomas results in improved diagnosis (Char, 1989).

Metastatic tumours to lid

A secondary metastatic tumour of the eye lid is very rare and as with uveal metastases, lung and breast carcinoma account for 80% of lesions that metastasise to lid.

Kaposi's sarcoma

These vascular tumours were first described 1872. Prior to 1981, most cases of Kaposi's sarcoma occurred in elderly Italian or Jewish men or African children tumour rarely affected periocular structures. Prior to the outbreak of AIDS, Kaposi's sarcoma was rarely noted to involve the periocular structures. It is now a common manifestation of AIDS and Kaposi's tumour of the lid, or more commonly lid and conjunctiva is a common sign in AIDS.

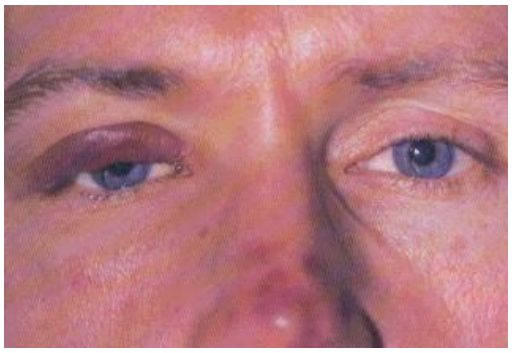


Figure 13. Kaposi's sarcoma (Char, 1989)

The lesions are usually violet in colour.

These tumours respond well to low-dose radiation therapy.

Naevus (pigmented spot)

These are usually congenital or of early onset. They can occasionally change in size or pigmentation. Such change may be hormonally related for example, with pregnancy or during puberty (Catania, 1995).

Pigmented (usually brownish) or amelanotic (white or clear spots on skin surface) varieties can occur.

They are commonly found at lid margins and present with well-defined borders. They are usually < 8 – 10 mm but may grow with age. They may show hairs growing through surface.

Catania (1995) classifies these into three types. Firstly, dermal naevus which is a deep form. The dermal variety is the most common and hardly ever become malignant. They may be either flat or raised.

The second type is a junctional naevus which is superficial, usually flat. This type of naevus that straddles the inner and outer lid margins is more likely to become malignant (Figure 14).

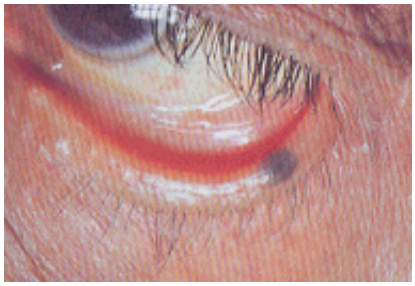


Figure 14 Junctional naevus (Catania, 1995)

The third type is a mixed dermal and junctional form

Papilloma (benign epithelial tumour)

Papilloma is more common in older patients. There are no symptoms but there may be cosmetic concerns.

They present as epithelial overgrowths of various shapes. They are avascular and have a roughened “granulated” surface.

They have a different surface texture from surrounding skin and vary in colour from amelanotic to black (Figure 15).

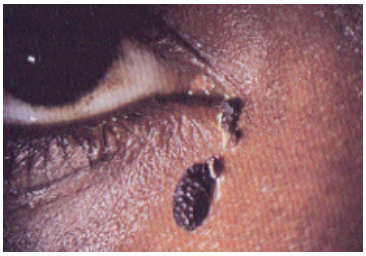


Figure 15 Pigmented papillomas (Catania, 1995)

Verrucae (viral wart)

These benign lesions have a slow insidious development, are contagious and are of viral origin. Verrucae may present as single or multiple non-secreting warts. They have smooth surfaces with petal-like or cauliflower-like dentate projections (Figure 16)

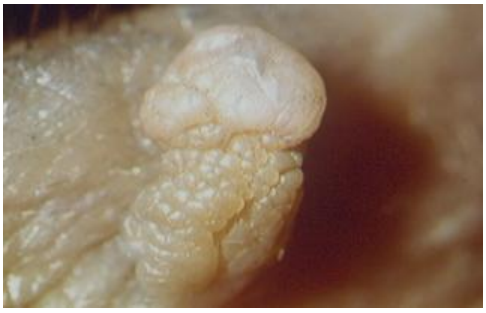


Figure 16 Viral wart on lower eye lid (S. Barnard)

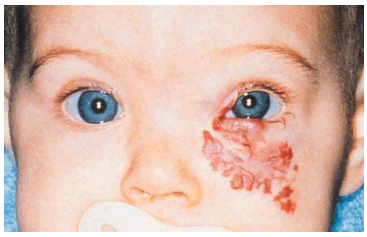
As virus is shed, it may cause a secondary viral keratoconjunctivitis.

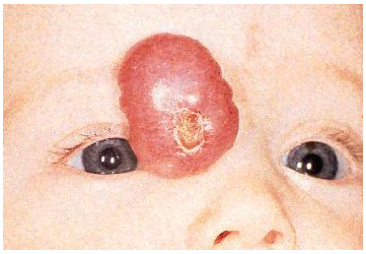
Patients need reassurance and education on the contagious nature of the lesion and when the patient expresses concern with cosmesis, the optometrist may consider referring for removal.

Infantile Haemangioma

Capillary haemangioma that involve lid, conjunctiva, orbit or a combination most commonly presents at birth or in fist few months. 95 percent are evident before six months. Haemangioma is the most frequent ophthalmic neoplasm of infancy *(Figures 17 & 18).*

Usually growth in the first year is rapid and then slow regression tends to occur. 75 percent resolve by the age of 7 years.





Figures 17 & 18 Examples of infantile haemangioma (Char, 1989)

Possible sequelae include strabismus, amblyopia, proptosis and compression of the optic nerve.

Generally, if the visual axis not involved, serial observation is all that is usually necessary. Possible treatment modalities include intralesion steroid injections but such intervention is not without risk and is rarely used.

Dermoid

These lesion are benign, developmental outpocketings of tissue. Dermoids are histological/embryological anomalies made of hair, tooth or bone and usually only require monitoring. (Figure 19).

They are usually noted at birth or in the early years and can be found at numerous sites in the body including the eyelid. They are common in syndromes such as Goldenhar and Treacher Collins. The most common ocular sites are superior temporal brow region and outer canthus (Catania, 1995).

Cosmesis can be a factor with regards to whether surgery is necessary.

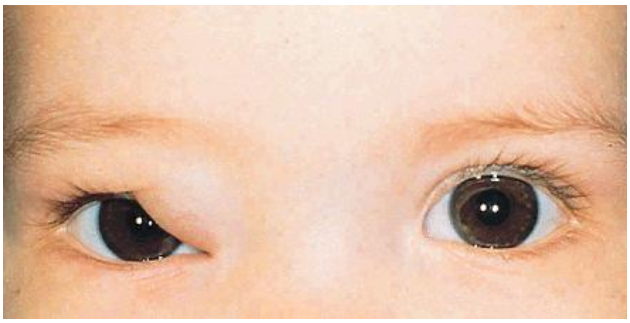


Figure 19 Dermoid

Treatment of lid tumours

The management of all lid malignancies depends upon the correct histologic diagnosis, assessment of tumour margins and the extent of systemic tumour spread (Char,1989). In many lid cancers the choice of therapy is not critical. A focal malignancy can be successfully treated with surgery, cryotherapy, or ionising radiation.

However, Char (1989) states that in at least three clinical settings, choice of the optimal therapeutic option is mandatory. In diffuse tumours it may be impossible to assess tumour margins without histologic evaluation. In such cases cryotherapy is contraindicated. As many as 40 percent of basal cell carcinomas are diffuse and accounts for the 10 percent failure rate noted with cryotherapy.

In cases in which tumours have extended into either orbit or bone, wide-field radiation is usually necessary when attempting to salvage the eye.

The choice of therapy for most lid tumours is based on the tumour's size and location and on the clinician's expertise with surgery and other therapeutic modalities. Virtually all rare primary lid malignancies are treated surgically. For further reading on specific treatment for the various lid tumours discussed here, the reader is referred to Char (1989).

Conjunctival tumours

Benign conjunctival tumours

There are a number of benign lesions that can occur in the conjunctiva and some of these can simulate malignancy.

The three most common benign tumours of the conjunctiva are granuloma, haemangioma and melanosis (congenital form).

Granuloma

This common lesion presents as a painless mass with usually a chronic development. The patient is most often unaware of the lesion.

