

Histopathological Patterns of Ophthalmic Lesions and Associated Factors in Jimma University Medical Center, Jimma, South West Ethiopia: a 5-year Retrospective Cross-sectional Study, 2021

Habib Ebrahim (✉ drhabibnmp@gmail.com)

Bishoftu General Hospital

Abdo Kedir

Jimma University

Lelisa Sena

Jimma University

Research Article

Keywords: histopathology, ophthalmic lesions, squamous cell carcinoma

Posted Date: September 13th, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1995158/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

Ophthalmic lesions comprise a wide range of disorders ranging from benign and precancerous to malignant lesions. This study was undertaken to investigate the prevalence and clinicopathological relations of ophthalmic lesions in Jimma University Medical Center as characterization of these lesions has vital importance for better diagnosis and management of patients.

Methods

A retrospective study of 209 ophthalmic lesions in Jimma university medical center from 2016 to 2020 which were registered on the biopsy log book was included in the study. Data were entered and cleaned Using an excel spreadsheet and analyzed in SPSS version 26. Descriptive statistics and regression analysis were done to determine the proportion of the ophthalmic lesions.

Results

209 cases of ophthalmic lesions were reviewed, of these 118 (56.5%) were malignant and 58 (27.8%) were benign lesions and CIN accounted for 20 (9.6%). Non-neoplastic lesions had the lowest group of cases observed accounting for 8 (3.8%). Conjunctiva was the most common site of ophthalmic lesions 128 (61.2%). Squamous cell carcinoma was the leading ophthalmic malignancy 58 (49.1%). There was a bimodal distribution of age, in the first decade due to retinoblastoma and the fourth decade due to Squamous cell carcinoma. Male to female ratio was found to be 1.7:1. The second decade and third decades of life had an 87% and 85% decrease in the odds of developing malignancy, with a p-value of 0.006 (AOR: 0.12 (CI: 0.02–0.54) and p-value of 0.007 (AOR: 0.14(CI: 0.03–0.58) respectively. Intra-ocular lesions were 22 times more likely to be diagnosed with a malignant diagnosis than other anatomical sites with a p-value of 0.026 (AOR: 22.05, CI: 2.54–9.84).

Conclusion

The commonest ophthalmic malignancy was Squamous cell carcinoma. There was a bimodal distribution of age, in the first decade due to retinoblastoma and the fourth decade due to squamous cell carcinoma. The second and third decades of life had decreased odds of being diagnosed with ophthalmic malignancy. The intra-ocular location of tumors was associated with increased odds of ophthalmic malignancy.

Background

Ophthalmic lesions comprise a wide range of disorders ranging from benign to precancerous and malignant lesions. The diagnosis of these lesions is based on clinical as well as histopathological features (1). Pathological profiles of orbito-ocular lesions provide information on the existence and prevalence of these diseases and may help guide diagnosis before surgical procedures and for the determination of treatment strategy. Globally, Tumors of the eye and ocular adnexa are some of the least frequent locations of malignancies in the human body accounting for 0.200.8% (2). Yet, these tumors are also some of the most serious eye conditions and are also the most challenging cases seen by ophthalmologists (3). Local data on cancer epidemiology in Ethiopia are scarce therefore, the true scale of the ophthalmic tumors is still unknown (4). Thus, the present study was aimed to focus on the comparative frequencies and distribution of various benign and malignant ophthalmic tumors and compare and contrast their geographical variation which can help to investigate the trend of these tumors in this part of the world and as well as the relationship of morphological and clinicopathological features of ophthalmic lesions.

Methods And Materials

A retrospective descriptive study was done based on the review of medical records of patients with biopsy results of ophthalmic lesions from 2016 to 2020 in Jimma University medical center. Ethical clearance was obtained from the Institutional review board (IRB) of Jimma University. A total of 209 biopsy report records were collected and included in the study period. Data was collected using structured checklist from the patient's biopsy records in the pathology department by trained technicians, training was given to the data collectors and supervisor on the objective of the study, data collection tools, and procedures. The principal investigator supervised data collection process daily. After data was collected it was checked for completeness, accuracy, and clarity by the principal investigator and supervisor. Data were entered into an excel spreadsheet, it was then cleaned and exported to SPSS V.26 for analysis and descriptive statistics tabulation was done to measure the relationship between multiple variables, and results were presented using tables, and figures and analysis involving two categorical variables was done using bivariate and multivariate logistic regression models to measure the degree of association between dependent and independent variables, a p-value ≤ 0.05 was considered statistically significant.

