

Pterygium: Clinical and Histopathological Study in Bundelkhand.

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Abstract: Purpose: is to study various Clinical aspects and Histopathological features of pterygium. Pterygium represents a triangular conjunctivo-epithelial overgrowth, proliferating from the bulbar conjunctiva and covering the cornea, causing severe vision loss. It is an abnormal growth and differentiation of the conjunctival epithelial structures of the corneal limbus. Chronic exposures to solar ultraviolet radiation, heat and dust as the most common pathogenic entities involved in its evolution. Recent studies linked pterygium with neoplastic proliferation, as ocular limbic stem cells and p53-protein expression are altered. Materials and Methods: Our study was conducted on 30 patients diagnosed with pterygium they were first clinically examined and their specimen, collected after surgery following admission of patients between February 2017 and April 2017 in the Departments of Ophthalmology of MLB Medical College Jhansi. Then histopathological studies were performed on these specimens. Results: 60% patients were male, 80% in the age group 31-35 years, in 75% most common site being nasal and in 60% most common presentation being visual impairment. Histopathology showed the presence of a conjunctivo-epithelial structure, significantly different from the structure from which it developed. In 30% of the cases, the covering epithelium was similar to that of the bulbar conjunctival mucosa. In some cases, the appearance of the covering epithelium of the membrane appeared pleomorphic, with dysplastic aspects, suggesting significant alteration of cell proliferation and differentiation. In approximately 70% of patients, we identified goblet cells in the surface epithelium. They appeared either isolated or associated in variable numbers, structures resembling intraepithelial glands. Conclusions this study shows pterygium in both gender, age, its site, common presentation. And on histopathological examination significant changes both in the epithelium and in the underlying connective tissue were seen.

Keywords: pterygium, goblet cells, clinical presentation, histopathology.

I. Introduction

Pterygium represents a conjunctival epithelial overgrowth triangular in most cases, which proliferates from the bulbar conjunctiva over the cornea [1], surpassing the anterior end, thus causing severe vision impairment. While most authors argue that chronic exposure to solar ultraviolet radiation plays a major role in the development and progression of lesions, the pathogenesis of pterygium is not fully understood. A number of factors have been involved in the pathogenesis of pterygium, among which the most frequently cited are: heat, dust, dry atmosphere [2] viral infections, immunological mechanisms, extracellular matrix remodeling, growth factors, some cytokines, antiapoptotic mechanisms and several angiogenic factors [3]. Pathologically pterygium is a degenerative and hyperplastic condition of conjunctiva. The subconjunctival tissue undergoes elastotic degeneration and proliferates as a vascularized granulation tissue under the epithelium. The corneal epithelium, Bowman's layer and superficial stroma are destroyed. [4]. Histological studies in recent years have been associated pterygium with neoplastic proliferation. [5] Clinically it is seen in usually old age, more common in males doing outdoor work, often bilateral. Usually present nasally. Presents with vision impairment due to induced astigmatism or progression into the pupillary areas of the cornea [6]. In the present study our goal was to highlight some clinical aspects and histopathological changes that occur in pterygium.

II. Materials and Methods

The study was carried on 30 patients presenting in opd and then underwent pterygium excision and the biological material represented by 30 fragments of pterygium collected from individuals aged between 25 and 50 years, operated between February 2017 and April 2017 in the Departments of Ophthalmology, MLB Medical College Jhansi. Immediately after harvesting, the biological material was placed in a fixative solution of 10% neutral formalin for 24-72 hours and then sent to the Department of Pathology MLB Medical College Jhansi, where they were worked in the classic histological technique of paraffin inclusion. Four millimeters thick histological cups were made using a HM350 microtome. For histological studies, we performed staining with Hematoxylin-Eosin, lightgreen trichromic (Goldner-Szekely technique) and PAS-Hematoxylin stain. Examination of the histological sections was performed using a 55I Nikon research microscope equipped with a 5 MP digital camera and the automatic exposure and retrieval software for microscopic images, NIS-Elements (Nikon).

III. Results

This study showed that clinically 60% were male rest female, 60% patients presenting with pterygium were in the age group 31-35 years, 66.6% of these presented with fleshy mass encroaching cornea nasally, 20% of these presented with double pterygium and rest with temporal pterygium. 60% of patients came with chief complaint of visual impairment while rest presented with symptoms such as foreign body sensation, redness, itching, and cosmetic intolerance. Study of the histopathological sections showed the presence of a conjunctivo-epithelial structure, with significant microscopic changes compared to the structural elements from which it developed. Regarding the covering epithelium, in approximately 30% of our patients the appearance of the covering epithelium was similar to that of the bulbar conjunctival mucosa, thus appearing as a stratified squamous type epithelium without keratinization. In its structure, we could observe several overlapping layers of cells. Relatively frequent, we found areas of squamous epithelium prone to pseudokeratinization, areas in which surface cells, called squamous cells, were loaded with cytoplasmic keratohalin granules or were intensely eosinophilic due to the existence of granules with eleidin content. Also, in about 10% of cases, the covering epithelium presented areas of erosion on the surface, affecting virtually the entire epithelial thickness.

