

Epidemiological Profile of Patients with Conjunctival Tumors in a Reference Ophthalmological Hospital in Eastern Amazonia

Perfil Epidemiológico de Pacientes com Tumores Conjuntivais em um Hospital Oftalmológico de Referência no Leste da Amazônia

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ABSTRACT

This research aimed to report the prevalence of conjunctival tumors, and their severity between genders, age groups, and to observe the distribution of their laterality in patients of a public health service in Belém do Pará, in the Eastern Amazon, Brazil. Methods: Data were collected, at the Bettina de Souza Ferro University Hospital, in 253 medical records for the last 12 years (2010 to 2022), regarding conjunctival tumors were removed and examined histopathologically by the Department of Ophthalmology of the Federal University of Pará (UFPA). The incidence of tumors undergoing excision surgery, the malignancy rate, and margins were investigated, and matched for gender, age, and laterality. Results: Subjects included 161 men and 92 women, with a mean age of 49.4 ± 47.2 years. Of these, 193 were benign tumors (76.3%), the most commonly found: 99 Pterygium; followed by 28 Epidermoid Carcinomas; 24 Pyogenic Granulomas; 20 Intraepithelial Neoplasia and 18 squamous papilloma. Among the 31 cases (23.7%) of malignant tumors, the number of male patients was 21 and female patients 10. Most malignant tumors were composed of squamous cell carcinoma (28 cases), followed by melanoma (3 cases). The mean age of patients with malignant tumors removed was 65.0 ± 31 years, as malignant tumors were more prevalent in older patients (chi-square, $p < 0.001$). Conclusions: The most common conjunctival tumors were the pterygium and Epidermoid Carcinomas, more present in male patients, younger and older, respectively.

Keywords: Conjunctival Tumor, Genre, Age, Malignancy, Laterality.

RESUMO

Esta pesquisa teve como objetivo relatar a prevalência de tumores conjuntivos e sua gravidade entre gêneros, faixas etárias, e observar a distribuição de sua lateralidade em pacientes de um serviço público de saúde em Belém do Pará, na Amazônia Oriental, Brasil. Métodos: Os dados foram coletados, no Hospital Universitário Bettina de Souza Ferro, em 253 registros médicos dos últimos 12 anos (2010 a 2022), referentes a tumores conjuntivais foram retirados e examinados histopatologicamente pelo Departamento de Oftalmologia da Universidade Federal do Pará (UFPA). A incidência de cirurgia de excisão de tumores, a taxa de malignidade e as margens foram investigadas, e combinadas para sexo, idade e lateralidade. Resultados: Os assuntos incluídos 161 homens e 92 mulheres, com idade média de $49,4 \pm 47,2$ anos. Destes, 193 eram tumores benignos (76,3%), os mais comumente encontrados: 99 Pterígio; seguido por 28 Carcinomas epidermóides; 24 Granulomas piogênicos; 20 Neoplasia intra-epitelial e papiloma 18 squamous. Entre os 31 casos (23,7%) de tumores malignos, o número de pacientes do sexo masculino era 21 e o de pacientes do sexo feminino, 10. A maioria dos tumores malignos era composta de carcinoma espinocelular (28 casos), seguido por melanoma (3 casos). A idade média dos pacientes com tumores malignos removidos foi de $65,0 \pm 31$ anos, pois os tumores malignos eram mais prevalentes em pacientes mais velhos (qui-quadrado, $p < 0,001$). Conclusões: Os tumores conjuntivais mais comuns foram o pterígio e os carcinomas epidermóides, mais presentes em pacientes do sexo masculino, mais jovens e mais velhos, respectivamente.

Palavras-chave: Tumor conjuntival, Gênero, Idade, Malignidade, Lateralidade.

1 INTRODUCTION

Conjunctival tumors are a group of essentially ophthalmological pathologies (SHIELDS & SHIELDS, 2019). Among these, benign tumors are more frequent than malignant, with their

proportions increasing with aging. And taking primarily the complex structure of the conjunctiva, it eventually understands most of the tumors (benign and malignant) that occur in this site (BIZARRO, 2014). Because the conjunctiva is composed of a membrane with a mucous appearance, and it is a tissue adjacent to the eye, whose function is to cover, anteriorly, the outermost region of the eye, known as the conjunctiva of the bulbar region, and, behind the eyelids, called the conjunctiva of the palpebral region (KANSKI, 2019; HÖFLING, DANTAS & ALVES, 2016), whose main functions contribute, above all, to compose the tear film, synthesizing mucus. The conjunctival lining, in parallel, with excreted secretions, forms a relevant barrier against infections (viruses, fungi and bacteria) and foreign bodies (HIRT, 2022; BAEK, 2005).

