

Pterygium and Rate of Dysplasia in Surgical Specimens

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Abstract

Purpose: To determine the rate of ocular surface squamous neoplasia in all pterygium specimens in a 2-year period at a single tertiary hospital in metropolitan Brisbane. Secondary outcomes measured included the percentage of tissue samples undergoing histological analysis and the clinical suspicion of dysplastic change.

Method: Retrospective chart review was undertaken for all pterygium surgery performed between the period of January 2009 and October 2010 at the Princess Alexandra Hospital in Brisbane. The rate of ocular surface squamous neoplasia, number of specimens sent for histopathology analysis, and clinical suspicion of dysplastic changes at initial review was recorded.

Results: One hundred and five out of 166 pterygia removed were sent for histological analysis, and 14 out of 105 (13.3%) showed ocular surface squamous neoplasia. Age, gender and side of surgery were not significantly different between patients with histologically normal and OSSN specimens.

Conclusion: Our results showed a much higher rate ocular surface squamous neoplasia in pterygium patients than otherwise suspected based on clinical examination. This finding suggests the need for routine submission of all pterygium specimens for histopathology analysis, so appropriate post-operative treatment and follow up can be instituted.

Introduction

Pterygium is a common ocular surface disease consisting of a wing-shaped, fibrovascular growth which can involve both the nasal and temporal bulbar conjunctiva. It has a prevalence of 1.1% in the general Australian population [1], and 7.3% in those aged 49 year or older according to the Blue Mountains Study [2]. It is more prevalent in men, the Aboriginal population and in geographical areas closer to the equator.² Like skin malignancies, prolonged exposure to ultraviolet radiation is the single most important risk factor in the development of pterygium and conjunctival neoplasms [1,3].

Ocular surface squamous neoplasia (OSSN) presents as a spectrum ranging from simple dysplasia (mild, moderate, severe), to carcinoma in situ, and invasive squamous cell carcinoma. Its appearance is often difficult to distinguish clinically from that of a pterygium. Lesions can be elevated, accompanied by feeding vessels, of variable color and consistency, ranging from gelatinous, velvety, to papilliform or leukoplakic [4]. It was previously thought to be a rare condition, with an incidence of 1.9/100,000 in a Brisbane study over a 10-year period, considerably lower than that of squamous cell carcinomas of the skin (600/100,000) [3]. More recently, Hirst et al. revealed the rate of OSSN to be 9.8% in a retrospective study of 533 pterygium specimens sent for histopathology, suggesting a much higher rate than previously thought, and a possible link between pterygium and OSSN [5].

Queensland has the highest rate of pterygium removal in Australia (56 per 100,000 population) [6]. Indications for surgical removal include significant irritation, encroachment on the cornea sufficiently to affect vision, and cosmesis. The current most commonly accepted surgical method is excision with autoconjunctival graft, as it aids healing and carries a low recurrence rate [7]. Adjunctive therapy such as mitomycin C, beta-irradiation and thiotepa has a variable success rate. Various regimes of topical mitomycin C have been shown to be effective in treating OSSN, including 0.02-0.04% applied four times daily for 7-21 days, with same number of weeks off between repeated treatment cycles [8,9]. At this institution, patients with histologically confirmed OSSN with involved surgical margins are often treated with topical mitomycin C for 2 weeks, with a week off between cycles.

Given the rate of OSSN found amongst pterygium in Queensland, this paper aims to look at current practice patterns in a tertiary referral teaching hospital as well as identifying the rate of OSSN amongst this patient population.

Methods

Retrospective histopathology and chart review was carried out for all patients undergoing pterygium surgery at the Princess Alexandra Hospital in Brisbane between January 2009 and October 2010. All charts were reviewed for details of clinical examination including whether lesions appeared suspicious for dysplasia.

