

Refractive astigmatism and pterygium

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Summary

The refraction of 50 patients with pterygium and their age- and sex-matched controls was carried out. Patients with pterygium had surgery by the bare sclera method. A post-operative refraction was carried out at 12 weeks. A refraction was also done in both eyes of patients with unilateral pterygium. There was a statistically significant association between refractive astigmatism and the presence of pterygium ($P < 0.01$). Astigmatism was the rule in most patients. Surgical removal caused a reduction in refractive astigmatism. The change in refractive astigmatism was as high as 1.50DC (diopter cylinder). The majority of the patients were in the presbyopic age group. Surgical removal of pterygium will significantly alter the refraction of patients.

Résumé

L'étude de la réfraction de 50 malades atteints de pterygium et de leurs homologues témoins de même âge et de même sexe a été entreprise. Les sujets atteints de pterygium ont subi une intervention chirurgicale par la méthode de bare sclera. Une réfraction ultérieure a été faite après 12 semaines. Elle a été également opérée sur les yeux des malades ayant un pterygium unilatéral. L'association entre l'astigmatisme réfractif et la présence de pterygium a été statistiquement significative ($P < 0.01$). L'astigmatisme existait chez la plupart des malades. La suppression du pterygium par une intervention chirurgicale a entraîné une réduction de l'astigmatisme réfractif. Le changement ainsi occasionné a été si important qu'il atteint le chiffre de 1.50DC. La plupart des sujets

appartenaient au groupe des presbyopes. L'intervention chirurgicale du pterygium modifiera de façon significative la réfraction des malades.

Introduction

Pterygium is a fairly common eye presentation at the outpatient clinic of the University College Hospital, Ibadan. It accounts for 9% of all new cases seen and 20% of all planned surgical procedures [1]. Most patients who are worried enough by the growth to come for help fall within the presbyopic age group. Patients often need to wait for many months to have their pterygium excised. The overloaded outpatient clinic prevents effective outpatient surgery. There is, at the same presentation, the need to correct their refractive error and prescribe glasses for the literate patients. It is often difficult to decide whether to give them their presbyopic correction before excision of the pterygia or wait until after surgery because of the possibility of a change in refraction after surgery.

It is known that pterygium induces astigmatism by altering the curvature of the cornea; the exact mechanism is not understood.

There are a few publications written many years ago on astigmatism and its relationship with pterygium [2-5]. Most of them report on the effect of small pterygia in the production of astigmatism; the large pterygia which are seen in our environment are not seen in the localities from which these reports came.

The aim of this study was (1) to find out if pterygium (small or large) causes astigmatism, (2) to determine the pattern and amount of refractive astigmatism produced by pterygia in our patients, (3) to determine the change in refractive astigmatism produced after pterygium excision, and (4) to find out if it may be possible to predict the change in refractive error

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after pterygium excision. This information may tell us what to do about out presbyopic patients who are awaiting pterygium surgery.

Subjects and methods

The refraction of 50 consecutive patients who presented with pterygia to the eye clinic of the University College Hospital, Ibadan were done by the author using a streak retinoscope. The patients had no other ocular disease, but 81 eyes had pterygia. Pterygia excision was carried out by the author on 69 eyes by the bare sclera method. In this method, after excision of the pterygium a small area of sclera in relation to the affected area of the cornea is not covered by conjunctiva but thoroughly denuded of sub-conjunctival tissue and allowed to heal by granulation [6,7].

The other eyes were awaiting surgery at the time of this report. Post-operative dressing was with antibiotic ointment for 10 days, subsequently all the eyes had steroid drops three times a day for 2 weeks, followed by gradual withdrawal of treatment over another 2 weeks. Refractions were carried out at 12 weeks post-operatively.

The refractions of 70 eyes of age- and sex-matched controls were established by the same method. The controls were companions or relations of patients who had come for various eye consultations. These subjects had no ocular complaints; any subjects who were found to have ocular diseases were excluded.

Refractions were also established for 19 consecutive patients with unioocular pterygium.

Patients who had other ocular diseases apart from pterygium were excluded.

Pre-operative refractions could not be done in eight eyes because of the extensive nature of their pterygia.

Results

Table 1 shows the range of astigmatism in eyes with pterygium and their controls. There was a significant difference between the refractive astigmatism of eyes with pterygia and their controls ($P < 0.01$).

Seventeen per cent of eyes with pterygium had an astigmatism of 1.25DC or greater compared to 4% of control eyes. Of the eyes with pterygium 8.33% had no astigmatism compared to 28.7% of control eyes.

Table 2 shows the mean value of astigmatism in eyes with pterygia and control eyes in different age groups. There appears to be an increase in the mean value of astigmatism with age in control eyes but the mean value of astigmatism is much lower in control eyes compared to eyes with pterygia in each age group.