As regards its histology, the conjunctiva of the eye is characterized by a stratified columnar epithelium without keratin, with columnar cells in the form of mixed goblets, formed by 2 to 5 layers of cells, supported on a basal membrane, while its stroma, containing blood and lymphatic vessels, in addition to nerves, is composed of fibrovascular tissue of connective origin (BAEK, 2005). Eventually, neoplastic cells may arise in the conjunctiva from its epithelial and stromal structures. When they multiply abnormally, they become clinically and histopathologically similar to tumors that arise from other mucous membranes in the body. However, unlike other mucous membranes in the body, the conjunctiva is partially exposed to sunlight, which can be a factor in the development of some tumors (SHIELDS & SHIELDS, 2019).

The conjunctiva of the eyes, eventually, is injured by several small injuries and damages of the most different causes, such as degenerative damages; circulatory; inflammations; that can lead to tumors in this tissue. As these damages become mutagenic, they can be blamed not only for more urgent vision injuries, but also for a fatality. These conjunctival tumors are didactically divided into malignant (more serious), pre-malignant and benign tumors, the less serious (NANJI et al., 2017). Other studies, similar in other populations, have also described the histological types of ocular tumors, and, among these, conjunctival tumors are the most frequently found, corresponding to about 44.28% of cases (DE ALMEIDA & FERREIRA, 2019)

And although, for the most part, diagnosed lesions, without much difficulty, are clinically demystified, they are, soon after, surgically removed (MIYANO, 2021; BAEK, 2005), however, it is difficult, eventually, only by clinical observation, to differentiate malignant tumors, that said, a histopathological evaluation is imperative for a more assertive conclusive diagnosis (ESLAMI, 2018). Bearing in mind that the incidence of malignant tumors

is divergent between ethnic-racial groups, nations, and, within these localities, it also depends on the genetic composition of the individuals of these populations; the socioeconomic situation; accessibility to health services, and epidemiological understanding of the rates of tumor lesions, parameters that guide the definitive decision of physicians (HIRT, 2022; MIYANO, 2021), in addition, scarce are the researches that are published and that carry epidemiological data regarding conjunctival tumors (BIZARRO, 2014). Most of the reported research supports the works of researchers who were concerned with the prevalence of the most diverse groups of ocular tumors, and few are those who seek to study their clinical-pathological correlation specifically with malignant conjunctival tumors (ESLAMI, 2018; BIZARRO, 2014).

Bearing in mind that tumors of the conjunctiva almost always develop slowly and their signs and symptoms are not specific; and their carriers avoid seeking clinical help, to try an evaluation for a more accurate diagnosis, suggesting that the estimated prevalence of these groups of tumors is greatly underestimated (BAEK, 2005). However, this information obtained demonstrates the importance of knowing the epidemiological profile of this diagnostic suspicion and requires an early conduct of the ophthalmological practice (MIYANO, 2021).

Therefore, the relevance of this research is due, on the one hand, to the scarcity of epidemiological information about conjunctival tumors, and also due to their clinical-pathological interconnection, especially with the Brazilian Amazon, in addition to, on the other hand, the prevalence of tumors conjunctivae have increased in the last decade (BIZARRO, 2014). This added to the lack of data, especially regarding the Brazilian population, regarding the incidence of primary malignant ocular tumors, hindering the advent of new secondary prophylaxis strategies and brevity in the diagnosis of the pathology, as well as making it difficult to elucidate the major sociodemographic and epidemiological indicators investigated by health professionals when they suspect plausible involvement in higher-risk individuals. Considering that a delayed diagnosis of the disease incurs a bad outcome that corroborates the loss of his vision and/or removal of his eyeball and adjacent regions, restricting not only physically the patient, but also his biopsychosocial well-being (MIYANO, 2021 ; AMARO, 2006). For these reasons, it was urgent to try to obtain more statistical data regarding the frequency of the most divergent typologies of conjunctival tumors in the population of the Brazilian Amazon and to investigate the clinical-pathological relationship, from the point of view of ophthalmic pathology, that is, in an abundant contingent of cases, and within a specified period of time. Thus, this research aimed to collect these data to inform the incidence of the most diverse types of conjunctival tumors; as well as reflecting on epidemiological characteristics, such as age, gender and clinic, which permeates anatomical location; and also

to investigate the differences possibly found in the largest groups of conjunctival tumors, regarding the variables analyzed in this research.

2 MATERIALS AND METHODS

2.1 RESEARCH LOCATION

The search was carried out in Department of Ophthalmology at the University Hospital Bettina Ferro de Souza, in Belém-PA, after authorization from the board of directors of the same hospital and approval from the Ethics Committee for Research in Human Beings of UFPA (CEP-UFPA).

2.2 ACCEPTANCE OF GUIDANCE

The project was submitted to CEP-UFPA for appreciation and after acceptance by the advisor Dr. Roberto Leão, expressed through the signature of the term of guidance acceptance.