They present with variable shapes and position and take the form of red spongy vascularised masses. They may be pedunculated. They often overgrow the lid margin and appear as a lid papilloma.

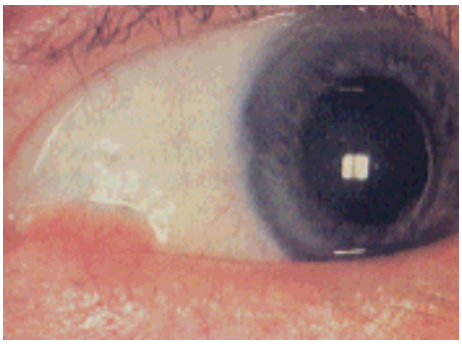


Figure 20 Granuloma overgrowing lid (Catania, 1995)

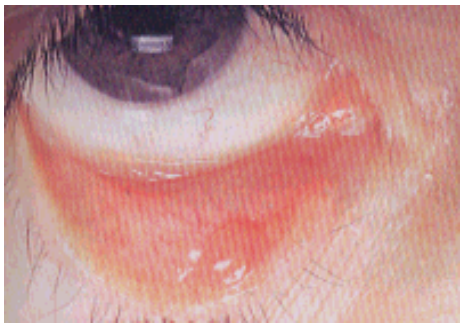


Figure 21 Granuloma of palpebral conjunctiva (Catania, 1995)

They exhibit a smooth posterior surface, next to globe, compared to rough surface of a papilloma.

They are usually self-limiting but hot compresses may help. Surgical removal may be indicated if the granuloma is persistent and produces poor cosmesis.

Haemangioma

These are usually present at birth and may enlarge with age. Their cosmetic appearance may be disconcerting for the parents and, later the patient.

Hemangioma present as a raised broad-based bulbar red or purplish tortuous vascular conjunctival mass (Figure 22).

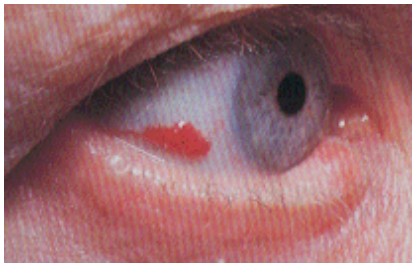


Figure 22 Hemangioma (Catania, 1995)

They can usually be easily differentiated from a lymphangioma which is lighter in colour.

Melanosis (congenital form)

Congenital melanosis as opposed to acquired melanosis are areas of conjunctival pigment which are present at birth or develop soon after. This condition is more prevalent in highly pigmented races. They may increase with age.

They present as flat, pigmented patches, usually at limbus and are of variable size and shape *(Figure 23).*

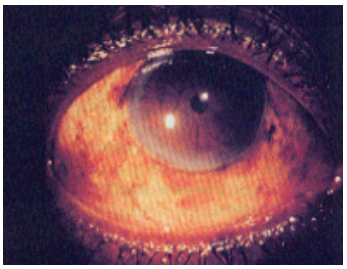


Figure 23 Congenital melanosis (Catania, 1995)

Some patients may need rreassurance. As with all lesions, the age of onset and history is important to ascertain.

Malignant conjunctival tumours

There are five malignancies may involve the conjunctiva and these are, in order of prevalence, squamous cell carcinoma, melanoma, lymphoid tumours,

sebaceous cell carcinoma contiguous with lid involvement and lastly, Kaposi's sarcoma.

Conjunctival squamous cell carcinoma

[or conjunctival intraepithelial neoplasia (CIN)]

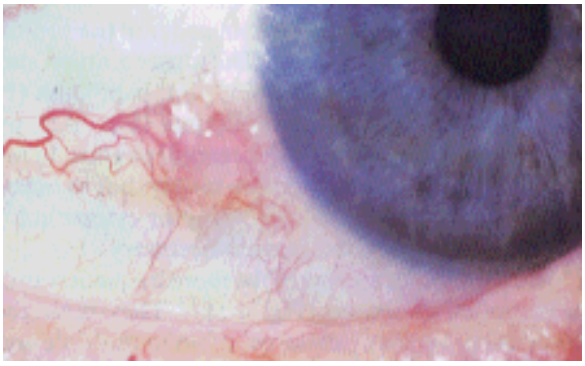


Figure 24 Conjunctival squamous cell carcinoma (Char, 1989)

CIN has a usual age of onset in the 60s and usually occurs at the limbus.

There are four common presentations: leucoplakic, vascular papilloma-like, gelatinous lesion with intrinsic vessels, and Pagetoid. Figures 25, 26 and 27 from Char (1989) show examples of this type of tumour.

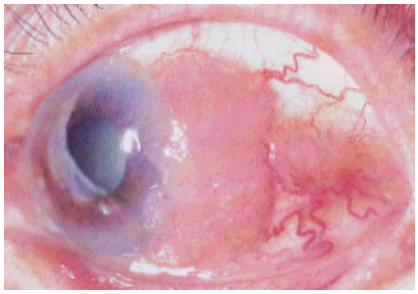


Figure 25 Vascular papillomatous

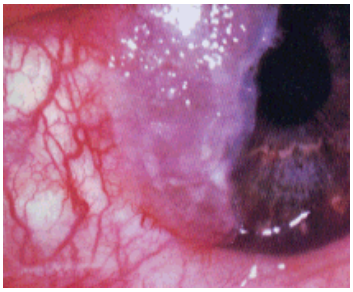


Figure 26 Paegtoid spread

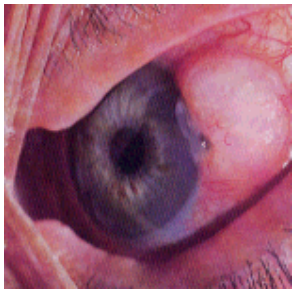


Figure 27 Leucoplakic

It should be noted that conjunctival intraepithelial neoplasia can mimic pterygium (Figure 28).

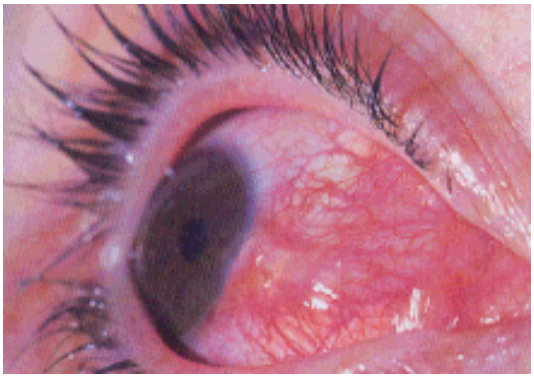


Figure 28 Invasive carcinoma mimicking pterygium (Char, 1989)

The histologic features of these tumours are fairly malignant but metastasis is apparently rare.

Conjunctival melanoma

This is uncommon and accounts for some 2% of eye malignancies.

Conjunctival melanoma can arise *de novo,* from nevi, or from acquired melanosis. The latter accounts for 75% of melanoma.

They usually occur in middle-aged individuals. They appear as a conjunctival epithelial lesion and should be differentiated from the **deeper** pigment found in melanosis oculi (Figure 29), oculodermal melanosis (naevus of ota), and blue naevi which are in the sclera.

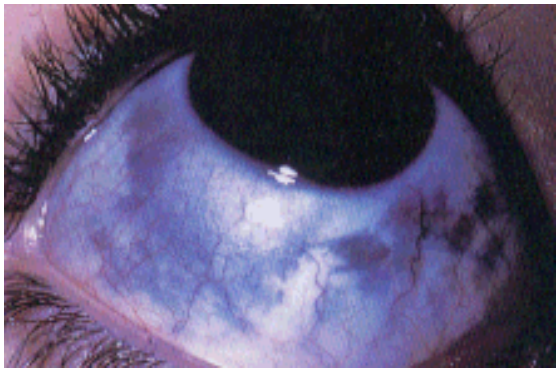


Figure 29 Melanosis oculi (Char, 1989)

Melanoma is very rare in dark skinned races.

Both pigmented and amelanotic types can occur. These are illustrated by figures 30 and 31(Char, 1989).

