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Orbital exenteration in Ibadan, Nigeria - experience from a tertiary health facility

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Abstract
Purpose: To report the demographic profile, clinical presentation, histological diagnoses and outcome of treatment in patients who had orbital exenteration(OE) in a tertiary health facility
Methods: Retrospective review of medical records of all patients who had OE over a 10-year period.
Results: Sixty-eight patients (M: F, 1.2**:**1) had OE with a mean age of 37.8 ± 23.4 years and peak age between 30 and 49 years. The ocular surface was the most common site of tumor origin in 35 (51.5%) patients, followed by spread of intraocular tumour into the orbit in 7 (10.3%) patients. Sixty (88.2%) patients underwent OE for malignant tumours of which invasive squamous cell carcinoma (SCC) of the ocular surface accounted for 32 (47.1%) cases.Twenty-eight (41.2%) patients tested positive for HIV, 27 (39.7%) of whom had invasive SCC. Twenty-six (38.2%) patients commenced adjuvant treatment post-operatively of whom 7 (10.3%) had complete treatment, while 34(51.5%) patients abandoned further post-operative treatment.All seven patients who completed their adjuvant treatment were alive and tumor free at 6 months to 74 months post-treatment; while eight of the 34 patients who abandoned post-operative treatment developed tumor recurrence.
Conclusions: Orbital invasion of ocular surface squamous carcinoma is the most common indication for OE in our center.Adjuvant chemotherapy increased survival of patients with advanced orbital malignancies post-exenteration, and presumably improved their quality of life. Health education of the populaceon early presentation to appropriate health facilities may reduce the burden of cases requiring orbital exenteration.

Keywords*: Ibadan, Nigeria, Orbital exenteration, Ocular surface squamous neoplasia, Orbital tumour*

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Résumé
Objectif: Pour rapporter le profil démographique, la présentation clinique, les diagnostics histologiques et les résultats du traitement chez les patients qui ont eu une exentération orbitaire (OE) dans un établissement de santé tertiaire
Méthodes: Examen rétrospectif des dossiers médicaux de tous les patients qui ont eu une OE sur une période de 10 ans.
Résultats: Soixante-huit patients (H: F, 1,2: 1) ont eu une OE avec un âge moyen de 37,8 ± 23,4 ans et un âge maximal entre 30 et 49 ans. La surface oculaire était le site d'origine tumorale le plus fréquent chez 35 (51,5%) patients, suivie de la propagation de la tumeur intraoculaire dans l'orbite chez 7 (10,3%) patients. Soixante (88,2%) patients ont subi une OE pour des tumeurs malignes dont le carcinome épidermoïde invasif (SCC) de la surface oculaire représentait 32 (47,1%) cas. Vingt-huit (41,2%) patients ont été testés positifs pour le VIH, dont 27 (39,7%) avaient une SCC invasive. Vingt-six (38,2%) patients ont commencé un traitement adjuvant après l'opération, dont 7 (10,3%) ont eu un traitement complet, tandis que 34 (51,5%) patients ont abandonné un traitement postopératoire supplémentaire. Les sept patients qui ont terminé leur traitement adjuvant étaient en vie et sans tumeur entre 6 et 74 mois après le traitement; tandis que huit des 34 patients qui ont abandonné le traitement postopératoire ont développé une récidive tumorale.
Conclusions: L'invasion orbitale du carcinome épidermoïde de la surface oculaire est l'indication la plus courante de l'OE dans notre centre. La chimiothérapie adjuvante a augmenté la survie des patients atteints de tumeurs orbitales malignes avancées après l'exentération et a probablement amélioré leur qualité de vie. L'éducation sanitaire de la population lors d'une présentation précoce aux établissements de santé appropriés peut réduire le fardeau des cas nécessitant une exentération orbitale.