Overall, 60.9% of patients with pterygium pre-operatively had astigmatism with the rule, i.e. the horizontal meridian of the cornea had less curvature than the vertical meridians; 30.67% had astigmatism against the rule, i.e. the horizontal curvature of the cornea was greater than the vertical curvature; 8.33% had no astigmatism.

Table 3 shows the post-operative change in refractive astigmatism in patients with ptery-

Table 1. Range of astigmatism in eyes with and without pterygium

Amount of astigmatism (DC)	No. of eyes of patients with pterygium	No. of eyes of controls	Total
0.00-0.50	31	55	86
0.75-1.00	20	12	32
1.25-1.50	4	3	7
1.50	6	0	6
Total	61	70	131

Refraction not possible in eight eyes.

$\chi^2 = 14.29$; $P < 0.01$.

Table 2. Mean astigmatism in eyes with pterygium and control eyes in different age groups

Age (years)	Mean astigmatism in eyes with pterygium (DC)	Mean astigmatism in control eyes (DC)
< 20	0.50	0.25
20-29	0.92	0
30-39	0.87	0.37
40-49	0.92	0.50
50-59	0.73	0.68
60-69	1.13	0.88

Table 3. Post-operative change in refractive astigmatism in patients with pterygium

Change in astigmatism (DC)	Patients with more astigmatism	Patients with less astigmatism	Patients with no change in astigmatism	Total
0.00	0	0	8	8
0.25-0.50	7	27	0	34
0.75-1.00	5	7	0	12
1.25-1.50	1	6	0	7
Total	13	40	8	61

gium. Ninety-six per cent of patients have a change in their refraction post-operatively. The change was in the amount and axes of astigmatism. This change was, however, less than 0.5DC in 60% of eyes.

A paired *t*-test on pre- and post-operative refractive astigmatism in pterygium patients showed there was a significant change in the amount of refractive astigmatism in patients with pterygium after surgery ($P < 0.001$).

Table 4 shows the differences in refractive astigmatism in the eyes of patients with unilateral pterygium. In this group 12 patients (70.60%) had more astigmatism in their eyes with pterygium than the eyes without pterygium. There was no significant difference in the spherical component of the refractive errors on either eye. The astigmatism was with the rule in 70% of patients in their eyes with pterygium as against 40% in eyes with no pterygium.

Discussion

There was statistically significant association between refractive astigmatism and presence

Table 4. Differences in astigmatism in the eyes of patients with unilateral pterygium

Difference in astigmatism (DC)	No. of eyes	Percentage of total eyes
No difference in astigmatism	5	29.40
0.25-0.50	6	35.30
0.75-1.00	4	23.53
1.25-1.50	2	11.77
1.50	0	0
Total	17	100

of pterygium ($P < 0.01$), with the refractive astigmatism being higher in eyes with pterygium than in control eyes.

That pterygium causes astigmatism has been documented by many authors [2-5,8]. The amount of astigmatism varies from one report to another but most agree that pterygium causes astigmatism with the rule when the latter

was measured with a keratometer. The pterygia seen in the environments reported by these authors were small.

In this study, 60.9% of patients with varying sizes of pterygium had astigmatism with the rule, 30.67% had astigmatism against the rule, while 8.33% had no astigmatism.

The average difference between the refractive powers of the two corneal meridians lies between 0.5DC and 0.75DC. This suggests that any value over 1.00DC should be regarded as pathological. In this series 17% of eyes with pterygium compared with 4% of control eyes had more than 1.00DC astigmatism.

It is suggested from this study that pterygium is associated with refractive astigmatism, more commonly with the rule. Unilateral refractive astigmatism occurs in 30% of cases in the general population [9]. In the patients with unilateral pterygium in this series 70% had unilateral astigmatism, much more than expected for the normal population. Refractive astigmatism therefore occurs more frequently in eyes with pterygium than eyes without pterygium. It is significant that the astigmatism was also with the rule. Pterygium excision caused a reduction in refractive astigmatism. Thirteen per cent of patients had an increase in the amount of astigmatism and seven of these eyes had recurrent pterygium. The contribution made by increased corneal scar at the corneal periphery may be important in increasing the astigmatism in these cases. It is also of note that the change in refractive astigmatism post-operatively was such as to suggest that there is less flattening of the horizontal curvature of the cornea. As the pterygia seen in this study were in the palpebral fissures, the horizontal curvature of the cornea possibly tends to be flattened in that direction. Surgical removal reduces the amount of flattening. Perhaps the mechanism whereby pterygium causes astigmatism is that the fibrovascular growth invades the corneal stroma and pulls the corneal lamellae in the direction of its growth thereby flattening the horizontal curvature of the cornea.

Although the mean change in refractive astigmatism was 0.34DC there were some eyes that had up to 1.50DC change. Presbyopic correction given to a patient with pterygium preoperative will be significantly altered after surgery. It is advisable to give the patient a prescription at least 6 weeks after surgery.