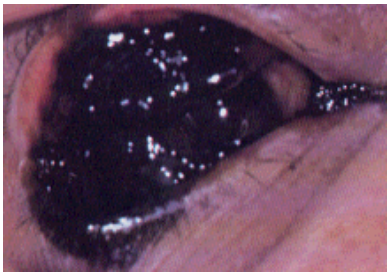


Figure 30 Amelanotic melanoma

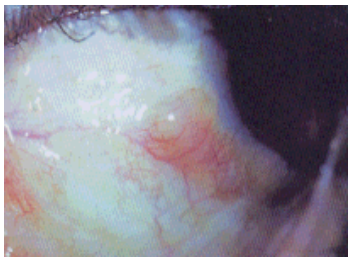


Figure 31Bulky diffuse melanoma

Acquired melanosis (benign or pre-cancerous)

Acquired melanosis may be benign but can be a pre-cancerous lesion. These appear as patchy brown, flat areas of conjunctival epithelial pigmentation or discolouration and were not present previously. History is important as their recent onset will differentiate them from congenital melanosis which is less likely to become malignant. The colour of the lesion may vary from tan or brown to black.

The lesion characteristically spreads slowly and may regress spontaneously. 20 percent of acquired melanosis lesions develop malignant transformation.

Acquired melanosis most frequently appears between age the ages of 30 and 40 years. Whilst the patients are asymptomatic they are commonly and understandably concerned and apprehensive.

Photographing the lesion is useful in terms of monitoring and as with any new suspicious lesion, referral by the optometrist is indicated. Suspicious lesions should be excised and sent for pathologic analysis. The resulting analysis will determine subsequent management.

Conjunctival lymphoid tumours

These characteristically present as a salmon-coloured, subconjunctival infiltrate (Figure 32).
Differentiating between benign and malignant lymphoid infiltrates is exceedingly difficult.

Certainly referral by the optometrist of any suspicious looking subconjunctival infiltrate is indicated.

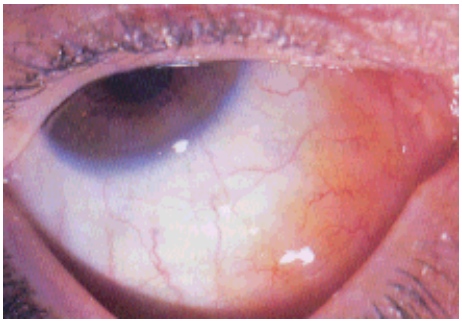


Figure 32 Salmon-red lymphoid tumour (Char, 1989)

Conjunctival Kaposi's tumour

Kaposis's sarcoma of the conjunctiva has become a common tumour amongst patients with acquired immunodeficiency syndrome. The clinical presentation with a reddish or bluish, relatively diffuse vascular conjunctival lesion is almost pathognomonic in a patient with AIDS (Figure 33)(Char, 1989).

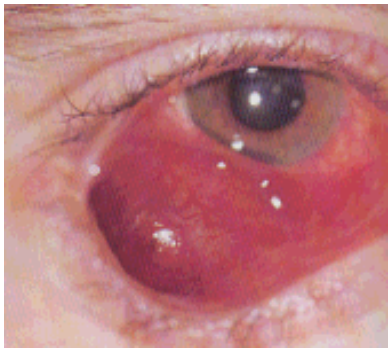


Figure 33 Kaposi's sarcoma (Char, 1989)

and responds rapidly to irradiation.

Caruncle

Most caruncular lesions are benign and in order of prevalence the benign lesions are naevi (43%), papilloma (13%), sebaceous gland hyperplasia (8%), and non-specific inflammation (4.5%) (Luthra et al, 1978). The most common malignancies were squamous cell carcinoma of the conjunctiva, sebaceous gland carcinoma of the lid, and conjunctival melanoma.

Figure 34 shows a caruncular naevus.

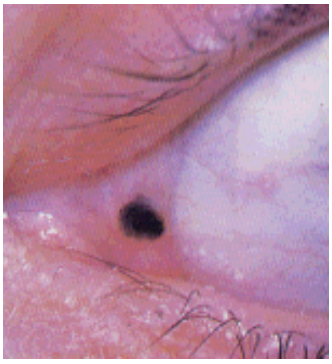


Figure 34 Caruncular naevus (Char, 1989)

Posterior uveal tumours

Choroidal melanoma is the most common malignant intraocular tumour of adults. Common differential diagnoses include:

- Choroidal naevus
- CHRPE (Congenital Hypertrophy of the Retinal Pigment Epithelium).
- Retinal pigment hyperplasia

Choroidal naevus

Choroidal naevi are present in 6.5% of autopsy eyes (Jones, 1998). They are usually flat or minimally elevated. These lesions will often not be detected if only direct ophthalmoscopy is used to examine the ocular fundi. Routine dilation of the pupils with binocular indirect ophthalmoscopy is a better method of detecting these lesions. In addition routine fundus photography, especially wide field systems such as OptoMap are extremely useful in detecting and monitoring choroidal naevi.

Choroidal naevi are usually slate grey in colour and vary in size from 0.5 mm to 10 mm. The majority are 1.5 mm to 5 mm (i.e., < 4 disc diameters). Less frequently hey can be blond in colour.

Most produce no symptoms and there is either no scotoma or a relative visual field defect.

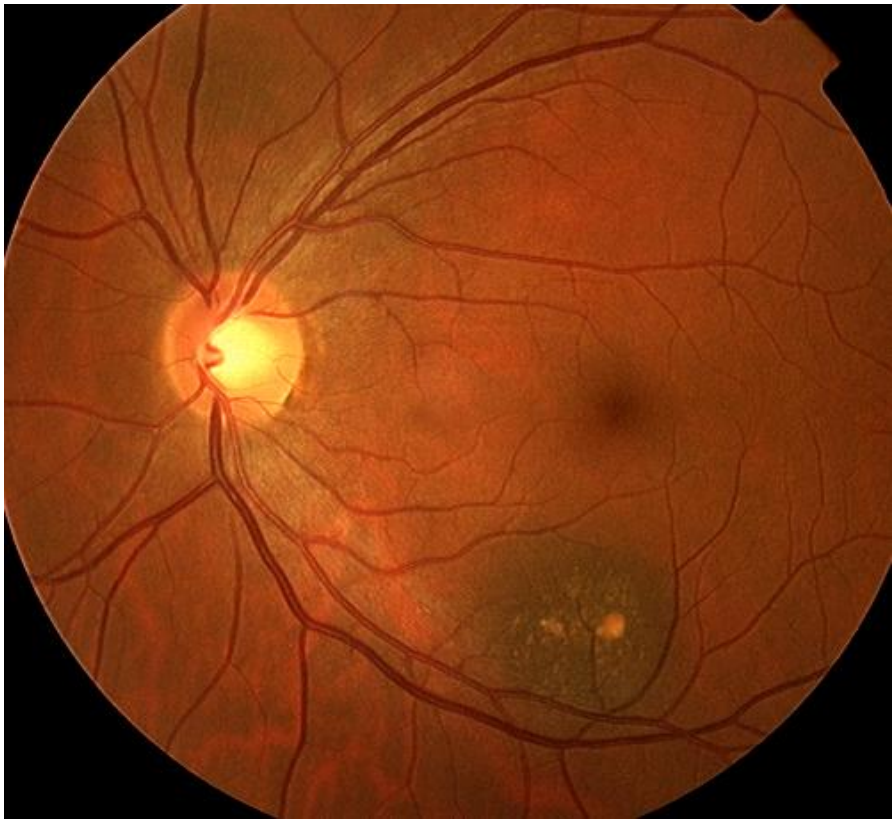


Figure 35 Choroidal naevus with drusen (S. Barnard)

Figure 35 shows a small choroidal naevus at the posterior pole. They may have overlying yellow or white drusen which may be isolated or confluent. Choroidal naevi can be blond.

Figure 36 shows the same ocular fundus as in Figure 35 this time imaged with the OptoMap laser scanning ophthalmoscope using combined red and green lasers. The white arrow shows the position of the lesion.