Mots *clés*: *Ibadan, Nigéria, Exentération orbitale, Néoplasie épidermoïde de la surface oculaire, Tumeur orbitale*

Introduction

Orbital exenteration (OE) is a disfiguring surgical eye removal procedure mostly performed for malignant orbital tumors, and involves removal of the eyeball with the orbital soft tissue [1]. In traditional OE, the

eyeball is removed along with the eyelids, conjunctiva, orbital soft tissue and periorbita, while in "extended exenteration", in addition to these, the adjacent bony wall, paranasal sinus or intracranial tissue may also be "removed and" in subtotal exenteration, the periorbita is preserved [2,3]. Occasionally, OE is performed for non-malignant diseases of the orbit which are refractive to other modalities of treatment, for control of pain, or to improve patients' cosmesis, but the resultant functional, aesthetic and psychological effects of OE on patients make the procedure a last resort in orbital tumor management [4-6]. This review of OE performed in a tertiary health center in South Western Nigeria over a 10-year period aimed to report patients' demographic profile, clinical presentation, histological diagnoses and outcome of treatment. To the best of the author's knowledge, there had been no previous reports on OE in South Western Nigeria.

Method

The medical records of all patients who underwent OE between October 2008 and September 2018 at the Oculoplasty and Ocular oncology Unit of University College Hospital, Ibadan, Nigeria were reviewed. University College Hospital is a foremost tertiary institution in Nigeria with facilities for surgical and radiation treatment of orbital pathologies, hence, the patients were referred from different parts of the country.Information retrieved from the medical records included their social and occupational status, age, sex, clinical presentation, treatment modalities and duration of symptoms prior to presentation, histological diagnoses, HIV status, adjuvant treatment and outcome of treatment. Ethical approval was obtained from the Institutional Ethical Committee of the hospital, and the methods in the study adhered to the tenets of the Declaration of Helsinki.

Data Analysis

Data collected were entered into a database and statistical analysis was performed with the aid of Statistical Package for Social Sciences, version 16 software (SPSS Inc, Chicago IL., USA) for exploratory and statistical analysis. Descriptive statistics such as means and standard deviations were used to summarize quantitative variables. The Chi square test was used to investigate associations between two categorical variables. All tests were declared significant at the 5% level of significance.

Results

A total of 68 orbits of 68 patients comprising 38 males and 30 females (M: F, 1.2**:** 1) were exenterated during the study period. The mean age of the patients was 37.8 ± 23.4 years with a peak age between 30 and 49 years (Table 1). Twenty-nine (42.6%) patients/ caregivers were artisans or petty traders, 15 (22.1%) were unemployed, 10 (14.7%) were retirees, 6 (8.8%) were farmers, 4 (5.9%) were drivers, while 4 (5.9%) were civil servants. The right orbit was exenterated in 36 (52.9%) patients, and the visual acuity was < 3/60 in 63 (92.6%) patients while five (7.4%) patients had acuity of 6/60 – 3/60.

Table 1: Age distribution of the 68 patients

Age group (years)	Number	Percent
< 10	14	20.6
10 – 19	3	4.4
20 – 29	4	5.9
30 – 39	13	19.1
40 – 49	13	19.1
50 – 59	10	14.7
60 – 69	4	5.9
70 – 79	2	2.9
80 – 89	5	7.4
Total	68	100

The ocular surface was the most common site of tumor origin in 35 (51.5%) patients, followed by primary orbital tumors in 17 (25%) patients, extension from the eyelid and paranasal sinuses in nine (13.2%) patients, and spread of intraocular retinoblastoma into the orbit in 7 (10.3%) patients. Sixty (88.2%) patients had OE for malignant tumors with 32(47.1%) patients having squamous cell carcinoma (SCC) arising from the ocular surface (Table 2).