2.3 ETHICAL PRECEPTS

This study was carried out in compliance with research standards involving human beings (Res. CNS 466/12) of the National Health Council after authorization of the project by the management of the university hospital, acceptance of the advisors and approval of the Ethics Committee in Research on Human Beings from UFPA. As this was the collection of information from the medical record, we were asked to release of the use of the Free and Informed Consent Form.

2.4 METHODOLOGY USED

As a methodological design, a standard form made by the authors of the project was used, containing information that was collected, through an online data collection protocol, from 253 medical records, in the year 2022, to perform the statistics of the same, the variables are gender, age, tumor laterality, whether malignant or benign, according to the classification already established by the local service, which histological type of conjunctival tumor, as well as whether there is a surgical safety margin described.

2.5 TYPE OF STUDY AND SAMPLE

The project was retrospective, cross-sectional, and was based on describing alterations found in the histopathological report, as well as evaluating the data of gender, age, tumor laterality and clinical characteristics, in the period of 2010 to 2022.

2.6 INCLUSION CRITERIA

Patients who underwent conjunctival tumor excision surgery in the period from 2010 to 2022.

2.7 EXCLUSION CRITERIA

Patients whose histopathological report confirmed a non-neoplastic lesion. And in this study, neither medical records nor injuries were included/excluded, but people (patients) were included/excluded. Therefore, the human being, and not his illness or his medical records, were always taken into account.

2.8 DATA STORAGE, CONSOLIDATION AND ANALYSIS

The data collected (gender, age group, histopathological diagnosis, laterality and tumor location), were stored in databases and subsequently submitted to comparative statistical analysis. The results were compared with those observed in the literature on the subject. According to the nature of the variables, statistical analysis was applied descriptive, being then informed the percentage values of the analyzed data.

For the statistical analysis of the differences between the proportions, didactically, the chi-square test was used, with level α : 0.05 (5%), with the help of the software BioStat 5.5. And the value of $p < 0.05$ was accepted as a significant difference.

In the operationalization stage, the data were organized using Microsoft Excel 2010. Graphs and tables were created using tools available in Microsoft Word, Excel and Bioestat 5.5. All tests were performed using the Bioestat 5.5 software. Quantitative variables were described by minimum, maximum, and mean and qualitative variables by frequency and percentage. 95% confidence intervals were calculated for the proportion to infer how the prevalences behaved in relation to the population from which they were obtained. The independence or association between two categorical variables was tested using the chi-square test. Results with $p \leq 0.05$ (bilateral) were considered statistically significant.

2.9 BENEFITS

Regarding the benefits of this research, we can mention the epidemiological identification of conjunctival tumors in the Amazon region, in the north of Brazil, contributing to the scientific study and early diagnosis of these pathologies.

2.10 RISKS

For participants, the risk of leaking their identities. As a way to minimize it, the patients' identities were kept in absolute secrecy and the information collected was presented as a whole, and, not, individually, serving solely for scientific purposes, but the the participants themselves were informed about it. Participants were not identified by name, and alphanumeric codes were used for each participant in the sample.

3 RESULTS

After analyzing the records, were organized, analyzed, didactically converted into graphs, and the following statistics were made. In which they were divided into 2 sessions, a session of characterization of the samples, in which the absolute values and percentages of gender, age group, type of tumor, number of surgeries performed, laterality, and severity of the tumor were observed. In addition to another session in which a association between the results obtained in the categories of gender, age, histological types, and laterality, for a more accurate analysis of the profile.

And as can be seen in section (5.1), below, the study sample was quite balanced, consisting only of binary genders (female and male), and with 5 age groups (covering ages from 2 to 96 years), as can be seen below:

4 SAMPLE CHARACTERIZATION

A total of 253 records were obtained. Most patients (161 or 63.6%) were male. In the sample, 33.6% of the individuals were between 40 and 59 years old and 32.4% were elderly (Table 1). Ages ranged from 2 to 96 years, with an average of 49.6 years.

Table 1 - Sociodemographic characteristics of patients undergoing conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	Frequency	Percentage
Sex		
Female	92	36.4
Masculine	161	63.6
Age		
2 to 19 years	23	9.1
20 to 39 years	57	22.5
40 to 59 years	85	33.6
60 to 96 years	82	32.4
Uninformed	6	2.4

The percentages are relative to the total number of records (n=253).

Figure 1- Records of surgeries per year.



Displayed the total surgery records by year (2010-2022). And it was observed that the highest number of cases occurred in 2021 (60 records). (Figure 1)

When analyzing the prevalence of laterality, it was noticed that 119 (47%) patients had a diagnosis in the right eye, similar to the proportion in the left eye (45.5%). as for tumor severity it can be noted that the majority (193 or 76.3%) had a benign tumor. To assess the generalizability of prevalences, 95% confidence intervals (95%CI) were calculated for the

proportion, shown below. And the narrower this interval is, the greater the certainty related to that proportion in the population from which this sample was obtained (**Table 2**).