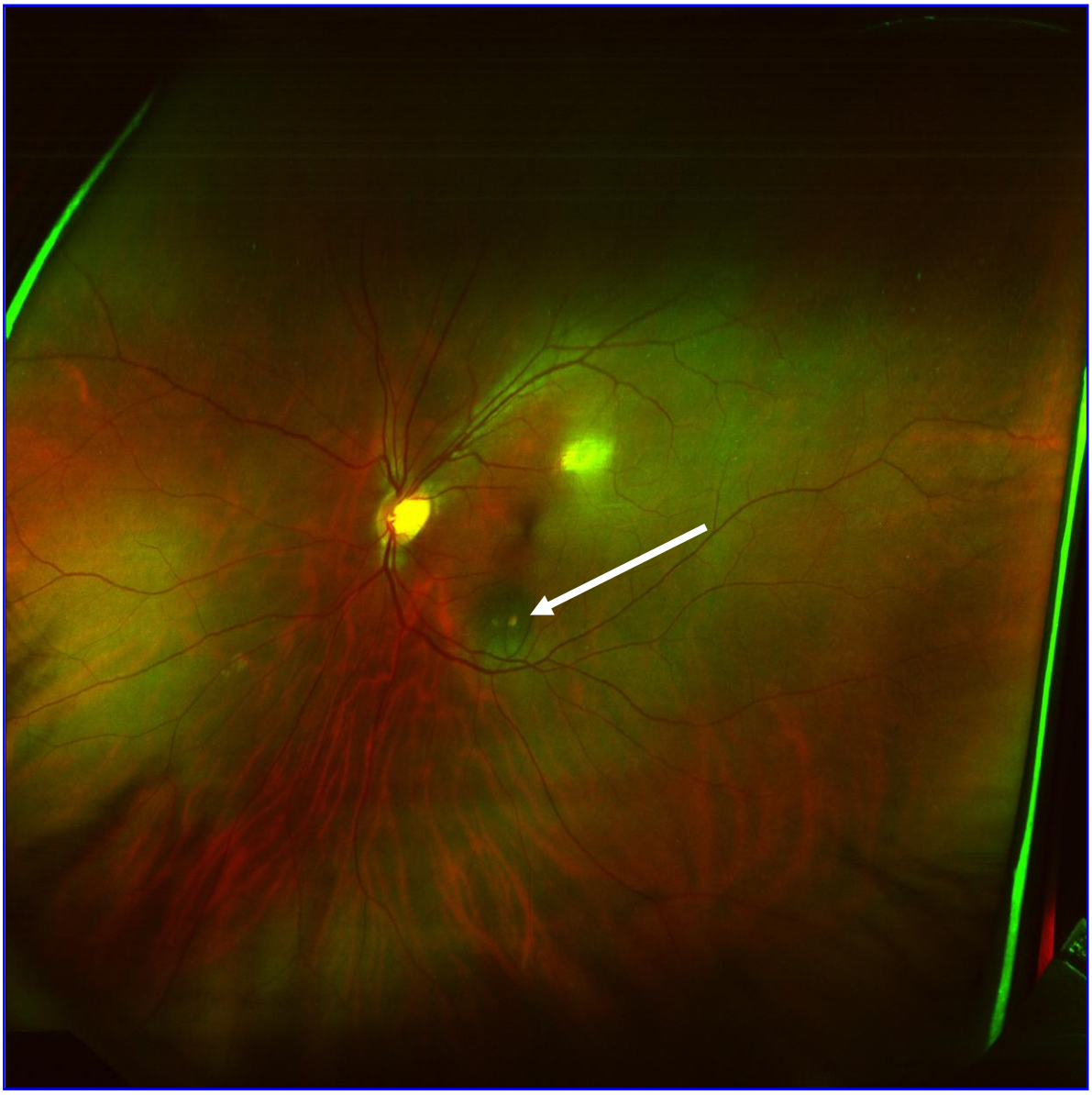


Figure 36. OptoMap image showing choroidal naevus (combined red and green laser) (S. Barnard)

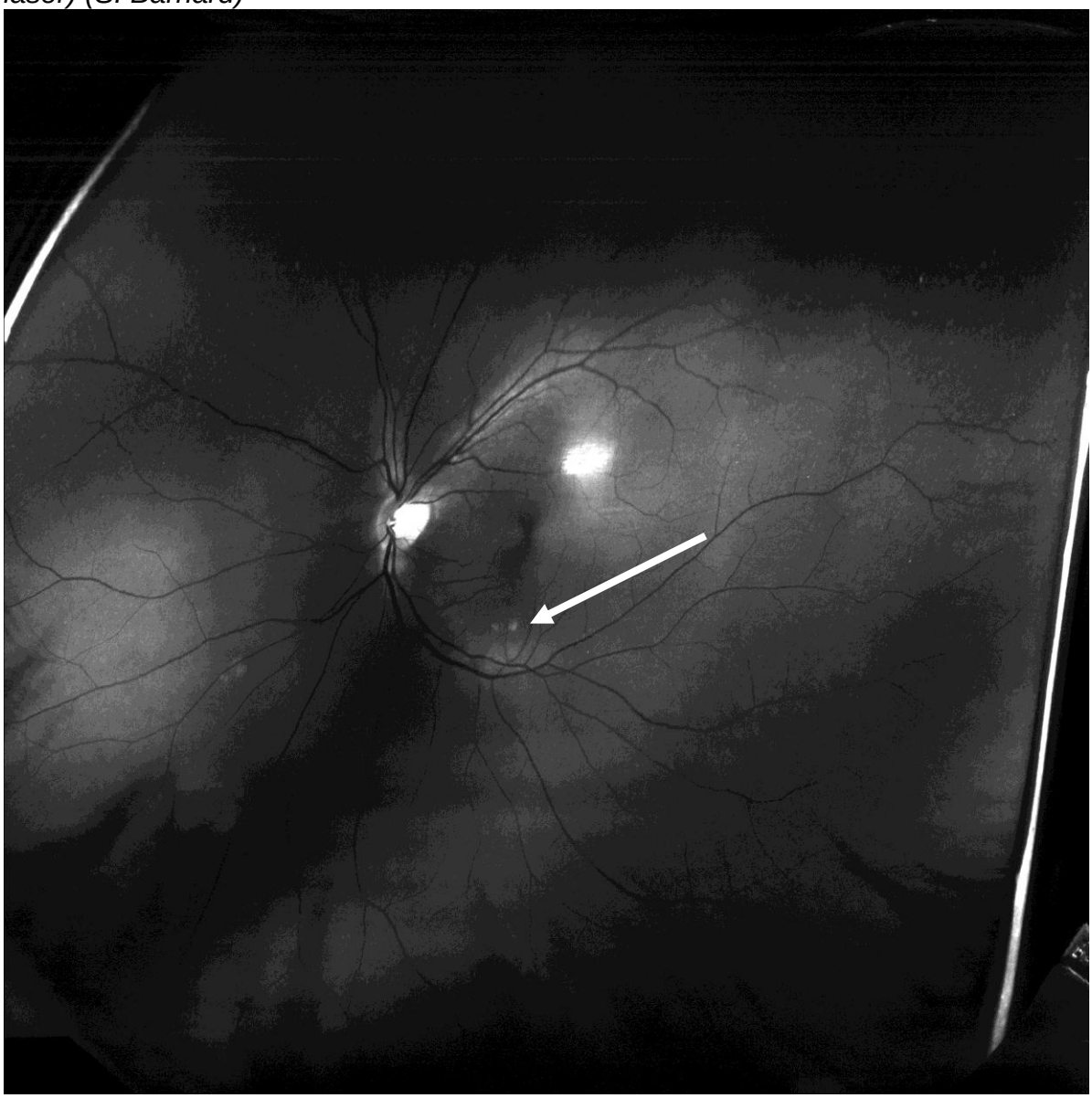


Figure 37 The same image as figure 36 but with red free, showing the retina only. Note that he drusen are visible as these lie in the RPE (S. Barnard)