Table 2: Histopathological diagnoses of tumours in the 68 patients

Tumour	Number	Percent
OSSN	32	47.1
Rhabdomyosarcoma	8	11.8
Retinoblastoma	7	10.3
Eyelid SCC	4	5.9
Conjunctival melanoma	3	4.4
Sino-nasal carcinoma	3	4.4
NSOID	3	4.4
Benign lacrimal tumor	2	2.9
Malignant lacrimal tumor	2	2.9
Sino-orbital fungal infection	2	2.9
Malignant peripheral nerve sheath tumor	1	1.5
Optic nerve glioma	1	1.5
Total	68	100

OSSN = ocular surface squamous neoplasia,
SCC = squamous cell carcinoma,
NSOID = non-specific orbital inflammatory disease

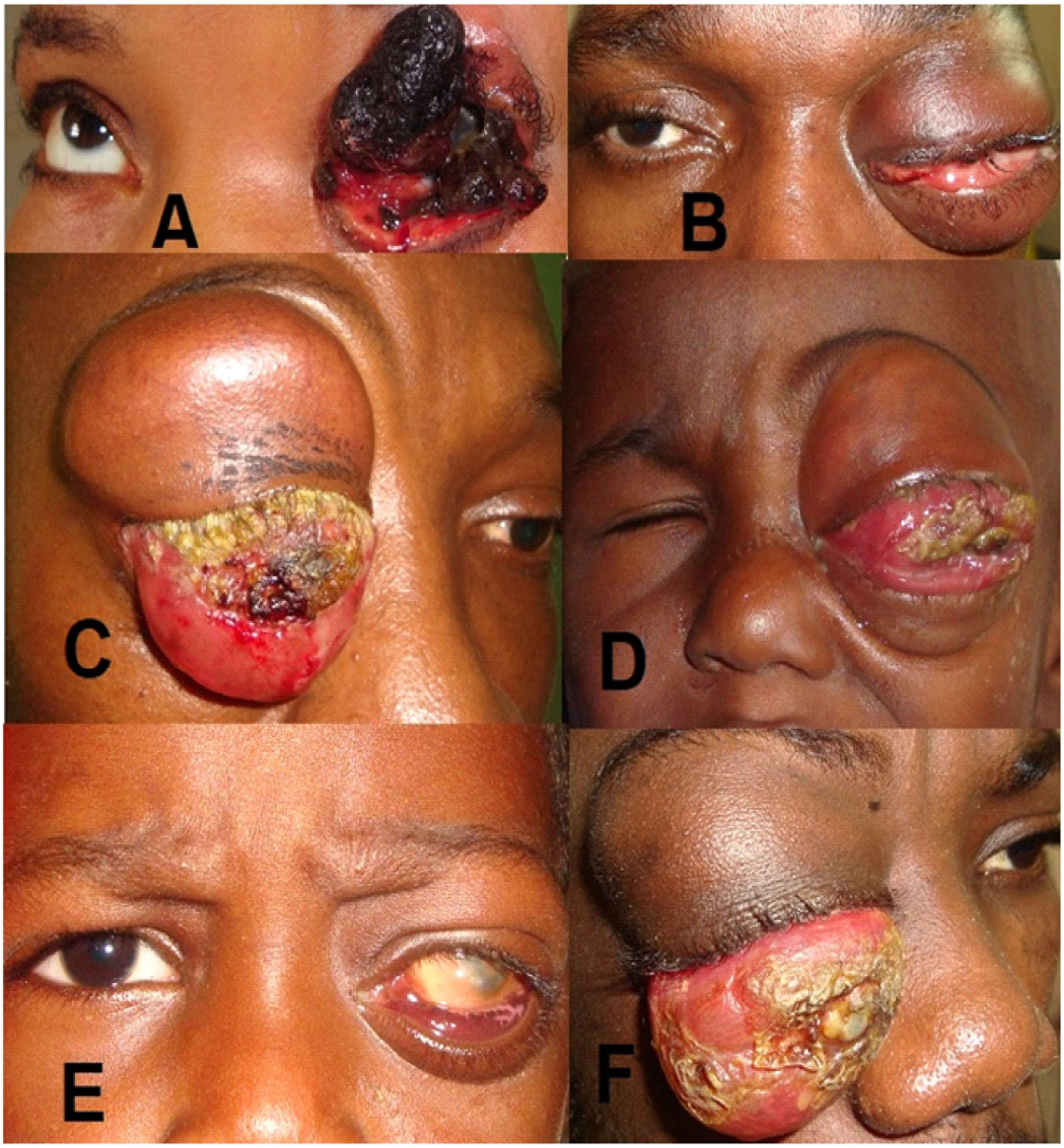

Figure 1:
A: Clinical picture of 26-year-old female patient with extensive conjunctival malignant melanoma with orbital infiltration
B: Clinical picture of 40-year-old male patient with moderately differentiated ocular surface squamous carcinoma with anterior orbital infiltration
C: Clinical picture of 30-year-old male patient with right lacrimal gland adenoid cystic carcinoma
D: Clinical picture of 4-year-old male patient with left orbital pleomorphic rhabdomyosarcoma
E: Clinical picture of 3-year-old male patient with left residual orbital retinoblastoma following chemoreduction
F. Clinical picture of 25-year-old male patient with long standing right lacrimal gland pleomorphic adenoma.

Figure 1 shows the clinical pictures of some of the patients who had OE. Twenty-eight (41.2%) patients tested positive for HIV, and 27 (39.7%) of them had invasive SCC. The mean age of the 32 patients with invasive SCC was 47.5 years ± 15.2 years, with the mean age (43.4 ± 10.7 years) of patients who tested positive for HIV being significantly lower ($t = 3.226$, $p = 0.027$) than the mean age (69.6 ± 17.6 years) of those who were negative for the viral infection. The average duration of symptoms before presentation was 13 months (Interquartile range, 15.8 months) and length of follow-up 6.5 months (Interquartile range, 12.8 months). All patients had computed tomography scan done prior to surgery. Intra-operatively, 63 (92.6%) patients had direct closure of the orbital defect with the skin of the eyelids while the remaining five (7.4%) patients had primary closure with transposition flaps. Post-operatively, three (4.4%)