All specimens sent for routine histopathology were identified via the pathology database and were examined by pathologists at the same institution. OSSN was reported as mild dysplasia, moderate dysplasia, severe dysplasia and carcinoma in-situ according to the classification by Grossniklaus et al. [10]. Patients were routinely followed up post-surgery on an outpatient basis. For statistical analysis, t-test was used to compare the means; Chi-square to compare proportions and Fisher's exact test to compare proportions for sample sizes equal or less than 5.

Results

One hundred and sixty six pterygium specimens were excised from patients between January 2009 and October 2010. The mean age of the patients was 54 (range 20-88, SD 14.57), with 66% male, and 34% female

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		Normal % (number)	OSSN % (number)	Total number	p-value
Age	Number	91	14	105	0.442 (t-test)
	Mean	54.26	57.50		
Gender	Female	94.4% (34)	5.6% (2)	36	0.131 (Fisher's exact test)
	Male	82.6% (57)	17.4% (12)	69	
Side of surgery	Right	86% (43)	14% (7)	50	0.877 (Chi square test)
	Left	87% (47)	13% (7)	54	

Table 1: Statistics between patients with histologically normal and OSSN specimen.

(ratio 1.9:1). Fifty two percent of surgery was operated on the left side, and 47% on the right (ratio 1.1:1). None of the pterygium cases were recurrent lesions. Of the 166 specimens, 105 (64%) were submitted for routine histological analysis. OSSN was seen in 14 (13.3%), with 7 showing mild dysplasia (6.7%), 4 moderate dysplasia (3.8%), 2 severe dysplasia (1.9%), and 1 carcinoma in situ (1%). Only 2 of the 14 OSSN specimens were commented on as appearing suspicious or atypical on clinical examination. A breakdown of each year revealed that only 39.7% of pterygia removed in 2009 were sent for routine histopathology (25 of 63), with a 24% rate of dysplasia (6 out of 25). In 2010, the rate of routine histological analysis was 79% (81 out of 103), with a 9.9% rate of dysplasia. There was no statistical significance in the rate of dysplasia in analyzed specimens between the two years (p 0.093). Similarly, no statistically significant difference was seen between the normal and OSSN patient groups in terms of age, gender and side of surgery (Table 1).

Discussion

This retrospective study examined the rate of OSSN in pterygium specimens submitted for routine histopathology during the most recent 2-year period. The mean age of patients in this study was 54, with almost twice as many men undergoing pterygium surgery than women. At this institution, the rate of routine histological submission of pterygiumspecimens during surgery doubled from 40% in 2009 to 79% in 2010, with an average rate of 64%.

The two-year combined rate of OSSN in specimens submitted for histopathology was 13.3%. Of all pterygium cases, only two appeared suspicious clinically, of which one showed moderate dysplasia, the other carcinoma *in situ*, highlighting the difficulty in clinically distinguishing benign from dysplastic lesions, and low-grade from higher grade of dysplasia.

Our findings, which are comparable to those of Hirst *et al.* in the same institution over the previous 6 years, demonstrated a much higher rate of OSSN in pterygium cases than would have otherwise been

suspected based on clinical assessment [5]. In addition, the rate of OSSN in this study population is much higher than previously documented in the general population [3]. None of the pterygium cases in this study represented a recurrent lesion, hence the recurrent rate of histologically normal pterygium and untreated OSSN in this study population is not known.

Patients with histologically diagnosed OSSN may require further adjunctive treatment with mitomycin C or interferon, and more frequent follow-up to monitor for recurrence. Under-diagnosis may lead to progression to more severe grades (such as invasive squamous cell carcinoma), and be associated with higher rate of recurrences, hence increased morbidity and mortality [4]. Given that it is not common practice to follow up patients that have had a pterygium excised indefinitely, a histological report can identify those that require closer monitoring for neoplastic recurrences. Although not routine practice in this hospital, it would therefore seem pertinent that all specimens of pterygium removed at surgery be submitted for histopathology analysis to improve the detection of OSSN and allow appropriate adjunctive treatment and follow up to be instituted.

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