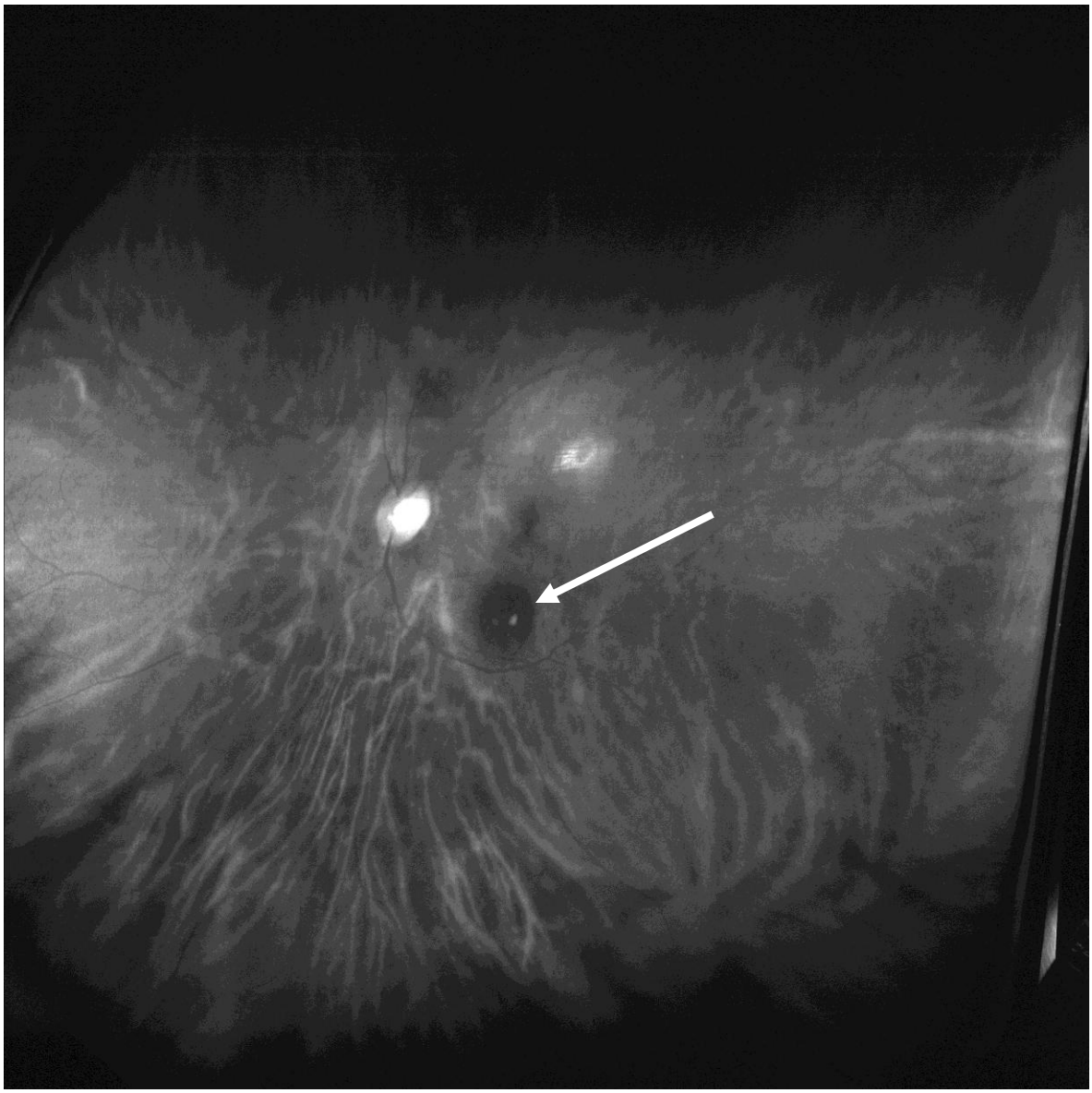


Figure 38 This image of the same eye shows the choroid only (red laser)(S. Barnard)

Figures 35 to 38 clearly illustrate that the naevus is positioned in the choroids with no ore minimal retinal involvement. The drusen appear in both figures 37 & 38 showing that the RPE is involved.

Choroidal naevi may show sub-retinal neovascularisation which is a sign of sign of chronicity. They can exhibit changes in the overlying RPE such as the drusen mentioned previously.

Further investigation necessary if visual symptoms present, if the lesion is elevated or greater than 6 mm diameter, if there is overlying orange pigmentation, or overlying sub-retinal fluid.

The orange pigmentation which consists of lipofuscin is commonly found in choroidal melanoma and the presence of orange flecks should raise the index of suspicion of the optometrist and referral for an ophthalmological opinion is more likely to be indicated.

For most choroidal naevi it is suggested that they are documented, preferably photographed and reviewed at yearly, or possibly two-yearly intervals..

CHRPE

Congenital hypertrophy of the retinal pigment epithelium takes the form of pigmented, flat, usually round lesions with distinct margins. They vary in colour from light brown to jet black and are stable in size. Prevalence is 1.2%.

They may have a hypo-pigmented ring around the lesion and atrophy can occur to give window-like defects called lacunae. Figure 39 shows an OptoMap image of a CHRPE (white arrow) with one large (yellow arrow) and one small lacuna.

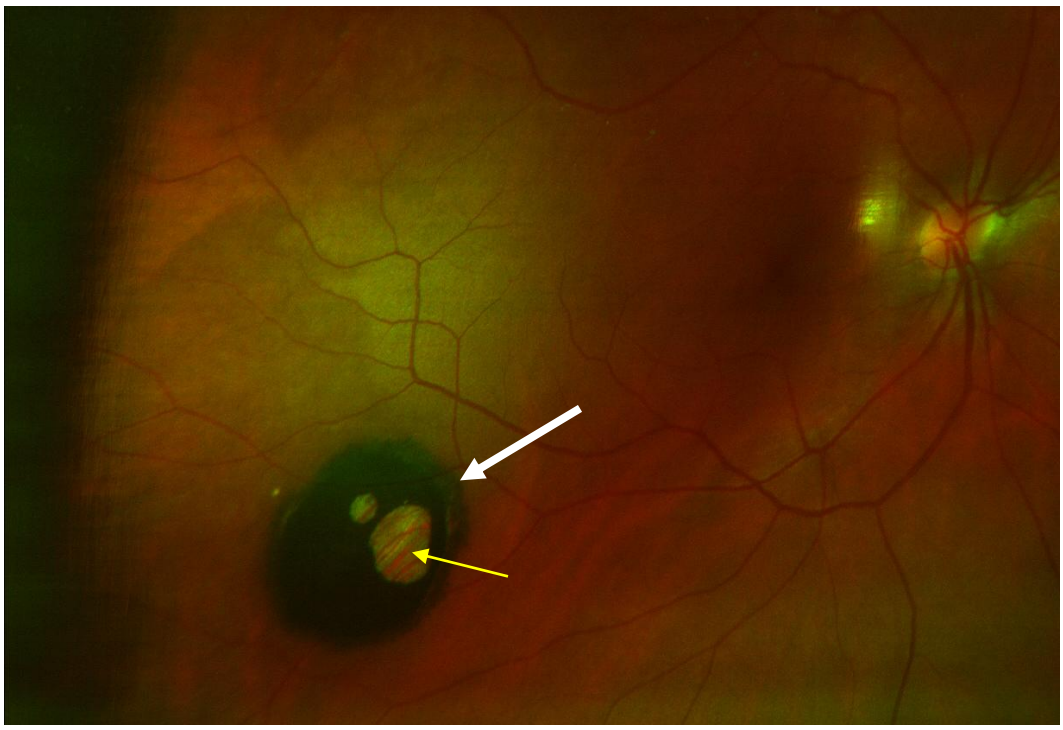


Figure 39 CHRPE with lacunae (S. Barnard)

Figures 40 and 41 show separately the choroid and retina respectively of the same eye. Note that because the CHRPE lies between the sensory retina and

choroid, the lesion shows up in both images, unlike the choroidal naevus in figures 36, 37 and 38.