Results

Patients' demographic characteristics

A total of 209 ophthalmic lesion cases were examined. This accounted for 2.4% of total biopsies received within the study period. Regarding age, it was categorized into 8 groups by decades. The largest category of age was the third decade of life making up 49 (23.4%) followed by the fourth decade with 40 (19.1%). The least age category was seen in those who were less than 1 year of age making up 2 (0.9%) of the cases observed. And the male to female ratio was 1.7:1). The mean age was 32.3 ± 19.5 SD (years) and the age range was 2 months – 80 years. (Table 1)

Table 1

Distribution of demographic and clinical features of ophthalmic lesions in 209 biopsy cases in Jimma University Medical Center from 2016 to 2020

Variables		Frequency	Percentage (%)
Age (in years)	≤ 10	31	14.7
	11–20	30	14.3
	21–30	49	23.4
	31–40	40	19.1
	41–50	19	9.1
	51–60	23	11
	> 60	17	8.1
Sex	Male	132	63.2
	Female	77	36.8
Site of lesion	Conjunctiva	128	61.2
	Orbital	28	13.4
	Eye Lid	25	12.0
	Intra ocular	24	11.5
	Lacrimal Gland	2	1
	Cornea	2	1
Presentation of illness	Mass	152	72.7
	FBS	24	11.5
	Proptosis	17	8.1
	Leukocoria	8	3.8
	Redness	4	1.9
	Loss of vision	2	1
	pain	2	1
Affected eye laterality	Right	103	51.2
	Left	97	48.2
	Bilateral	1	0.5
Duration of illness	≤ 1 Month	31	15.5

Variables	Frequency	Percentage (%)
1 Month – 6 Months	102	51.2
6 Months – 1 Year	36	18
> 1 year	30	15

Clinical features

Conjunctiva lesions were the most common cases with 128 (61.2%) followed by orbital lesions 28 (13.4). Regarding laterality, the right eye was affected in 103 (51.2%) of cases and one patient had both eyes affected due to NHL accounting for 0.5% of the cases. More than half of patients presented with a duration of illness of 1 month up to 6 months 102 (51.2%). The most common presentation of illnesses was a growth of mass observed in 152 (72.7%) cases, followed by foreign body sensation in 24 (11.5%) cases, and two patients presented with loss of vision.

When comparing the site of lesions with the presentation of illness, most conjunctival lesions presented with the growth of mass in 100 (78.1%) followed by foreign body sensation in 22 (17.1%) cases. Intraocular lesions mostly presented with proptosis 9 (37.5%) followed by leukocoria in 8 (33.3%). About three-quarters of orbital lesions presented with mass 21 (75%). Almost all cases with eyelids presented with mass 24 (96%) while lacrimal glands presented with the growth of mass and proptosis and finally, corneal lesions presented with redness of the eye and growth of mass in the two cases observed. (Table 2)

Table 2
Malignant histopathological diagnoses of ophthalmic lesions, in Jimma University Medical Center from 2016 to 2020

Malignant lesions	Frequency	Percentage (%)
Squamous cell carcinoma	58	49.15
Retinoblastoma	23	19.49
Carcinoma in situ	9	7.62
NHL	6	5.08
Sebaceous carcinoma	6	5.08
Rhabdomyosarcoma	3	2.54
Others	14	10.63

The most common surgical approach used for ophthalmic biopsies was excisional biopsy for 166 (79.4%) of cases, with the most common indication being squamous cell carcinoma (SCC) making up 56 (33.7%) of cases. Enucleation was done in 24 (11%) of cases while the incisional biopsy was done in 16 (7%) of cases. Exenteration was done for 4 (1.9%) cases (Fig. 1). Unilateral surgery was done for almost all cases 208 (99.5%) while one case underwent bilateral eye surgery 1 (0.5%). (Fig. 1)

(Table 1)

(Fig. 1)

Histopathological diagnosis

Malignant neoplasms were more frequent than benign lesions accounting for 118 (56.5%), while benign lesions make up 58 (27.8%), and conjunctival intraepithelial neoplasia (CIN) accounted for 20 (9.6%). Non-neoplastic lesions were 8 (3.8%) of the cases, and the non-diagnostics and suspicious cases were small which accounts for 5 (0.04%) of the total ophthalmic lesions. Almost all of the ophthalmic lesions were primary lesions accounting for 199 (97%) whereas hematopoietic reticuloendothelial lesions accounted for 6 (3%) of the cases, in which all were diagnosed as Non-Hodgkin lymphoma. It was not mentioned whether this lymphoma arose primarily from ocular sites or as a systemic lymphoma. None of the specimens were found to be metastatic or secondary.