The most common changes of the covering epithelium were focal hyperplasia (Figures 3), where there was an excessive thickening of the intermediate layer, called polyhedral cell layer, microscopic aspect indicating a local disorder of the maturation and proliferation processes of cells. In approximately 70% of patients we identified in the surface epithelium goblet cells, either isolated or associated in variable numbers, forming real “intraepithelial glands” (Figures 2). Goblet cells are observed in classical stains, having the appearance of a cup or goblet, with a dilated apical pole, with foamy cytoplasm slightly stained due to the synthesis and accumulation of substances rich in glycosaminoglycans.

These cells are not normally found in the corneal epithelium, however they are found in conjunctival epithelium, where they produce mucines, substances that constitute the innermost layer of the tear film covering the outer surface epithelium of the conjunctiva and cornea. The emergence of an increased number of goblet cells in the epithelium of pterygium may be the consequence of the exposure of the anterior segment of the eye to irritant pollutant.

Another microscopic change highlighted in the study was the presence of intussusceptions in the connective tissue underlying the epithelium. These invaginations were formed mostly from goblet cells, giving the aspect of mucous glands, similar to the “glands of Henle”,

IV. Figures and Tables

Figure 1: showing a patient in opd with pterygium present nasally



Figure:1

Figure 2 and 3: showing histology of pterygium specimen stained with Haematoxylin and eosin stain

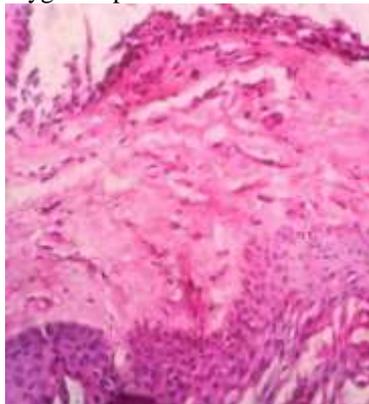


Figure:2: showing stratified squamous epithelium without keratinization with goblet cells.

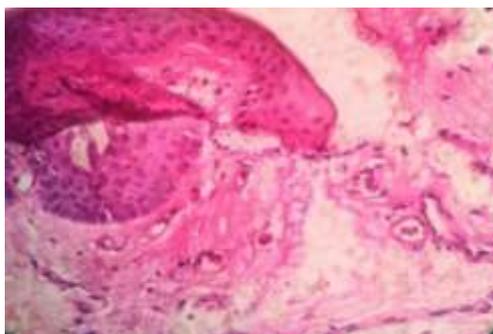


Figure:3: showing cellular hyperplasia.

Table 1 Demography in 30 patients

A	g	e	M	a	l	e	F	e	m	a	l	e
2	5	-	3	0	2		2					
3	1	-	3	5	1		7					
3	6	-	4	0	3		2					
4	1	-	4	5	1		0					
4	6	-	5	0	1		1					
Gender (total %)							1	8	(	6	0	%)
							1	2	(	4	0	%)

Table 2 Clinical aspects of Pterygium in the study

P	t	e	r	y	g	i	u	m	(	s	i	t	e	)	N	u	m	b	e	r	o	f	p	a	t	i	e	n	t	s	(%)
N	a	r	a	s	a										2	0	(	6	6	.	6	%)											
T	e	m	p	o	r	a									4	(	1	3	.	3	3	%)											
D	o	u	b	l	e										6	(	2	0	%)														
S	y	m	p	t	o	m	s	:																									
V	i	s	u	a	l	I	m	p	a	i	r	m	e	n	t	1	8	(	6	0	%)												
F	o	r	e	i	g	n	B	o	d	y	s	e	n	s	a	t	i	o	n	1	2	(	4	0	%)								
R	e	d	n	e	s	a	n	d	I	t	c	h	i	n	g	6	(	2	0	%)													
A	s	y	m	p	t	o	m	a	t	i	c	9	(	3	0	%)																	