Table 2- Prevalence of laterality and malignancy in patients undergoing conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	Frequency	Percentage	CI95%*
Laterality			
Left eye	115	45.5	39.2 - 51.8
Right eye	119	47.0	40.8 - 53.4
Uninformed	19	7.5	4.7 - 11.7
Malignancy			
Benign	193	76.3	70.5 - 81.3
pre-malignant	24	9.5	6.3 - 14.0
Malignant	36	14.2	10.3 - 19.3

*95% CI: 95% confidence interval for prevalence. The percentages are relative to the total number of records (n=253).

Histopathologically, 39.1% of the individuals had pterygium, followed by squamous cell carcinoma (in 11.1%) and pyogenic granuloma (9.5%, Table 3). 20 patients had a record of compromised margins, of which 16 (80%) had histopathological type squamous cell carcinoma, one person (5% of 20 patients) had intraepithelial neoplasia, two (or 10%) had melanoma and one had mucoepidermoid carcinoma. 9 patients had free margins, of which two (22.2%) had squamous cell carcinoma, one had intraepithelial neoplasia, three (33.3%) had melanocytic nevus, one had pseudoepitheliomatous hyperplasia, one had conjunctival melanoma and one had nevus conjunctival compound.

Table 3 - Prevalence of histopathological examination results in patients undergoing conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	Frequency	Percentage	CI95%
Histopathological			
Pterygium	99	39.1	33.1 - 45.5
Squamous cell carcinoma	28	11.1	7.6 - 15.8
Pyogenic Granuloma	24	9.5	6.3 - 14.0
Intraepithelial Neoplasia	20	7.9	5.0 - 12.1
Squamous papilloma	18	7.1	4.4 - 11.2
Melanocytic nevus	13	5.1	2.9 - 8.8
Conjunctival nevus	6	2.4	1.0 - 5.3
Epithelial cyst	5	2.0	0.7 - 4.8
Primary Melanosis	5	2.0	0.7 - 4.8

Dermoid	4	1.6	0.5	- 4.3
Actinic keratosis	4	1.6	0.5	- 4.3
Lipoma	3	1.2	0.3	- 3.7
Melanoma	3	1.2	0.3	- 3.7
Conjunctival Rhinosporidiosis	3	1.2	0.3	- 3.7
Pseudoepitheliomatous hyperplasia	2	0.8	0.1	- 3.1
Others	16	6.3	3.8 - 10.3	

*95% CI: 95% confidence interval for the prevalence. Findings cited only once were grouped under “other”. The percentages are relative to the total number of records (n=253).

5 ASSOCIATION BETWEEN HISTOLOGICAL TYPES, GENDER, AGE AND LATERALITY

Next, factors related to the most prevalent pathological types were evaluated. For example, in female individuals, most (40 or 61.5%) had histopathological pterygium, in the male group, 47.6% of individuals also had histopathological pterygium. However, these observed differences were not significant (p=0.322), that is, there was no significant association between the most frequent histological types and the gender of the patients (Table 4).

Table 4- Association between sex and the main histological types of patients who underwent conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	Female (n=65)	Male (n=124)	p-value
Histopathological			0.322
Pterygium	40 (61.5)	59 (47.6)	
Squamous cell carcinoma	9 (13.8)	19 (15.3)	
Pyogenic Granuloma	8 (12.3)	16 (12.9)	
Intraepithelial Neoplasia	4 (6.2)	16 (12.9)	
Squamous papilloma	4 (6.2)	14 (11.3)	

Categorical variables are displayed as n (%). The percentages are relative to the total of each column. For this analysis, the chi-square was used.

The analyzed parameters of Age and histopathology were significantly associated (p<0.001): at the age of 40 to 59 years, 64.8% had histopathological pterygium, this proportion being greater than expected by the statistical test; of individuals aged 60 to 96 years, 18 (25.7%) had histopathological squamous cell carcinoma, this proportion being higher than expected by the statistical test; of individuals aged 2 to 19 years, 2 (50%) had pyogenic granuloma, this proportion being higher (†) than expected; of individuals aged 20 to 39 years, 11 (27.5%) had pyogenic granuloma, a higher proportion than expected; in the group aged 60 to 96 years, 13

(18.6%) had intraepithelial neoplasia, this proportion being higher than expected by the statistical test (†); of individuals aged 20 to 39 years, 17, 5% had squamous papilloma, this proportion being higher than expected (Table 5). That is, these frequencies were significantly higher in the respective age groups.