The most common malignant diagnosis was squamous cell carcinoma 58 (49.1%) cases followed by retinoblastoma at 23 (19.4%). Squamous cell carcinoma was the most common neoplasm of conjunctiva accounting for 55 (42.9%) from the site followed by conjunctival intraepithelial neoplasia at 20 (15.6%). sebaceous carcinoma was the most common eyelid neoplasm accounting for 5 (35.7%) of cases followed by Non-Hodgkin Lymphoma (NHL) at 3 (21.4%), Most orbital lesions were benign with Benign soft tissue tumors constituting 4 (26.6%) of cases followed by inflammatory lesions 2 (13.3%) of the cases, Likewise, lacrimal gland tumors were also diagnosed as benign with pleomorphic adenoma occurring in both of the cases observed from the location. There were two corneal lesions diagnosed with pterygium and acute inflammation. (Table 2)

(Table 2)

Ophthalmic lesions and associated factors

Factors associated with ophthalmic lesions were assessed and measured for the degree of association using bivariate and multivariate regression analysis. The second decade of life had an 87% decrease in the odds of developing malignancy, also the third decade of life has an 85% decrease in the odds of developing malignancy when compared to other decades as shown by a p-value of 0.006, (AOR: 0.12 (CI: 0.02–0.54) and p-value of 0.007, (AOR: 0.14(CI: 0.03–0.58) respectively.

In addition, patients who presented with intra-ocular lesions were 22 times more likely to be diagnosed with a malignant diagnosis than other anatomical sites. Hence, the anatomical sites of lesions have a statistically significant association with the diagnosis of malignancy with a p-value of 0.026 (AOR: 22.05,

CI: 2.54–9.84). The surgical approach was statistically significant to the nature of the specimen. Enucleation of the eye in which retinoblastoma was the most common indication was done in 11% of all cases. Retinoblastoma is also the commonest childhood ophthalmic malignancy. Enucleation was associated with 10 times more likely to be done than an excisional biopsy for malignant neoplasms as shown by a p-value of 0.002 (AOR: 10.73 (CI: 2.44–47.14). (Table 3)

Table 3

Factors affecting histopathological diagnoses of ophthalmic lesions among study cases, in Jimma University Medical Center from 2016 to 2020

Variables	Categories	Malignancy		Odds ratio(95% CI)		P-values (Adjusted)
		Yes	No	Crude	Adjusted	
Age	≤ 10	27	4	1.4(CI:0.2–7.4)	1.4(CI:0.2–7.3)	0.676
	11–20	11	19	0.1(CI:0.03–0.5)	0.1(CI:0.02–0.5)	0.006*
	21–30	19	28	0.1(CI:0.03–0.6)	0.1(CI:0.03–0.5)	0.007*
	31–40	23	17	0.3(CI:0.07–1.2)	0.2(CI:0.07–1.2)	0.091
	41–50	10	8	0.2(CI:0.06–0.8)	0.2(CI:0.05–1.2)	0.097
	51–60	15	8	0.4(CI:0.09–1.9)	0.4(CI:0.09–1.9)	0.27
	> 60	13	3	1	1	
Site of lesion	Conjunctiva	68	61	1.09(CI:0.4–2.5)	1.1(CI:0.4–2.7)	0.8
	Intra-ocular	23	1	21(CI:2.4–9.8)	22(CI:2.5–9.8)	0.005*
	Orbital	14	13	0.9(CI:0.3–2.9)	1.1(CI:0.3–3.4)	0.863
	Eye Lid	13	12	1	1	
Type of surgery	Enucleation	22	2	10.7(CI:2.4–47.1)	10.7(CI:2.3–48)	0.002*
	Excisional	82	80	1	1	

Note: *Significantly associated with Malignant diagnosis.