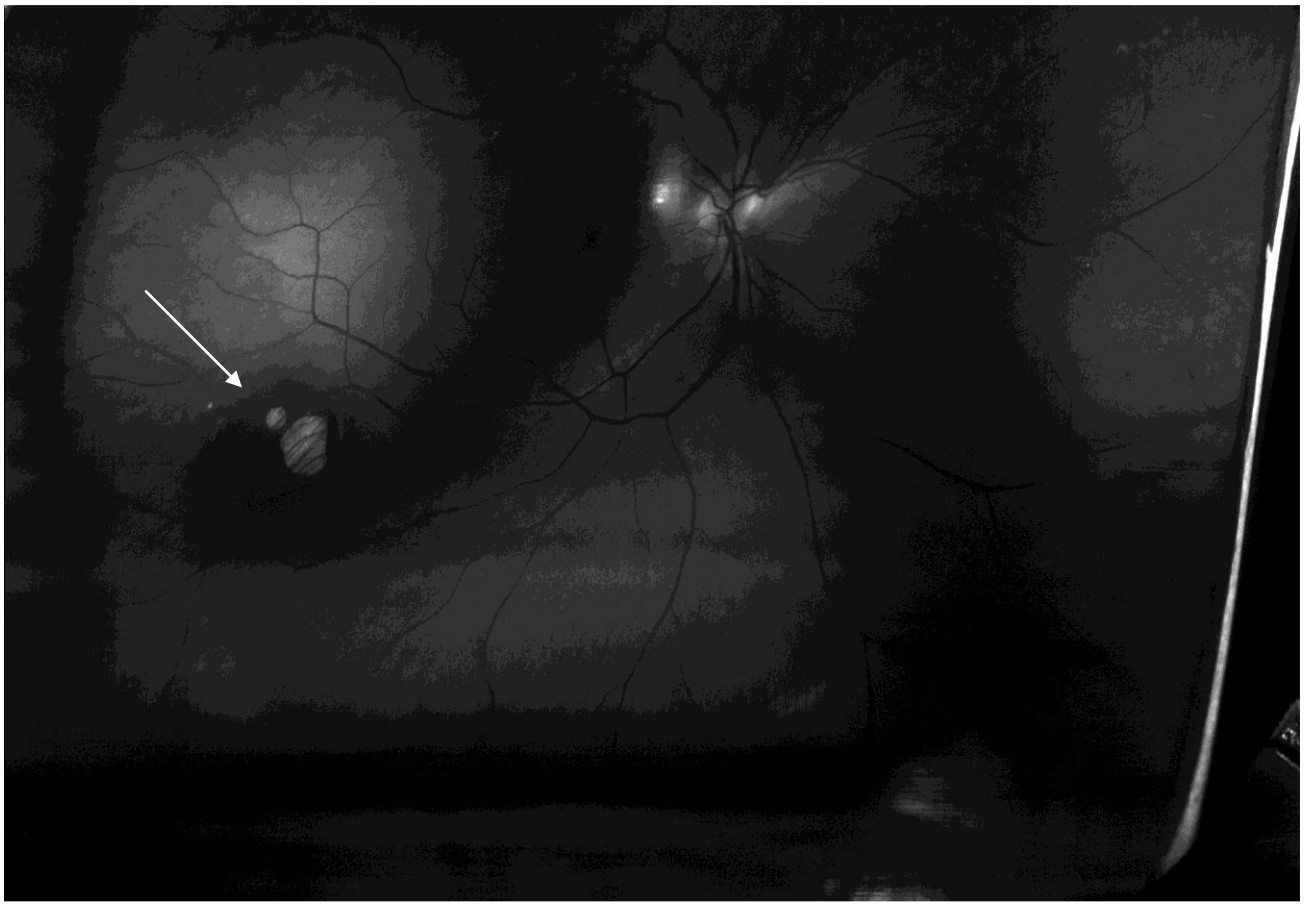


Figure 40 Same CHRPE (white arrow) as previous figure. This image shows only the retina (S. Barnard / OptoMap)

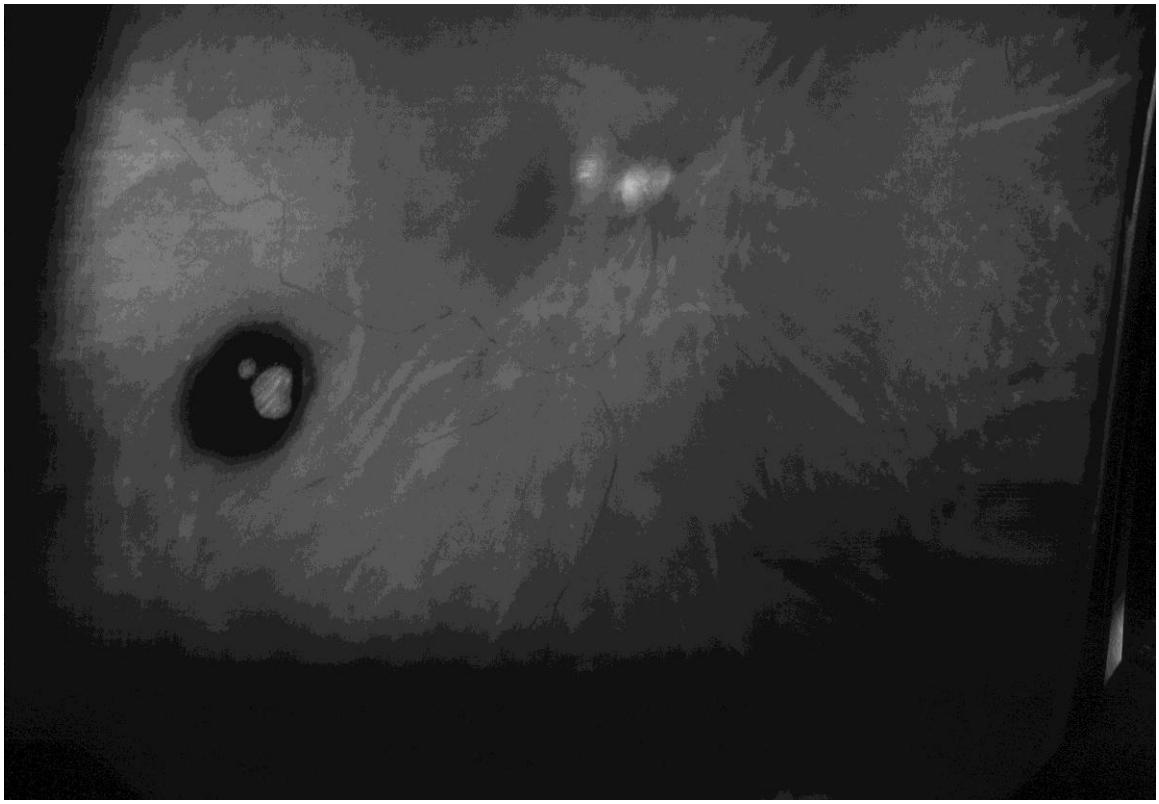


Figure 41 Same CHRPE as previous figure. This image shows only the choroid (S. Barnard)

Groups of small CHRPE are often called “bear tracks”.

These lesions are benign and **rarely** become malignant. Nevertheless, they should be reviewed at regular intervals, yearly or two-yearly.

However, there is a correlation between CHRPE, particularly multiple lesions, especially those with less regular margins, and adenomatous polyposis and Gardner Syndrome.

Hypertrophy of the retinal pigment epithelium may also be acquired. Differential diagnosis is helped by history of early observation of the lesion. This is further support for the need to examine the entire retina using indirect ophthalmoscopy or photography at the first eye examination of a patient.

Acquired hyperplasia and hypertrophy of the RPE

Acquired retinal pigment hyperplasia and hypertrophy are lesions that require differential diagnosis from CHRPE, naevi and melanoma.

Acquired hyperplasia of the retinal pigment epithelium are primarily caused by acquired lesions of retina such as past trauma; post-inflammation; or degenerative processes. An example of a cause is toxoplasmosis. This condition can be congenital following inflammation during foetal development. The appearance of these lesions is of darkly pigmented flat lesions with irregular ragged edges (Figure 42).

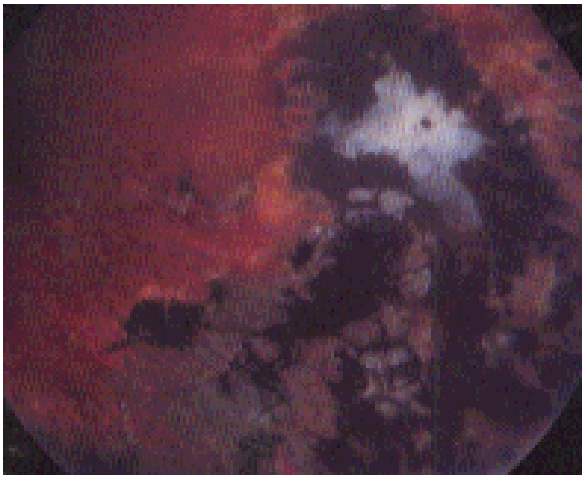


Figure 42 Acquired hyperplasia of RPE

Choroidal malignant melanoma

This is the most common intraocular tumour of adults with an incidence 6 per million per year in USA. It is most common in middle-aged and older Caucasians and is rarely found in patients less than 20 years old Char (1989). Choroidal melanoma is very rare in blacks.

Patients with ocular or oculodermal melanoma are at increased risk of choroidal melanoma (Kanski, 1992).

History and presentation vary; approximately a third of uveal melanoma patients are asymptomatic when they are first diagnosed (Char, 1989). Possible symptoms caused by choroidal melanoma include photopsia, reduced visual acuity and visual field defects.

Metastasis to other parts of the body or extrascleral extension are the causes of death.