Table 5 - Association between age and the main histological types of patients undergoing conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	2 to 19 years (n=4)	20 to 39 years (n=40)	40 to 59 years (n=71)	60 to 96 years (n=70)	p-value
Histopathological					<0.001
Pterygium	1 (25.0)	21 (52.5)	46 (64.8)†	30 (42.9)*	
Squamous cell carcinoma	0 (0.0)	0 (0.0)*	9 (12.7)	18 (25.7)†	
Pyogenic Granuloma	2 (50.0)†	11 (27.5)†	4 (5.6)*	6 (8.6)	
Intraepithelial Neoplasia	0 (0.0)	1 (2.5)	6 (8.5)	13 (18.6)†	
Squamous papilloma	1 (25.0)	7 (17.5)†	6 (8.5)	3 (4.3)	

Categorical variables are displayed as n (%). The percentages are relative to the total of each column. The chi-square was used. *: this frequency was lower than what would be expected by chance. †: this frequency was higher than expected.

When analyzing the laterality and histopathological parameters together, it was noticed that they were not significantly associated (p=0.251), that is, the histopathological types did not vary significantly between the two eyes.

Table 6- Association between tumor laterality and the main histological types of patients undergoing conjunctival tumor excision surgery at the University Hospital Bettina de Souza Ferro, from 2010 to 2022, Belém-Pará.

Variable	Left Eye (n=85)		Right Eye (n=90)		p-value
Histopathological					0.251
Pterygium	38	(44.7)	55	(61.1)	
Squamous cell carcinoma	14	(16.5)	11	(12.2)	
Pyogenic Granuloma	12	(14.1)	10	(11.1)	
Intraepithelial Neoplasia	13	(15.3)	7	(7.8)	
Squamous papilloma	8	(9.4)	7	(7.8)	

Categorical variables are displayed as n (%). The percentages are relative to the total of each column. The chi-square was used.

6 DISCUSSION

Regarding the results obtained in this research, in this session, were discussed in the light of comparison, with similar existing and contrary findings in the literature, as well as the

theoretical data that elucidate the phenomena found here were confronted with other research. In addition to primarily being compared to the findings of other researchers who exclusively researched malignant and benign conjunctival tumors; secondarily, they were also compared to the findings of studies with other types of ocular tumors, methodology, and objectives similar to those claimed in this research. And, finally, the phenomena found in this research were discussed with studies that elucidate and/or touch them, in order to explain the data reported in the previous session of this research, but that had not been reported in the articles of this field of study. Therefore, Next, the most accessible, relevant published works were displayed, and that contemplated the most prominent findings in the 2 categories addressed in this research: characterization of the collected sample and the association between these results obtained regarding the categories of gender, age, histological types, and laterality.

7 SAMPLE CHARACTERIZATION

After analyzing the sociodemographic data of the research patients, it can be seen that 63.6% of these were male, the sample had an average age of 49.6 years. But that 33.6% of the research participants were between 40 and 59 years old, and the elderly corresponded to 32.4% of the sample collected (from 2 to 96 years old).

Data, these, corroborated by the findings of Margotto (2016), in which, in his epidemiological research, he detected that 27.77% men, compared to 9.43% of women, exhibited cancerous lesions among various ocular injuries, demonstrating a clear difference between the 2 genders. At the same time, in other studies, the female gender stood out, in percentage, in relation to the male. As can be seen from the findings of Hirt, (2022), in which it was observed that the female prevalence, in their sample of 155 patients, was 56.4%; as well as by Damasceno (2018), when reporting that the distribution of his sample between genders was 165 women (51%) against 159 men (49%); data similar to those of Bizarro (2014), who, when investigating 1622 patients, showed a sample of 59.6% female and 40.4% male. A proportion corroborated by the findings of Xu et al. (2008) and Díaz (2004), who found proportions similar to these, with, respectively, 57% and 55.1% of female individuals, and, 43% and 44.9% of male patients, leading his research on eye tumors.

A phenomenon that can be explained by the greater demand of women for health services, reflecting greater self-care and concern for health than men, which can cause data from the male gender to be underreported (BIZARRO, 2014). As well as the gender population proportion in Brazil, which according to the Brazilian Institute of Geography and Statistics (2022), was 51.1% female and 48.9% male, corresponding to 4,800,000 women more than men

in Brazil, which may be expanding the sample space in some studies. While men are exposed to risk factors more prominently than women, which can trigger possible development of conjunctival tumor diseases. And these are more inclined to immunological suppression caused by ultraviolet rays, and, in this regard, does not match the female gender, especially with regard to environmental weather (ALKALLAS, 2020; LIU-SMITH, 2017), as well as being less likely to wear sunglasses; avoid exposure to the sun around noon; seek shade when working outdoors (AMERICAN CANCER SOCIETY, 2019); in addition, they are more prone to ocular tumors because they are the largest contingent of labor in agriculture and civil construction, whether due to the sun or exposure to chemical and physical risks (MARGOTTO, 2016; RADESPIEL-TRÖGER, 2009); and, also, for being the majority transmitters, by sexual means, of HPV to females, which explains the 10,000 cases of laryngeal carcinomas; oropharynx; mouth; eyes; anus; and penis correlated with HPV infection (MEDRADO, 2017; ZARDO, 2013), and, finally, most men are concentrated in regions below 30 degrees of latitude (north or south) in relation to the equator, due to the high population density of these regions (India, Africa, China and the Middle East) , and what predisposes to greater exposure to ultraviolet rays, infrared radiation, and carcinogenic pollutants (HENN, 2022; GICHUHI, 2013).

