# Original Article

# Clinicopathological Study of Epithelial Lacrimal Gland Tumors at Tertiary Eye Hospital

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## Abstract

### Background

Lacrimal gland tumors are rare, constituting approximately 9% of all orbital lesions. Primary epithelial lacrimal gland tumors are histologically similar to those arising in the salivary glands. Pleomorphic adenoma and adenoid cystic carcinoma are the most common benign and malignant tumors, respectively.

### Material and Methods

A retrospective study of 39 cases of lacrimal gland tumors over a period of 7 years was conducted. A detailed history of patients was taken with special attention to age, sex, macroscopic (gross examination), and microscopic features of the tissue. Microscopic examination was done using the standard H & E staining procedure.

### Results

A total of 39 cases of lacrimal gland tumors were studied. Among them, there were 19 cases of pleomorphic adenoma, the most common benign tumor of the lacrimal gland, and 17 cases of adenoid cystic carcinoma, the most common malignant tumor.

### Conclusion

The incidence of benign lesions was slightly lower than that of malignant tumors in this study. Benign tumors occurred in a younger age group compared to western studies. Among malignant tumors, adenoid cystic carcinomas were the most common.

***Keywords:***

*Lacrimal gland tumors, Orbit, Pleomorphic adenoma, Adenoid cystic carcinoma*

## Introduction

The lacrimal gland is a secretory gland situated in the lacrimal gland fossa, behind the supraorbital rim. Histologically, the lacrimal gland is divided into acini and ducts. Individual acini and lobules of acini are separated from each other by interlobular and intralobular connective tissue [1]. Lacrimal gland lesions are relatively rare, with an estimated incidence of 1-1.3/1,000,000 per year [1,2]. Lacrimal gland tumors account for 5% to 14% of space-occupying orbital lesions, with epithelial tumors representing 23% to 70% of all lacrimal gland tumors [3,4,5]. Tumors of the lacrimal gland comprise a wide spectrum, of which the most common demonstrate epithelial and lymphoid differentiation. Among benign tumors, the most common is pleomorphic adenoma, which comprises around 50% of epithelial tumors. Malignant neoplasms constitute the remaining 50% of primary epithelial tumors

of the lacrimal gland [6,7]. The most frequently encountered is adenoid cystic carcinoma, comprising approximately 20–30%, whereas carcinoma ex pleomorphic adenoma constitutes approximately 10%, adenocarcinoma 5–10%, and mucoepidermoid carcinoma 1–2% [7]. There are no significant differences in the gender distribution of lacrimal gland tumors [8]. The symptoms and findings of a lacrimal gland lesion include a growing mass at the site of the lacrimal gland, displacement of the eyeball, decreased motility, diplopia, and ptosis. Pain is the cardinal symptom of adenoid cystic carcinoma. The diagnosis of lacrimal gland tumors depends primarily on histological evaluation, as do the choice of treatment and prognosis.

## Materials and Methods

A retrospective study of 39 cases of lacrimal gland tumors was conducted at the Pathology Department, M & J Western Regional Institute of Ophthalmology, a regional tertiary ophthalmology institute in western India, affiliated with B. J. Medical College, Civil Hospital, Ahmedabad, Gujarat, India, from January 2017 to December 2023. These cases were collected over a period of 7 years. Clinical history was taken with a specific focus on age, sex, laterality, and histopathological examination, which included macroscopic and microscopic examinations with special stains where required. For histopathological examination, specimens were processed in 10% buffered formalin, then sectioned and stained with Hematoxylin and Eosin stain. Hematoxylin and Eosin-stained sections from various areas were examined microscopically for diagnosis and other histological characteristics.

The inclusion criteria were histopathologically proven primary or recurrent lacrimal gland tumors and tumors with adequate histological material. Poorly preserved tissue bits were excluded from the study.