It may be possible, however, to relate the amount and axis of refractive astigmatism with size of pterygium and to predict the amount of refractive astigmatism a given length or width of pterygium may cause. If there is a correlation in the above comparison, some pterygium patients may not need to wait several weeks or months to obtain glasses because of the long waiting period for surgery.

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Book review

An Introduction to Clinical Diagnosis in the Tropics

A. O. Falase. Baillière Tindall, London, 1987.
184 pp. NGN23.00.

The recent explosion of interest in tropical diseases especially by bodies such as the World Health Organization and the Wellcome Trust is hardly matched by the availability of basic clinical textbooks targeted at the practitioner 'on the spot'. Hence this slim, elegant and well-illustrated textbook which goes a long way towards realizing the objective so well enunciated by the author that 'I have long felt a need for more books that reflect the realities of clinical practice in the tropics'.

The book is written in 10 chapters. Two unique chapters that all practitioners who desire a successful practice in the tropics should read many times are (i) 'Medicine in the tropics' which provides a useful 'non-medical' background to the myriad socio-political and economic problems that influence health planning, execution and management in the tropics and, (ii) 'The sequential steps to rational diagnosis' which distills information so lucidly put in the didactic chapters on history taking, physical examination and pathophysiology and clinical manifestations of the various disorders affecting the different organ systems. Indeed, Chapter 4 on 'Symptoms and signs in various systems' accomplishes in just about 100 pages what is more than adequate for the undergraduate (and certainly enough for the postgraduate) physician to know in everyday practice, and also satisfies the requirements for professional examinations. The sheer brevity, simplicity, profuseness of clear illustrations and lucidity of the chapter will ensure that the book is read very many times, not only by medical personnel but additionally by the more inquisitive nurse and paramedical practitioner.

The author concedes that fever is probably the most important mode of presentation of disease in the tropics. As is generally recognized, fever in these circumstances is usually due to infections and/or infestations, many of

which have disappeared from temperate countries since the turn of the century. Consequently, inadequate attention is given to the recognition and treatment of these 'so-called' exotic fevers in most books on clinical medicine. This is the likely reason why the author devoted a whole chapter to 'The febrile patient', an approach which is not only apt but additionally catalogues the tropical fevers seen in everyday practice.

Any practitioner reading this very useful chapter on fevers should complement any new knowledge acquired with the information available in the chapter on 'The clinical sideroom laboratory'. It is too well known that few hospitals in tropical countries can boast of the sophisticated laboratory equipment for the elaborate diagnosis of even the more common infectious disorders. What is usually required is the crude identification of the infective agent rather than elaborate species recognition and/or typing. In any case, most of the patients seen at the primary health care level lack either the wealth or the inclination to attend the big urban hospitals although they easily account for at least 90% of all patients seen in all health institutions in the tropics. The newly qualified doctor and even the more experienced urban-based doctor must therefore be able to quickly perform simple sideroom tests and continually update his knowledge on these procedures in order to be confident in diagnosing the more common tropical disorders such as malaria and sickle cell disease and expediting appropriate treatment. This chapter is written in non-technical language and anybody with a basic knowledge of pathology should very easily comprehend the methodology of the various procedures, especially as only the simplest of laboratory hardware and consumables are required.

Are there any defects in this book? Yes,

but they are relatively minor. More illustrations, especially of classical cases of the commoner non-infective tropical disorders such as Burkitt's tumour, endomyocardial fibrosis and sickle cell disease might have considerably illuminated the discussions on the recognition of those disorders, although cost implications would also have to be considered. Photographs of pathological specimens and typical radiographic appearances, illustrating, for example, vesical schistosomiasis with hydronephrosis, avascular necrosis of femoral head due to haemoglobinopathy, calcific pancreatic diabetes mellitus and giant goitres with pharyngeal obstruction would convey to the non-tropical practitioner the dimensions of the problems of late presentation of even fairly simple disorders in the tropics. A section on ECG peculiarities in the African might also inform the Caucasian doctor newly posted to Africa that many ECG variants are purely physiological and do not connote an abnormal prevalence of ischaemic

heart disease. Nevertheless, these are only minor observations which in no way detract from the immense value of this useful text and which might be considered when a second edition is due.

All in all, the book is well written and suitable for medical students and practising doctors alike. At a most reasonable price of only NGN23.00 it is easily affordable by anybody even in these economically trying times. It is a book that should adorn the shelves of all doctors practising in, or planning to practise in tropical countries. For medical students, there is an added bonus in that the book contains numerous tips, hitherto dropped only during ward clinical demonstrations by the author (an experienced university teacher and administrator) but very frequently asked in the final MB examinations.

Dr Abayomi O. Akanji
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Announcement

The Pan-African Society of Cardiology (PASCAR) will hold its fourth congress and tenth anniversary between April 2 and 6 1991.

Theme:

Preventive Cardiology in Africa.

Venue:

Africa Hall
Addis Ababa, Ethiopia.

Call for abstracts:

Deadline: October 31 1990.

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