Regarding the age of research participants with ocular tumors, there was a pattern of similar research in the literature, since Hirt (2022) reported that his research patients had a mean age of 49.5(\pm 20.1) years; as well as Damasceno (2018) had patients who matched the second group reported in this research (elderly), who had an average age between 65 and 75 years; Matheus (2017) published that conjunctival tumors more frequently affected individuals between 20 and 39 years old, while Bizarro (2014) noticed a high prevalence of tumors in middle-aged and elderly individuals, with an average age of 59.4 years for their diagnosed patients.

Surgery records, in the interval between 2010 and 2022, report more surgical procedures being performed in the years 2015 (32), 2017 (30), 2018 (35) and 2021, the year in which the greatest increase was observed (60 records) in the number of surgeries performed. Such results were the result of management components of specialized and experienced professionals in the ophthalmic-surgical field, since, according to the effectiveness in 2015, of Dr. Frederico Lobato (specialist in ophthalmology), managed to leverage the indicators of surgeries, which were still awaiting the results of preoperative exams in 2014, starting the series of increases in surgeries undertaken in 2015, which relieved the queues in 2016. Which later rose again in 2017 and 2018, after the completion of preoperative exams in 2016. And then this phenomenon was also observed after hiring Dr. Ana Cláudia Wanzeler (ophthalmology specialist) who received the

accumulated queue of 2020, the year in which the pandemic began. Therefore, in 2021, the postponed surgeries from 2020 were performed. Factors, these, that contributed to achieving the goal of surgical care.

While the highest prevalence measured for laterality was right-handed in 47% of the diagnoses of the tumors found (similar to the left-handedness of 45.5%). And the malignancy of these conjunctival tumors, in the analyzed medical records, was mostly benign (76.3%).

As for the side of the eye most affected by tumors, it was a question that showed divergences, not very significant, between the studies found in the literature, since Hirt (2022) reported that the right eye had the most tumors (169 cases) while 162 cases were in the left eye; while Bizarro (2014) reported that the right and left eyes, respectively, were affected by benign and malignant tumors, also proportionally, with 44% and 45% percentiles. And finally, Kumar, (2013) and Saari (2001) did not observe statistical differences between the groups of ocular tumors (right-handed and left-handed) found in these studies.

The severity of ocular tumors, reported in the literature, had a higher prevalence of benign ones, according to research Hirt (2022); By Almeida & Ferreira (2019); Bizarro (2014); Deprez & Uffer (2009); Xu et al. (2008); Paul (2008); Obata (2005) and Diaz (2004). With the exception of the findings by Fotouhi et al. (2009) who reported a lower prevalence of benign tumors, such as pterygium and pinguecula, in 44% of cases. What according to Eslami (2018) can be explained by divergences of genetic factors, socioeconomic issues and environmental nuances in the analyzed populations. In addition, according to the American Academy of Ophthalmology (2011) most of the suspicious findings are removed by surgeries performed for cosmetic purposes, which may lead to a possible underreporting of malignant tumors.

At the same time, the highest prevalence of conjunctival tumors, confirmed by histopathological examinations, in the sample, were between Pterygium (39.1%); Epidermoid Carcinoma (11.1%); Pyogenic Granuloma (9.5%); Intraepithelial Neoplasia (7.9%) and Squamous Papilloma (7.1%). In this sample, it was also detected Epidermoid Carcinoma (11.1%) and Melanoma (1.2%) as the only malignant tumors present in the sample.

These histopathological findings demonstrate, in some points, divergences with other epidemiological studies of benign tumors found in the literature, since Hirt (2022) found more tumors benign squamous cell papilloma type with 26% incidence, and 27.3% of pyogenic granuloma in their sample. While Eslami (2018), confirming the findings of this research, reported a higher frequency of pterygium diagnoses in 52.5% of cases, and papilloma with 2.1% of the sample. In contrast Damasceno (2018), even with a sample reporting a majority of 70.9% of benign tumors, pointed out actinic keratosis as responsible for 36.5% of cases. For Bizarro

(2014) the most prevalent benign tumors, in his research, were the squamous papilloma, with 1/3 of the representativeness of the sample, followed by the presence of melanocytic nevus egranuloma. Besides Deprez & Uffer (2009) who found in descending order, in their research, the squamous papilloma; melanocytic nevus and epidermoid cyst, as the most prevalent benign tumors. Data similar to those published in China by Xu et al. (2008) in another study, in which the most evident benign tumors were melanocytic nevus, squamous papilloma, epidermoid and dermoid cysts. Just like Díaz (2004), in a survey carried out in Spain, found the melanocytic nevus and the epidermoid cyst, among the most prominent benign tumors.