A lesion less than 6 mm, that is, less than approximately three to four discs diameter is unlikely to be malignant melanoma. As a guide, it is useful to

remember that a 20 D BIO lens produces a 12 mm retinal field. Any flat tumour larger than 6 mm should certainly be photographed and followed.
It can be difficult to differentiate a small melanoma from an atypical large naevus.

Techniques to assist in examination include BIO, SL with CL, photography, fluorescein angiography, ultrasound and visual fields. Standardised A-Scan ultrasonography (echography) has been used to differentially diagnose malignant melanoma from other types of lesion.

Malignant choroidal melanoma may present with variable appearances. They are usually mottled, oval to round elevated masses. They vary from brown to greenish grey in colour. An orange mottled appearance may be observed and is caused by deposition of lipofuscin (wear and tear pigment released by RPE cells). The presence of lipofuscin is not diagnostic (Kanski (1992) however, the presence of lipofuscin should raise the practitioner's index of suspicion. The tumour may take an amelanotic form (Figure 52).

Char (1989) advises more extensive evaluation of presumptive naevi if any of the following is present:

1. Visual symptoms (e.g., decreased visual acuity or an absolute scotoma)
2. An elevated lesion or one with a diameter greater than 6 mm
3. Overlying orange pigmentation
4. Overlying subretinal fluid

Melanomas vary in size from 5 mm - 7 mm to a lesion occupying whole fundus.

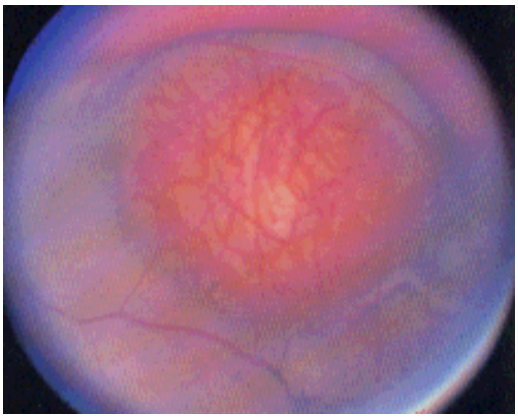


Figure 43 Malignant choroidal melanoma

The 5-year survival rate is between 20% and 50% but risk of metastasis is low.

Treatment methods include enucleation and irradiation.

Anterior uveal tumours

Iris naevus

These are benign flat lesions usually not involving pupil or trabecular meshwork and are usually less than 4 mm. Larger lesions may require biopsy.

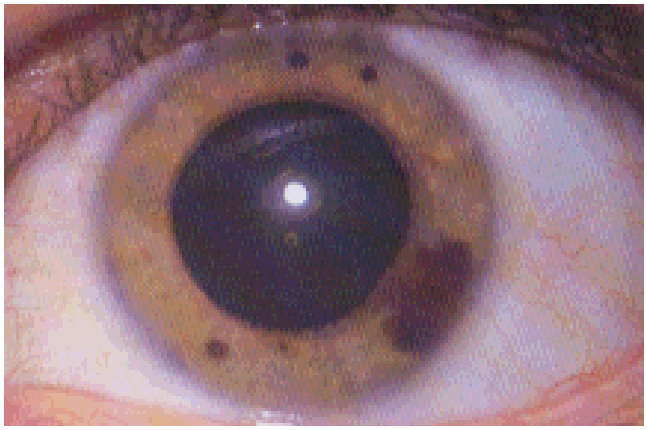


Figure 44 Iris naevus (Char, 1989)

Iris naevi do not produce a secondary glaucoma but like naevi elsewhere, they may become malignant.

Iris and cilary body melanomas

Iris and cilary body melanomas account for 20 percent of uveal melanomas. Light-coloured irides are more likely to develop melanoma than dark irides. They occur at an age 10 to 20 years younger than choroidal melanoma

Signs that a pigmented iris lesion may be a melanoma include

- Prominent intrinsic vessels
- Ectropion irides
- Secondary cataract
- Increased IOP
- Decrease in VA (astigmatism from pressure on lens)

Figures 45 and 46 show an iris melanoma and the tractional effect of such a lesion causing ectropion iris.

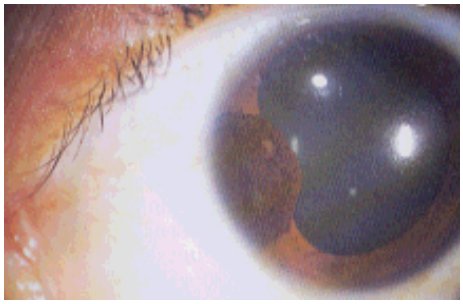


Figure 45 Iris melanoma (Char, 1989)

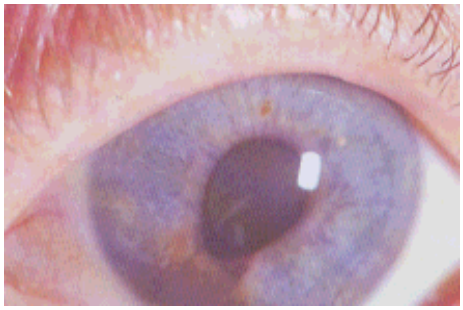


Figure 46 Iris ectropion (Char 1989)

Practitioners should document lesions and diagnosis is aided by observing growth over time and also the presence of vascularity.

Patients with pigmented iris lesions should be examined with slit lamp examination and careful fundoscopy using scleral depression. Gonioscopy will determine whether the lesion extends in to the trabecular region. Such lesions may be the cause of secondary glaucoma.

Tumour related mortality from iris melanoma is rare. Metastasis can occur and may be precipitated by glaucoma surgery in the presence of an undiagnosed tumour.

Retinal tumours

Von Hippel-Lindau syndrome

This is one of the phakomatoses and the syndrome includes a vascular tumour, angiomatosis retinae.

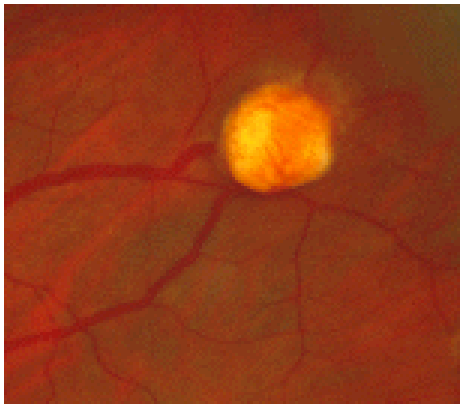


Figure 47 Angiomatosis retinae

Most patients with von Hippel-Lindau syndrome have a positive family history.

Whilst the lesions are benign, they can bleed. Treatment with laser may be advocated but recurrence may occur.

Retinoblastoma

This is the most common intraocular malignancy of childhood and occurs in 1:18,000 live births.

It may occur through sporadic somatic mutation in retinal cells or be inherited via an autosomal dominant with marked penetrance mode. 60 percent of cases occur through mutation with the remainder occurring due to heredity.

The average at diagnosis is eighteen months.

A common presenting sign the presence of a “white pupil” (leucocoria) which may have been observed by the parents or first noted when viewing photographs of the child taken using flash photography (figure 48).

Differential diagnoses of leucocoria include cataract and persistent hyperplastic primary vitreous (PHPV), retinopathy of prematurity and toxocara.

Another sign causing the parent to seek advice is the development of a strabismus. Care should always be taken to obtain a satisfactory view of the ocular fundi of any infant or child who develops strabismus to rule out pathology prior to commencing orthoptic treatment. The author has seen one case of retinoblastoma presenting in primary care optometric practice where the two year-old girl had been receiving treatment for a convergent squint by an ophthalmologist in Switzerland. The family had moved to the UK and sought follow-up care for the squint. Leucocoria was apparent on retinoscopy.

Retinoblastoma may also present as ocular inflammation.