patients developed sino-cutaneous fistula, and no other major post-operative complications were noted.Twenty-six (38.2%) patients commenced adjuvant treatment post-operatively of whom 7 (10.3%) completed their full course of treatment, while 34 (50.0%) patients abandoned further post-operative treatment. All seven patients (4 SCC, 3 rhabdomyosarcoma) who completed their adjuvant treatment were alive and tumor free at 6 to 74 months post-treatment; while eight of the 34 patients (6 SCC, 2 rhabdomyosarcoma) who abandoned post-operative treatment re-presented with tumor recurrence within 12 months after surgery.

Discussion

Orbital exenteration is performed for varying ocular conditions but mostly for malignant orbital tumours which could be primary, secondary or metastatic [6-8]. The specific indications for OE vary in different studies, and in the present review, about half of our cases underwent OE on account of invasive squamous cell carcinoma fromorbital invasion of ocular surface squamous neoplasia. This is similar to the report of Ackuaku-Dogbe [9] among an indigenous black population but at variance with studies [6,10,11] among Caucasians where more cases of basal cell carcinoma were reported. Malignant transformation of epithelial cells by the ultraviolet rays in the sun and high prevalence of HIV infection had been postulated to be responsible for the higher rate of SCC in tropical Africa [9,12,13].

About half (41.2%) of the patients tested positive to HIV, 27 (96.4%) of whom had invasive SCC. This agrees with previous authors [12,14,15] who reported strong relationship between SCC and HIV seropositivity in sub-Saharan Africa. The mean age of the patients with SCC (47.5 ± 15.2 years) in this study is similar to findings in previous studies [12,13]. The mean age of those who were positive for HIV was significantly lower ($t = 3.226$, $p = 0.027$) than the mean age of those who tested negative to the virus similar to previous studies [12,15] which reported that HIV infection is a major risk factor to SCC in the younger age group.