Contrary to what is reported, in a heterogeneous way, about benign tumors, malignant tumors, here in this study, were quite similar to the researched literature. Since Hirt (2022), Yousef & Finger (2012) and Toshida (2012) reported in their studies the squamous cell carcinoma as one of its most prevalent tumors. Following the same path Miyano (2021), in his research with conjunctival tumors, he found a higher prevalence of conjunctival carcinomas (64.5%), while conjunctival melanomas reached 32.2% of his sample. Bin how Damasceno (2018) similarly pointed out Carcinomas and Melanomas as the most prevalent malignant tumors in his research. Equally, Eslami (2018), Bizarro (2014) and Aghogho, Ernest, Temitope (2009) reported squamous cell carcinomas and melanoma as the most prevalent malignant tumors in their sample. Similarly, Coroi (2010); Deprez & Uffer (2009); Diaz (2004); Margo (1999); Proença (1998) and Cook (1990) reported, in a concordant manner, that, in their research, among the most common malignant tumors, the carcinomas and melanomas were among those present. And finally, among the studies analyzed Tonietto (2003), Kato (1996); Schelini (1992); Burnier Júnior (1988) and Schelini (1987) published that squamous cell carcinomas are one of the most common malignant conjunctival tumors in their research, covering from 20% to 61.53% of the tumors in their samples.

According Bizarro (2014) divergences in epidemiological findings around the world, about tumors, are common, as well as this theory is shared by Kumar (2013); Mak (2011); Xu et al. (2008); Takamura (2005); Wang (2003); Lee (1999); Sihota (1996), which are authors of an Asian series of studies. For Yousef & Finger (2012) the incidence of these can change between countries, however in countries close to the equator they have higher incidences and occur earlier. And yet, Deprez & Uffer (2009) contributes by elucidating that the frequency of different types of tumors is more vehemently due to factors such as geographic position; population genetics; socio-economic situation and access to health services.

Among the tumors removed, 20 (7.9% of the sample) had records of compromised margins, which, prior to surgery, were affected by epidermoid carcinomas (80%); by

melanomas (10%); and by intraepithelial neoplasms (5%). And 9 patients (3.55% of the sample) had free margins, from which benign tumors (melanocytic nevus, pseudoepitheliomatous hyperplasia, and compound conjunctival nevus) were previously removed in more than half of the cases (55.5%), and 33.3% of cases due to malignant tumors (squamous cell carcinoma and melanoma).

These findings may have their importance ratified in the literature by the experiments by Yacoub (2012) and Midená (2000), in which they found that 92.3% tumors of the conjunctiva and cornea had a high risk of recurrence after being removed, especially when they exhibit, previously, margins compromised by squamous cell carcinoma, which was shown to be responsible for at least 22.2% of cases of tumor recurrence, whereas tumors with perilocal invasion (scleral and intraocular) were associated with a higher prevalence (50%) of recurrence, as well as for Pizzarello (1978) who detected that subtypes with greater severity of squamous carcinoma in the conjunctiva show higher rates of recurrence. Such as the increase of up to 41% in squamous cell carcinomas and 24% in conjunctival intraepithelial neoplasms after surgical treatment. Since tissues with dysplastic characteristics can recur in 69% of cases (YACOUB, 2012). But they can have their recurrence rates reduced, between 7% and 22%, by concomitant treatments such as cryotherapy (FINGER, 2005; PEKSAYAR, 1989).

For Kathryn (2011), Shields (2004) and Erie, (1986) the recurrence rates after surgical removal of intraepithelial neoplasms of the conjunctiva can occur within the second year after surgery, and differ between 15% and 52%. But that can be reduced to 5% if the removal of the tumor is complete (TUNC, 1999). Therefore, for Kathryn (2011), surgical removal associated with cryotherapy and other topical therapies (5-FU, Interferons and MMC) are encouraged by their promising prognosis. At the same time, for Williams & Nicola (2021), a distance of 2 mm should be used, as a margin, when these tumors are to be surgically removed, in addition to at least 2 sessions of cryotherapy, to vitrify the tumor, through successive freezing and thawing of these tumors. margins, and epitheliectomy is still suggested, using alcohol, in circumscribed pathology, because for Shields (2004) these procedures promote a histopathological advantage in these tumors.

8 ASSOCIATION BETWEEN HISTOLOGICAL TYPES, GENDER, AGE AND LATERALITY

When the main types of tumors were associated with the gender of the patients, it was noted that the most prevalent benign tumor was the pterygium, with 61.5% and 47.6%,

respectively, in females and males, and Squamous Carcinoma, as the most frequent malignant tumor, in females (13.8%) and males (15.3%).