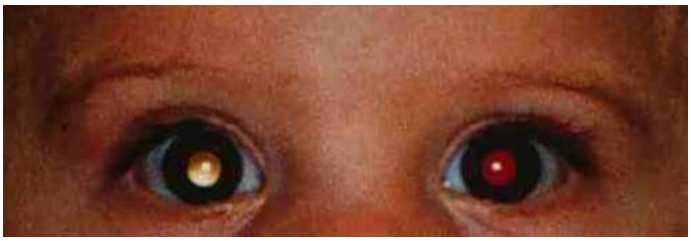


Figure 48 Leucocoria

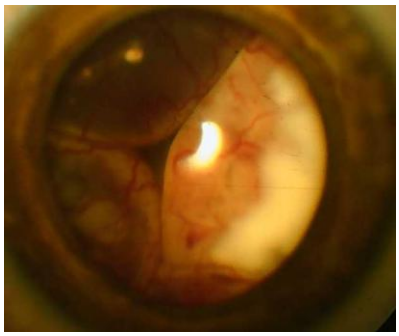


Figure 49 Retinoblastoma

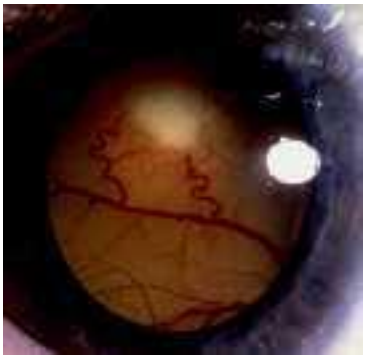


Figure 50 Retinoblastoma

Examination of the ocular fundi of infants and young children can be difficult. When necessary, fundoscopy should be carried out under general anaesthesia. The very wide field of view that may be obtained with the OptoMap laser scanning ophthalmoscope has a very useful role in primary care optometric practice in routinely examining the ocular fundi of children.

Enucleation is often necessary but small tumours may be treated without enucleation. Char (1989) discusses treatment options.

Optic nerve head tumours

There are a variety of tumours that can occur at the optic nerve head. These include metastases, hemangiomas, melanomas, melanocytomas and retinoblastomas.

By their very position, they are generally easily observable.

Optic nerve tumours

Meningioma

This is the most common optic nerve tumour and accounts for approximately 20 percent of CNS tumours. These tumours may arise from the optic nerve meningeal sheath or by extension along the nerve from the central nervous system.

The first sign or symptom is rapid loss of vision which normally occurs before any proptosis. Indeed, proptosis may not occur with an optic sheath meningioma.

Lesions just posterior to globe can give shift towards hypermetropia due to compression of the globe. Optometrists should therefore be aware that a unilateral deterioration in visual acuity together with increased hypermetropia may, albeit rarely, be caused by meningioma of the optic nerve sheath.

Tumours of lacrimal gland

There are a wide variety or orbital neoplasia that can occur in the region of the lacrimal gland (Char, 1989)/.

As a lacrimal gland mass increases in size, it often produces a characteristic “S-shaped” lid. This is illustrated in Figure 51.

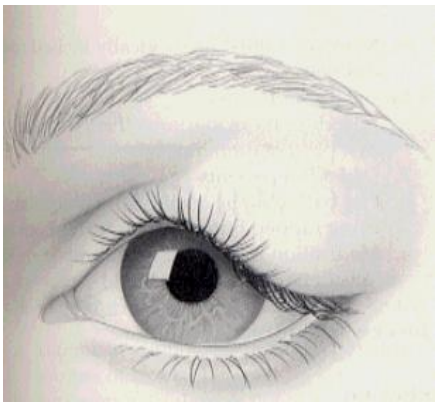


Figure 51 “S-shaped lid” (Catania,1995)

Primary neoplasia of the lacrimal gland, except lymphoma, are nearly always unilateral.

Epithelial malignancies of the lacrimal gland are usually painful and progress more rapidly than benign epithelial neoplasia. In comparison, benign mixed tumors have an insidious onset and produce chronic symptoms.

Symptoms of dry eye as the presenting system are rare (Char, 1989).

Benign lacrimal gland tumours

These include dermoid cyst and benign adenoma. A dermoid cysts typically presents as a painless subcutaneous mass. As with elsewhere in the eye, this is a congenital ectodermal or mesodermal tumour.

Malignant lacrimal gland tumours

These include malignant mixed epithelial tumours (pleomorphic adenocarcenoma). This tumour occurs primarily in elderly patients and causes acute pain. It may develop from a benign adenoma and rapidly progresses.

Conclusions

Malignant tumours of the eye and adnexa are rare in primary care optometric practice. Benign lesions are much more common. These need to be monitored and suspicious lesions referred for ophthalmological or dermatological opinions.

Monitoring lesions is made much easier by the use of both external eye and fundus photography. The author advocates routine non-mydriatic fundus photography on all patients attending for an eye examination. Serial photography can assist greatly in monitoring lesions and detecting new lesions.

Figure 52 shows an Optomap laser scanning ophthalmoscope image of the fundus of an asymptomatic 75 year old patient. She had been examined and routinely photographed twelve months earlier at which time there were no obvious signs of a tumour. In the intervening twelve months she had developed an amelanotic melanoma (arrow).

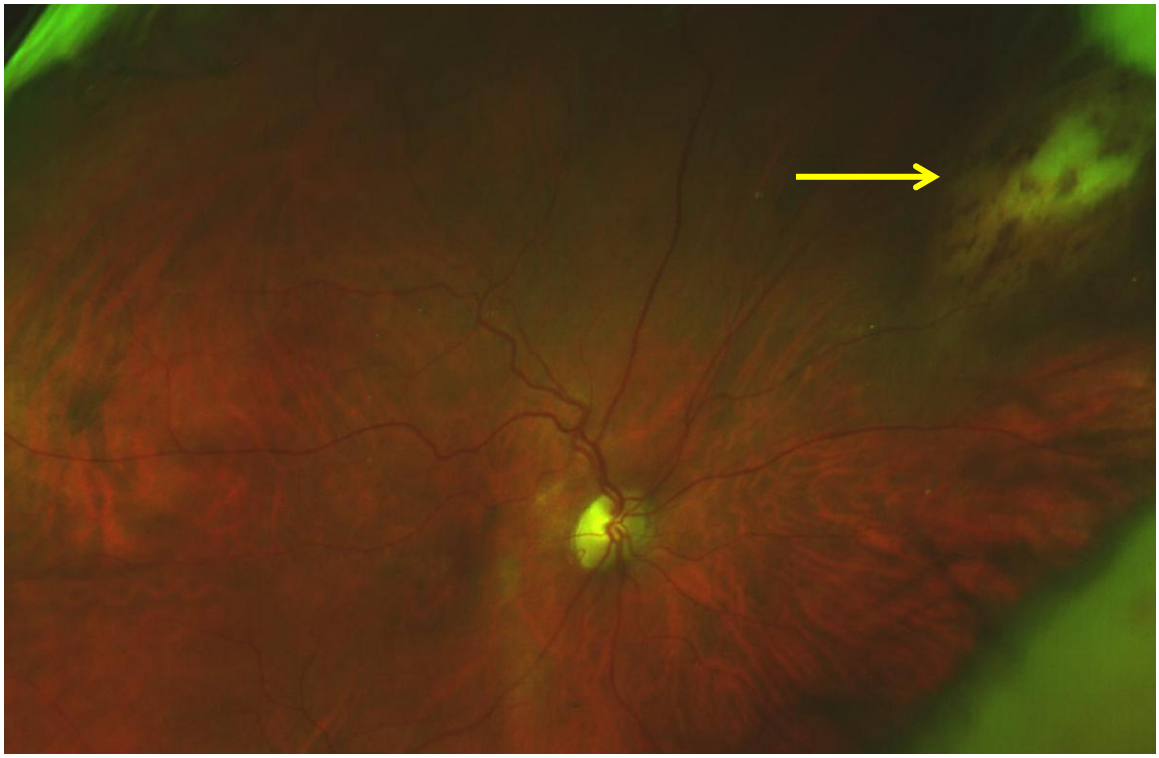


Figure 52 Optomap image of amelanotic melanoma (A Levit & S Barnard)

A final note

Optometrists in the UK are only likely to see neoplasia presenting in the early stages. The devastating effects of untreated neoplasia amongst unfortunate people elsewhere in the world can still be seen by practitioners working in such countries.

Figure 52 shows a previously unpublished photograph of a patient with a malignant lid tumour seen by the author when working at the NOOR Eye Institute, Kabul, Afghanistan in 1976. The patient had walked two hundred miles to reach the hospital. The tumour was inoperable and the patient died a few days later from metastases.

Figure 52 Advanced lid tumour (S. Barnard)

Acknowledgements and further reading

The author wishes to fully acknowledge the following books and references from which many of the figures have been taken. The author particularly recommends the reader to Catania (1995), Char (1989), Jones (1998) and Kanski (1992) for further reading on this subject.

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