## Results

A total of 39 cases of lacrimal gland tumors were studied. Among them, 48.7% were benign, all of which were pleomorphic adenoma (PA) (Figure 1A). The remaining 51.3% were malignant, including 16 cases (41%) of adenoid cystic carcinoma (ACC) (Figure 1B), 3 cases (7.7%) of mucoepidermoid carcinoma, and 1 case (2.6%) of adenocarcinoma (Table 1). Both benign and malignant lesions were most commonly seen in the age range of 21-60 years, comprising almost 80% of cases (Table 2). There was a male predominance among both benign and malignant cases (Table 2).

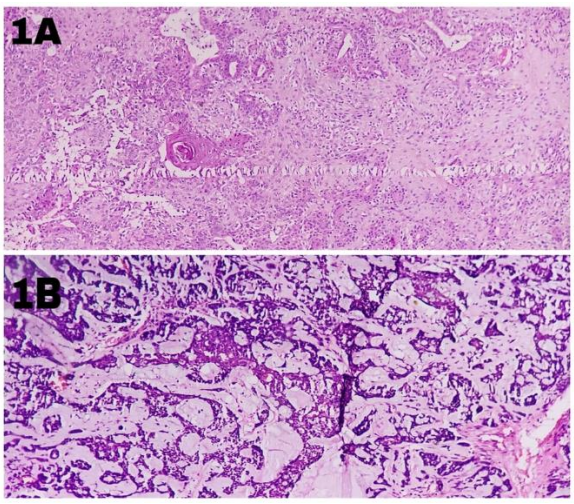


***Figure 1: A. Pleomorphic adenoma-shows tumour composed of ductal epithelial and surrounding myoepithelial cells in stroma. (Hematoxylin-Eosin stain, ×400). B. Adenoid cystic carcinoma-tumour cells arranged in cribriform and tubular pattern in a matrix. ((Hematoxylin-Eosin stain, ×400).***

For histopathologic grading, ACC was divided into three grades: Grade I: well-differentiated tumors composed of tubular and cribriform patterns without any solid component (Figure 1B), Grade II: tumors with a pure cribriform pattern or mixed with less than 30% solid areas. Grade III: tumors predominantly composed of solid areas [9]

Histologically, 8 cases (50%) were grade I ACC, 7 cases (43.75%) were grade II ACC, and 1 case (6.25%) was grade III (Table 3). In terms of laterality, left eye lacrimal gland tumors were slightly more common (Table 1).

***Table 1: Incidence of tumour in lacrimal gland and laterality.***

| No. | Tumours | No. of cases | Percentage (%) | Laterality (%) | |
|---|---|---|---|---|---|
| | | | | Right | Left |
| | **Benign** | | | | |
| **1** | Pleomorphic adenoma | 19 | 48.7% | 9 (47.4%) | 10 (52.6%) |
| **Total** | | 19 | 48.7% | 9 (47.4%) | 10 (52.6%) |
| | **Malignant** | | | | |
| **1** | Adenoid cystic carcinoma | 16 | 41.0% | 7 (43.7%) | 9 (56.3%) |
| **2** | Mucoepidermoid carcinoma | 3 | 7.7% | 2 (66.7%) | 1 (33.3%) |
| **3** | Adenocarcinoma | 1 | 2.6% | | 1 (100%) |
| **Total** | | 20 | 51.3% | 9 (45%) | 11 (55%) |
| | **Total no. of cases** | 39 | 100% | 18 (46.2%) | 21 (53.8%) |

***Table 2: Incidence according to age and sex in benign and malignant lacrimal gland tumours.***

| Age group (Years) | BENIGN | | | MALIGNANT | | |
|---|---|---|---|---|---|---|
| | Male | Female | Percentage (%) | Male | Female | Percentage (%) |
| **0-20** | 2 | | 10.5% | 2 | | 10.0% |
| **21-40** | 6 | 2 | 42.1% | 6 | 4 | 50.0% |
| **41-60** | 6 | 2 | 42.1% | 4 | 3 | 35.0% |
| **>60** | 1 | | 5.3% | | 1 | 5.0% |
| **Total** | 15 | 4 | 19 | 12 | 8 | 20 |
| **Percentage (%)** | 78.9% | 21.1% | 100% | 60.0% | 40.0% | 100% |