(Table 3)

Discussion

Pathological profiles of orbito-ocular lesions when characterized according to demographic data, presentation of illness, and clinical findings provide information on the existence and prevalence of these diseases and may help guide diagnosis before biopsy or resection and for determination of treatment strategy. Various studies conducted on orbital malignancies have shown differences in their relative frequencies in different areas of the world.

In general, malignant neoplasms were more frequent than benign lesions, 56.5% of the cases were malignant neoplasms. This observation is consistent with previous studies in Ethiopia (5), Pakistan (6), and Nigeria (7), conversely, studies from India (1), the Philippines (8), and the USA (9) showed that benign neoplasms were more frequent than malignant neoplasms.

Previous studies done in India (1, 10), Pakistan (11) and Ethiopia (12) conducted in various settings reported that there was a marginal increase in ocular lesions among the male sex. Likewise, The current study also showed there is an increased presentation of ocular lesions in males than females. The reason for this could be that males have an upper hand in socioeconomic and cultural status when compared to females as also discussed by a study in Nigeria (13). Therefore males can access health facilities more easily and tend to have better care.

The current study also showed that age has a statistically significant association with malignant histopathological diagnosis. The study found a bimodal peak in age distribution in both males and females in the first decade of life due to retinoblastoma and the fourth decade of life due to squamous cell carcinoma. Benign lesions were more commonly seen in the second decade of life. This is consistent with various other study findings in Nepal (14), Nigeria (8), and China (16) showing comparable results. Considering other OSSN diagnoses following SCC, conjunctival intraepithelial neoplasms were the commonest followed by carcinoma in situ. This is in alignment with the previous study from Nepal (14).

Regarding the presentation of illness a growth of mass was the commonest accounting for 72% of all cases followed by foreign body sensation and proptosis. This finding is in alignment with a study from Zambia (17) and in contrary to the finding from Kano, Nigeria (18) and Malaysia (15) that showed that leukocoria and proptosis as prominent symptoms. This discrepancy from the current study stems from the later researches having a predominance of an intraocular location while conjunctival tumors are entertained more in the current study.

A previous study in Kano, Nigeria (18) discussed that the duration of symptoms before seeking medical care was mostly around 6 months. This is in alignment with the current study that also showed similar findings. Delay in presentation to the hospital could be due to the absence of awareness, misapprehension of the illness, and economic difficulties. Regarding the laterality, the current study showed that Orbito-ocular tumors involved the right eye more than the left at 51.2% and with only one case of bilateral illness; likewise, a study in Nepal (19) showed similar findings.

When compared by age, the commonest ophthalmic childhood malignancies were retinoblastoma and rhabdomyosarcoma. This goes along with various studies including a previous study from Ethiopia (5), Nigeria (20), and Pakistan (11) having comparable findings. Retinoblastoma was also the commonest intraocular malignancy. Other intraocular lesions were Melanoma and Staphyloma. In contrast in adults, the study found that Squamous cell carcinoma, sebaceous carcinoma, and Non-Hodgkin lymphoma as the most common malignant neoplasms. Pterygium and benign soft tissue tumors were the commonest benign neoplasms. This is in alignment with previous studies done in Ethiopia (5) Nepal (14), the Philippines (3), and India (2).

Conclusions

This study showed that malignant ophthalmic neoplasms are more common than benign lesions with a slightly more male preponderance. Squamous cell carcinoma was the leading primary malignancy of ophthalmic neoplasms while Retinoblastoma was the most common childhood ophthalmic malignancy. Second and third decades of life had decreased odds of being diagnosed with ophthalmic malignancy. The intraocular location of tumors was associated with increased odds of ophthalmic malignancy.

There is a wide geographical disparity in the occurrence of several ophthalmic lesions. Reporting of these differences can help a clinician in making an accurate clinical diagnosis and achieve precise early management.

Abbreviations

CIN – Conjunctival intraepithelial neoplasm

FBS – Foreign body sensation

NHL- Non-Hodgkin lymphoma

OSSN - Ocular Surface Squamous Neoplasia

SCC- Squamous cell carcinoma

Declarations

Ethics approval and consent to participate

Ethics approval was obtained from the Institutional Review Board (IRB) of Jimma University. Informed consent was obtained from all study participants and for the participants below 16 years of age, informed consent was taken from their legal guardians. All study procedures were carried out in accordance with the relevant guidelines and regulations (declaration of helsinki).

Consent for publication

not applicable.

Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary material. Raw data that support the findings of this study are available from the corresponding author, upon reasonable request.

Competing interests

none declared.

Funding

This study did not require any funding.

Author's contribution

HE conceived the idea, carried out the proposal writing, participated in the data collection, data analysis, and drafted the manuscript. AK and LS had participated in editing and final version of the manuscript. All authors read and approved the final paper.

Acknowledgments

The authors would like to acknowledge staff members of the pathology departments and advisors for their support in providing necessary help.

Author information

¹Department of Pathology, Bishoftu General Hospital, Bishoftu, Ethiopia. ²Department of Pathology, College of Medicine and Health Sciences Jimma medical center, **P.O. Box: 378**, Jimma, Ethiopia. ³Department of Epidemiology, College of Medicine and Health Sciences Jimma University, **P.O. Box: 378**, Jimma, Ethiopia

References

1. P K, M M, S K. Histopathological spectrum of ophthalmic lesions in Chhattisgarh: study from a tertiary care centre. *International Journal of Advances in Medicine*; Vol 4, No 1 (2017): January-February 2017 DO – 1018203/2349-3933ijam20164077. 2017.
2. Misra S, Patil K, Misra N, Tandon A. Epidemiological study and treatment outcome of primary ocular and adnexal malignancies in a rural Indian tertiary eye care center. *Nigerian Journal of Ophthalmology*. 2016;24:67–70.
3. Domingo R, Manganip L, Castro R. Tumors of the eye and ocular adnexa at the Philippine Eye Research Institute: A 10-year review. *Clinical Ophthalmology*. 2015;9:1239.
4. Memirie S. Estimates of Cancer Incidence in Ethiopia in 2015 Using Population-Based Registry Data. *Journal of Global Oncology*. 2018;4.
5. Assegid A. Pattern of ophthalmic lesions at two histopathology centres in Ethiopia. *East African medical journal*. 2001;78(5):250–4.
6. Khan A, Sarwar S, Sadiq M, Rehman M, Ullah A, Ahmad I. Analysis of 1246 Cases of Orbital Lesions: A Study of 17 Years. *Natural Science*. 2015;07:324–37.
7. Onwubuya I, Owoyele T, Olaofe O, Ezike K. Morphological Spectrum of Orbitoocular Diseases in a Tertiary Health Centre in Keffi, North Central Nigeria. *Advances in Medicine*. 2015;2015:1–5.

8. Suleiman D, Iliyasu Y, Ahmed SA, Liman A. Histopathologic spectrum of paediatric eye and ocular adnexal tumours: A 10-year review from a referral centre in Nigeria. *Nigerian journal of clinical practice*. 2020;23:654–9.
9. Shields CL, Demirci H, Karatza E, Shields JA. Clinical survey of 1643 melanocytic and nonmelanocytic conjunctival tumors. *Ophthalmology*. 2004;111(9):1747–54.
10. Misra S, Patil K, Misra N, Tandon A. Epidemiological study and treatment outcome of primary ocular and adnexal malignancies in a rural Indian tertiary eye care center. *Nigerian Journal of Ophthalmology*. 2016;24:67–70.
11. Khan AA, Sarwar S, Sadiq MA, Ahmad I, Tariq N, Sibghat UI N. Analysis of orbital malignancies presenting in a tertiary care hospital in Pakistan. *Pak J Med Sci*. 2017;33(1):70–4.
12. Shifa J, Gezmu AM. Presenting signs of retinoblastoma at a tertiary level teaching hospital in Ethiopia. *Pan African Medical Journal*. 2017;28.
13. Wall LL. Dead mothers and injured wives: the social context of maternal morbidity and mortality among the Hausa of northern Nigeria. *Stud Fam Plann*. 1998;29(4):341–59.
14. Santosh U, Singh M, Kafle P, K C B, Khatri A, Yadav S, et al. Prevalence of Histopathologically Diagnosed Ophthalmic Neoplastic Lesion Among Ophthalmic Biopsies in a Pathology Laboratory of a Tertiary Care Hospital. *JNMA; journal of the Nepal Medical Association*. 2019;57:352–6.
15. Reddy SC, Anusya S. Clinical presentation of retinoblastoma in Malaysia: a review of 64 patients. *Int J Ophthalmol*. 2010;3(1):64–8.
16. Cheng CY, Hsu WM. Incidence of eye cancer in Taiwan: an 18-year review. *Eye (Lond)*. 2004;18(2):152–8.
17. Julius P, Siyumbwa SN, Moonga P, Maate F, Kaile T, Kang G, et al. Clinical and Pathologic Presentation of Primary Ocular Surface Tumors among Zambians. *Ocul Oncol Pathol*. 2021;7(2):108–20.
18. Habib S, Lawan A, Pam V. Clinicopathologic Presentation of Malignant Orbito-Ocular Tumors in Kano, Nigeria: A Prospective Multicenter Study. *Annals of African Medicine*. 2019;18:86.
19. Limbu B, Aemero M, Gushchin A, Moore G, Rohit S. Clinico-Pathological Patterns of Patients Who Underwent Orbital Exenteration in a Tertiary Eye Hospital of Nepal. *Ethiopian Journal of Health Sciences*. 2016;26:543.
20. Onwubuya I, Owoyele T, Olaofe O, Ezike K. Morphological Spectrum of Orbitoocular Diseases in a Tertiary Health Centre in Keffi, North Central Nigeria. *Advances in Medicine*. 2015;2015:1–5.