The findings of this research session diverge with the results of Hirt (2022) who demonstrated that women, 54.8% of the sample, had malignant tumors. Going against the findings of Damasceno (2018), which revealed that 29.1% of their patients with tumors were malignant. And, if there is, a higher incidence (83.3%) of malignant melanomas in males. While for Kathryn (2011) the highest incidence of squamous cell carcinomas and Conjunctival intraepithelial neoplasms were present in elderly Caucasian males.

For Bizarro (2014) the difference between the prevalence of benign and malignant tumors was insignificant and showed no relationship with the patient's gender. Opposing Xu et al. (2008), who reported that benign tumors were more present in women, while premalignant and malignant tumors were not more prevalent in a given gender. For Díaz (2004) there was a higher prevalence of benign tumors in females, and malignant tumors in men. And, in another research, Coroi (2010), reported that malignant tumors, such as carcinomas, were more numerous in males. Such findings are plausible, considering that for Kathryn (2011) and Tonietto (2003) excessive smoking; increased exposure to chemicals and environmental agents (such as dry weather or excess suspended particles); injuries and contamination on the ocular surface; and HPV infection, are factors that are more prevalent in males and lead to more mutations in the genome of ocular tissues.

Considering the intersection of parameters such as age group and types of conjunctival tumors, it can be understood that younger patients, between 2 and 19 years old, had a higher incidence of a benign tumor (pyogenic granuloma) in 50% of cases; following this benign tumor pattern, individuals between 20 and 39 years old had a prevalence of pyogenic granuloma in 27.5% and squamous papilloma in 17.5%. Both groups did not demonstrate, in this study, the presence of any malignant tumors. In the age group between 40 and 59 years old, 64.8% exhibited pterygium more vehemently. And in individuals between 60 and 96 years old, 25.7% demonstrated squamous cell carcinomas, twice as much as found in the group 20 years younger. In parallel, intraepithelial neoplasia corresponded to 18.6% in this last, more advanced age group.

The results of this research, which paired conjunctival tumors with age groups, were homogeneous with those reported in the literature. Since Damasceno (2018) reported more malignant tumors in patients aged 67 years and older. While for Kathryn (2011) the squamous cell carcinomas and Conjunctival intraepithelial neoplasms were more frequent in individuals over 56 years of age. For Tonietto (2003) and Schellini (1991), the appearance of squamous cell

carcinoma of the conjunctiva eventually occurs in people aged over 50 years, however it is also possible to appear in younger groups, even though it is not common, especially if they are Caucasian, and live in the equatorial regions of the planet, or have HIV.

Bizarre (2014) observed that most cases of ocular tumors are registered in the middle age group, followed by the elderly, and low among the youngest. It also demonstrated that benign tumors had a higher prevalence at the beginning in younger groups, and that the average age of patients diagnosed with malignant tumors was higher. However, benign tumors are common in all age groups, but malignant tumors have an incidence that increases with each year of life, and is therefore higher in people over 65 years of age.

In an attempt to pair tumor laterality with the types of tumors surgically removed, it was found that they did not vary significantly ($p=0.251$) in their presentations between the right-handed positions ($n=90$) and/or sinister ($n=85$) in the eyes of patients.

Although the laterality of the tumor was not significant in the sample, it was slightly higher on the right side (5.5%). This finding was also irrelevant for Bizarro (2014), in which there was a prevalence of 45% in the right eye and 44% in the left eye, being considered equally involved both for lesions caused by benign tumors and in lesions arising from malignant tumors. Saari (2001) and Kumar (2013), likewise, did not report any predominance difference in the correlation of laterality with tumor severity.

9 CONCLUSION

This study ends by reporting that 63.6% of the patients in this study with conjunctival tumors were male, of which 33.6% were aged between 40 and 59 years and 32.4% were elderly. Most patients (76.3%) had benign tumors, among which 39.1% were of the Pterygium type. The malignant tumor with the highest incidence was squamous cell carcinoma (11.1%) followed by melanoma (1.2%). Of those who had compromised margins after surgical removal, 80% had squamous cell carcinoma as histopathological type, and among those with free margins, 33.3% had melanocytic nevus.

Almost half of men (47.6%) were diagnosed with pterygium, and only 15.3% of men were diagnosed with squamous cell carcinoma. Patients aged 2 to 39 years had more diagnoses of pyogenic granuloma. Middle age (40 to 59 years old) accounted for 64.8% of cases of Pterygium, whereas squamous cell carcinoma was more present in the range between 60 and 96 years old (25.7%), as well as intraepithelial neoplasia (18.6%). The severity of the tumors was similarly distributed between the two eyes.

And although the profile of this group was drawn in Belém do Pará. In future studies, variables such as risk behaviors, comorbidities, occupational activities, family history and education level can always be paired. Which are also observed in the most varied researches reported around the world, but neglected in this research due to the lack of these data in the digital dockers. Therefore, it is suggested to implement them so that future profiles can be traced and the relationships between these factors in the eastern Amazon region can be better understood.

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