***Table 3: Histological patterns present in Adenoid cystic carcinoma of lacrimal gland.***

| No | Histological patterns | No of cases (Grade) | Percentage (%) |
|---|---|---|---|
| **1** | Mixed (>= 2) patterns | 6 (II) | 37.5% |
| **2** | Cribriform | 2 (I)(II) | 12.5% |
| **3** | Tubular | 7 (I) | 43.75% |
| **4** | Solid | 1 (III) | 6.25% |
| **Total** | | 16 | 100% |

***Table 4: Comparison of current study with other published studies on epithelial lacrimal gland tumours***

| Epithelial tumours | Current study | Weis et al. [10] | Shields et al. [12] | Henderson et al. [16] | McLean et al. [17] | Wright et al. [18] |
|---|---|---|---|---|---|---|
| **Total cases(n)** (%) | 39 | 118 | 30 | 58 | 38 | 125 |
| **Benign** | 19(48.7%) | 57(48.3%) | 11(36.7%) | 25(43.1%) | 19(50%) | 78(62.4%) |
| **Malignant** | 20(51.3%) | 61(51.7%) | 19(63.3%) | 33(56.9%) | 19(50%)) | 47(37.6%) |

## Discussion

Space-occupying lesions of the lacrimal gland account for approximately 5% to 14% of all biopsied orbital masses [3]. They are generally classified as originating from epithelial elements of the lacrimal gland or from non-epithelial components. Among epithelial lesions, 55% have been reported to be benign and 45% malignant [3,4].

In our study, a slightly higher incidence of malignant epithelial tumors (51.3%) was found compared to benign tumors (48.7%). The regional difference in the prevalence of lacrimal gland tumors may be due to geographical variation, environmental exposures, genetic predisposition, sample size, and the duration of the study. The clinical implications of these findings are significant for understanding regional variations and can help healthcare providers tailor screening and diagnostic strategies based on the population's risk profile. For higher malignant lesions, more aggressive screening protocols may be warranted to detect tumors at earlier stages when treatment outcomes are more favorable. A similar pattern of distribution has been reported by Weis et al. [10], which is in concordance with our study. Table 4 shows the distribution of lacrimal gland tumors in the current study compared with previous published studies.

The incidence of pleomorphic adenoma (PA) ranges from 21% to 62% of all epithelial lacrimal gland tumors [10]. In this study, PA accounted for 47.5%. The average age at diagnosis in PA cases was 39.5 years, which is similar to other studies in the Asian population [11], which have reported a younger age at diagnosis compared to an average age of 53 years in the Western population [12,13]. Another significant finding in this study was that in 36.8% of PA cases, the duration of symptoms was less than one year, although classically, patients affected by PA usually have a long history (1-2 years) of painless proptosis [2].

The incidence of adenoid cystic carcinoma (ACC) has been reported to be 29% to 64% of all epithelial neoplasms of the lacrimal gland [5]. In this study, the incidence of ACC was found to be 41%. The mean age at diagnosis was 35.4 years, which is younger than the mean age of 45.1 years reported in a previous study [14].

In this study, both benign and malignant tumors showed male predominance, whereas the Western population shows males and females equally affected [13], which is discordant with our study. Regarding laterality, benign and malignant tumors were slightly more common in the left eye in our study, while B. Chawla et al. showed the right eye to be more common for benign tumors and no laterality difference in malignant tumors [15].

The limitations of our study include the general limitations of a retrospective study, such as non-standardized techniques of examination, documentation, surgical procedures, and histological analyses. Additionally, the relatively small sample size, retrospective study design, and short duration lead to potential bias in the prevalence of lacrimal gland tumors.

## Conclusion

Our study explores the clinicopathologic features of epithelial tumors of the lacrimal gland in an Indian patient population. The incidence of benign lesions was slightly lower than malignant tumors in this study, indicating regional variability in the pattern of distribution of epithelial lacrimal gland tumors. Benign tumors occurred in a younger age group compared to Western studies. Among malignant tumors, ACCs were the most common.

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