Figures

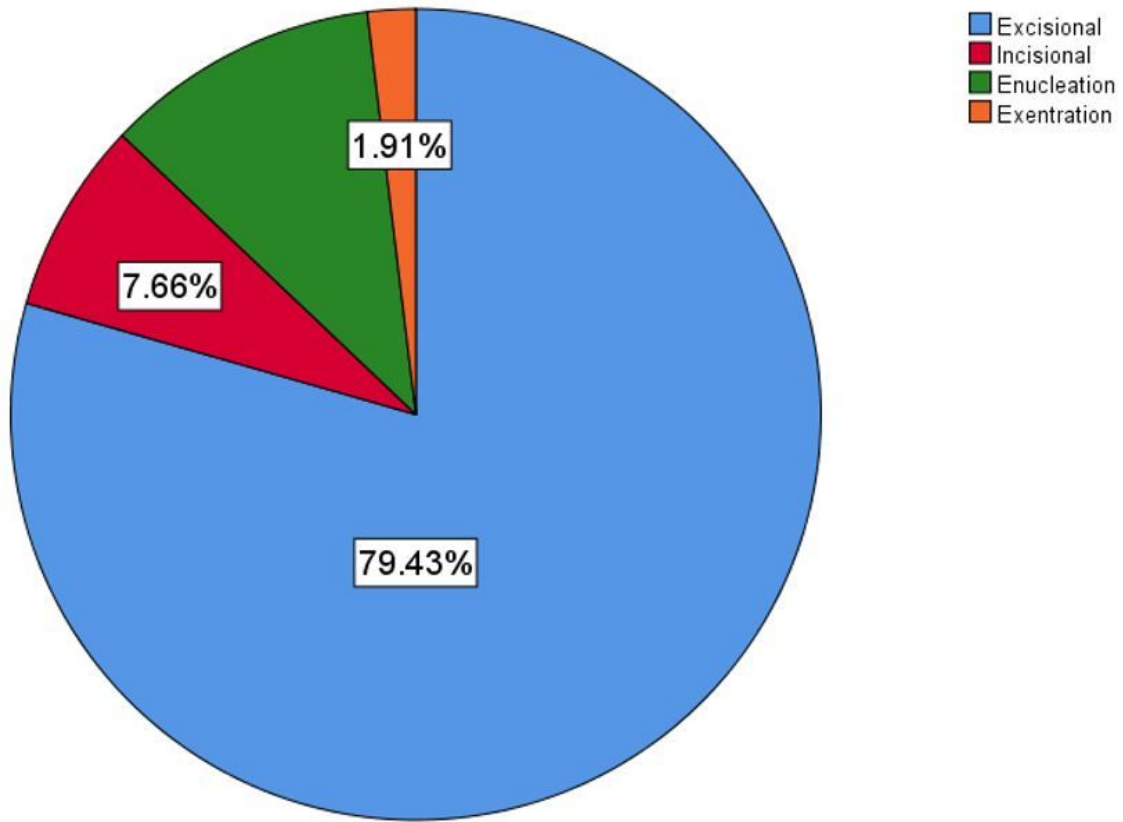


Figure 1

Types of surgical procedure done for ophthalmic lesions in Jimma University Medical Center from 2016 to 2020