Table 3 Histopathological Features

M	o	s	t	c	o	m	m	f	e	a	t	u	r	e	s	f	o	u	n	d	N	u	m	b	e	r	o	f	p	a	t	i	e	n	t	s	(%)				
1)	C	e	l	l	M	o	r	p	h	o	l	o	g																														
1.1)	E	p	i	t	h	e	l	i	u	m	:	n	o	n	k	e	r	a	t	i	z	e	d	s	t	r	a	t	i	f	i	e	d	s	q	u	a	m	9	(3	0	%)
1.2)	W	i	t	h	P	s	e	u	d	o	k	e	r	a	t	i	n	i	z	a	t	i	o	5	(1	0	%)															
1.3)	W	i	t	h	E	r	o	s	i	o	3	(	1	0	%)																											
2)	S	u	r	f	a	c	e	S	q	u	a	m	o	u	s	C	e	l																									
2.1)	L	o	a	d	e	d	w	i	t	h	k	e	r	a	t	o	h	y	a	l	i	n	g	r	a	n	u	l	e	s	1	1	(	3	6	.	3	3	%)			
2.2)	L	o	a	d	e	d	w	i	t	h	e	l	a	i	d	i	n	g	r	a	n	u	l	e	s	7	(2	3	.	3	3	%)										
3)	O	t	h	e	r	f	e	a	t	u	r	e																															
3.1)	C	e	l	l	H	y	p	e	r	p	l	a	s	i	a	2	4	(	8	0	%)																					
3.2)	E	p	i	t	h	e	l	i	u	m	w	i	t	h	G	o	b	l	e	t	c	e	l	s	2	1	(7	0	%)													
3.3)	I	n	t	u	s	s	u	s	c	e	p	t	i	o	n	s	i	n	c	o	n	n	e	c	t	i	v	e	t	i	s	4	(	1	8	.	3	3	%)			

V. Discussion

Pterygium represents an overgrowth of fibrovascular tissue with a triangular structure, increasing progressively from the conjunctiva over the cornea [1, 3]. Untreated, it can invade the cornea, occupying the optical axis of the eye, covering the pupil, and eventually leading to loss of vision or the appearance of astigmatism [7, 8]. Although considered a benign condition, pterygium seems to be a condition with a very high prevalence, requiring repeated surgery. In a study published in 2009, Shiroma H *et al.* [9] have found a prevalence of 30.9% for pterygium in a single eye, compared with 13.3% for both eyes simultaneously. The highest prevalence reported was 33% in a population study conducted in China, which included subjects older than 50 years in the Doumen Region [10]. Microscopy and immunohistochemical studies on the structure and evolution of pterygium were imposed in recent years because the disease may recur several times after surgical removal, relapse being a new trauma for the patient. According to some authors [11] recurrence would happen due to the fact that epithelial and connective cells with proliferative character remain on the edge of resection, hence the proliferative process can resume. Other researchers have shown that although pterygium does not metastasize, it is a neoplastic disease presenting disordered cell proliferation. This cell proliferation is characterized by alterations in proteins involved in cell development and is enhanced by UV-light that causes specific mutations of the TP53 gene, known as a tumor suppressor gene. Therefore, most authors consider that

ultraviolet radiation is a risk factor for pterygium [12–14]. The histological study conducted by us showed that in the structure of the covering epithelium of the pterygium appear abnormal cells, which alter the architecture of the conjunctival epithelium of which it has grown. Thus, the covering epithelium may appear pleomorphic, with dysplastic aspects, features that indicate a profound disturbance of cell proliferation and differentiation process. We consider a disturbance of cell proliferation and differentiation process the emergence of goblet cells, agglutinated in the form of intraepithelial glands, sometimes resembling hyperplastic and hypertrophic, as well as Henle's glands. We believe that these morphological factors are the result of direct action etiopathogenic factors, particularly dust particles in the air, because, as support and other authors [15], ocularmucosa is constantly exposed to particulate matter from the external environment and people living in areas with high concentrations of pollutants are often affected by eye symptoms [16]. Other authors [17] believe that goblet cell hyperplasia is a stereotypical response of conjunctival mucosa when there is significant air pollution. These arguments are supported by other authors [16, 18] who have detected abnormalities in the tear film and subclinical changes of the ocular surface in people who have lived in cities with a high level of air pollution. Moreover, Novaes P *et al.* [15] conducted a study involving 29 volunteers and found that the number of goblet cells increased proportionally to contaminant exposure, NO₂ in particular. Concerning the appearance of erosions of the covering epithelium, we believe that their presence is due to the abrasive effect of dust microparticles and of microorganisms such as viral or bacterial agents that can temporarily penetrate the membrane of the pterygium epithelium. Histological changes present in the connective tissue of the pterygium are extremely varied. According to some authors [19, 20] the first alteration of the connective tissue consists of a local hyalinisation, process through which degenerated collagen and a granular material probably resulted from degeneration of other components of the connective tissue appear.

VI. Conclusion

Pterygium as seen in our study in Bundelkhand it was found more common in middle aged male, commonly presenting on nasal side with chief complaint of visual impairment and although considered an extension of the bulbar conjunctiva over the cornea, shows significant changes both in the epithelium and in the underlying connective tissue, compared with the structure of the cornea or conjunctiva. In the epithelium, we found areas of hyperplasia, prone to pseudokeratinization, areas with erosion and even dysplastic areas. More than two thirds of patients with pterygium we identified numerous goblet cells, either diffusely scattered or clustered in the form of intraepithelial glands. Also, the epithelium presented, numerous intussusceptions in the underlying connective tissue forming "mucinous glands of Henle" composed primarily of the goblet cells.

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