The management of rhabdomyosarcoma presently includes chemotherapy and radiation therapy after histological diagnosis [16]. A number of the patients with rhabdomyosarcoma ($n = 8$) in our study had to undergo OE due to late presentation with distortion and disfigurement of the orbital tissues. This differs from the pattern in western countries where patients usually seek treatment early at appropriate health facilities [17].

Retinoblastoma, the most common intra-ocular malignancy in children, remains a cause of morbidity and mortality in our region due to late presentation [18]. It was noted that seven patients underwent OE on account of orbital retinoblastoma following late presentation and poor response to chemoreduction. Outcome of treatment in patients with retinoblastoma had shown remarkably improved survival rate in western countries, [19] but this remains poor in many developing countries [18].

A third of our patients had received surgical treatment elsewhere, and occasionally, multiple excisions were done before their referral to our facility, thus, contributing to the delayed presentation with advanced tumors seen in many patients that necessitated orbital exenteration. This pattern of presentation is similar to reports from other developing countries [5,9]. Worthy of note were 27 patients with invasive SCC which started clinically as ocular surface tumors, 18 of whom have had simple surgical excisions done elsewhere but subsequently developed tumor recurrence. These could have had successful tumor control if the primary tumor excisions were combined with intraoperative cryotherapy and post-operative topical mitomycin C as reported in literature [12].

The technique of OE varies in different studies and includes eyelid-sparing technique, use of myocutaneous flap implantation or dermis fat graft, [9,10,20,21] and spontaneous granulation [5]. Majority of our patients underwent eyelid-sparing technique with direct closure of the socket while a few patients in whom the tumors involved the eyelids underwent primary reconstruction with transposition flaps.

Similar to what obtains in many developing countries, adequate facilities for managing advanced orbital tumors are not available in every part of the country, hence, a large proportion of the patients were referred to our facility from distant parts of the country. The long distances that the patients and caregivers had to travel, and financial constraints following “out-of-pocket” payment system mostly practiced in the country adversely affected accessing appropriate health care facilitiesby the patients. This could partly explain the delayed presentation and inadequate out-patient follow-up clinic visits in our patients with a large proportion of them abandoning post-operative adjuvant treatment. It is thus difficult to accurately describe the treatment outcome and factors affecting survival of patients in this study. However, of the 26 patients that commenced adjuvant chemotherapy post-operatively, seven patients (4 had SCC, 3 rhabdomyosarcoma) who completed their treatment were alive and tumor free at various periods (ranging from 6 months to 74 months) of completing the treatment, while eight of the 34 patients (6 had SCC, 2 rhabdomyosarcoma) who did not receive further treatment post-operatively developed tumor recurrence, thus suggesting that surgical treatment with complete adjuvant chemotherapy increases

survival among patients with advanced orbital malignancies and presumably improves their quality of life. Our finding is similar to the report of Ackuaku-Dogbe [9] in the same sub-region, and may not be different in other developing countries.

Similar to previous studies, [6,9,22] the major complication recorded in this review was post-operative sino-cutaneous fistula in three patients. This usually results from perforation of paranasal sinuses intra-operatively with eventual necrosis and breakdown of the wound. These patients were managed conservatively by regular dressing and secondary granulation of their sockets.

Conclusion

In conclusion, orbital exenteration is not a commonly performed procedure in our center and orbital invasion of ocular surface squamous carcinoma is the most common indication. Most of our patients present late with advanced tumors of the orbit. Distance from the health facility with financial constraint areimportant factors hampering their post-operative treatment and adversely affecting the outcome of treatment. Health education, public enlightenment, effective health insurance scheme,and possibly, free treatment for patients with malignancies may reduce the burden of cases of orbital exenteration.

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