

CASE REPORT

Chemotherapy in Ocular Surface Squamous Neoplasia: A Case Report**Onyia, Onyinye¹, Ubochi, Chinemerem¹, Ejiakor, Ifeoma¹, Anumudu Elias¹**¹.Department of Ophthalmology, Federal Teaching Hospital Owerri, Imo State.**Correspondence:** Onyia, Onyinye

Department of Ophthalmology

Federal Teaching Hospital Owerri

ABSTRACT

Ocular surface squamous neoplasia (OSSN) is an important ophthalmic public health problem in sub-Saharan Africa due to high levels of UV radiation and incidence of HIV/AIDS. Its occurrence is 10 times more in Africa than in other regions, affecting about 1.3 people per 100,000 population per year. There are 2 OSSN disease patterns: younger adults with a mean age of 40 years, predominantly women affected, and those that affect older adults with a mean age of 60 years and predominantly males. In recent times, chemotherapeutic agents such as 5-fluorouracil (5FU) have been used successfully in the treatment and as adjunct therapy of OSSN.

Keywords: OSSN, 5FU, Chemotherapy

INTRODUCTION

Ocular surface squamous neoplasia (OSSN) represents a spectrum of dysplastic squamous lesions on the conjunctiva and cornea, ranging from conjunctival intraepithelial neoplasia (CIN) to invasive squamous cell carcinoma (SCC), as shown in Figure 1.¹ Clinically, OSSN typically arises at the limbus, with variable extension onto the cornea or bulbar conjunctiva, sometimes mimicking benign conditions such as pterygium.² Africa has the highest incidence of OSSN in the world, affecting 1.6–3.4 per 100,000 persons/year in sub-Saharan Africa.^{3,4} In addition, it runs a more aggressive course and typically affects the younger blacks. Risk factors for developing OSSN include ultraviolet light and sun exposure, vitamin A deficiency, trauma, inflammation, xeroderma pigmentosum (XP),

human immunodeficiency virus (HIV) infection, human papilloma virus (HPV) infections and other immunosuppressive conditions.⁵ Human immunodeficiency virus (HIV) and human papilloma virus (HPV) are thought to play a predominant aetiological role among Africans.³ The primary treatment for OSSN has generally been surgical excision with a no-touch technique, but this has been associated with sequelae such as conjunctival scarring, symblepharon, conjunctival hyperaemia and limbal stem cell deficiency.⁶ The management paradigm has shifted from surgery alone to topical chemotherapeutic agents like 5-fluorouracil (5FU), proving highly effective as adjuvant or primary treatment.⁷

These topical treatments have the advantage of treating the entire ocular surface, reaching subclinical disease that could otherwise cause recurrence following surgical excision.

Case presentation - This is a case report of Mr. O.E., a 41-year-old male oil and gas industry employee diagnosed 3 years ago with human immunodeficiency virus (HIV) infection on highly active anti-retroviral therapy (HAART). He presented with painless, gradually progressive growth on the right eye of 3 years duration. There was associated tearing, redness, grittiness but no noticeable reduction in vision and sought care with several topical/herbal remedies. General examination found a young man in no obvious distress with normal findings. Ocular examination revealed visual acuity of 6/12 with a fleshy growth on the nasal interpalpebral conjunctiva of the right eye measuring about 6mm x 3mm. Its widest length extended unto the cornea between 12 to 7 o'clock positions, with dilated blood vessels and a central enlarged feeder vessel. Other anterior segment, posterior segment structures as well as the left eye appeared essentially normal. A clinical diagnosis of OSSN, SCC variant was made, and patient was prepared for 2-3mm wide margin excision biopsy.

Surgical procedure was done under local anaesthesia (subtenon's block and topical), corneal epithelial was pre-treated with 99% absolute alcohol to facilitate complete peeling. Bare sclera was treated with adjunct intra-operative 5% 5-Fluorouracil (5FU) for 5 minutes and copiously irrigated with 50mls of ringer's lactate (see Figure 2).

Biopsy result - Histology confirmed diagnosis of SCC with micro-invasion into the fibro-collagenous dermis. All the surgical margins of resection showed dysplastic cells.

Post-op adjunct treatment - Additional 4 weeks of chemotherapy was instituted, 1-month post-surgery to ensure adequate healing with 1% topical 5FU in aqueous artificial tear substitute tid x 4 weeks.⁸

Mr O.E. was followed up weekly with good compliance but no complaints or symptoms on each visit. Slit-lamp bio-microscopy examination with corneal staining revealed mild conjunctival hyperemia over and around the excision site. A freshly reconstituted bottle of chemotherapeutic agent was administered at every follow-up visit. Each preparation was in a fresh dispenser of aqueous artificial tear substitute and from a fresh vial of 5% 5FU (Fluracil 500, Biobaxy Technologies, Mumbai India).

Reconstitution procedure - To get 1% 5FU chemotherapeutic agent, 2 mLs of 5% 5FU was added to 8 mLs of aqueous artificial tears substitute.

Post chemotherapy - There was no gross recurrence 8 weeks post excision.

Incision biopsy was repeated with a specimen taken from 3 different sites (2 from the margins and 1 central) after 4 weeks of chemotherapy. New histology result revealed no evidence of malignancy.

Follow-up - Patient was seen and reviewed in clinic 3 months after excisional biopsy (1 month after chemotherapy) with no complaints, re-growth or signs of limbal stem cell deficiency (LSCD) as shown in Figure 3.

Discussion

Ocular surface squamous neoplasia (OSSN) is a condition with significant morbidity, capable of causing visual loss and, in rare cases of metastatic spread, mortality. Its pathogenesis is strongly linked to environmental and immunosuppressive risk factors, including ultraviolet radiation and HIV/AIDS, as exemplified by our patient, a young, HIV-positive male in a sunny climate.¹

While surgical excision remains the diagnostic and therapeutic gold standard, its limitations are well-documented. Surgery alone carries risks of limbal stem cell deficiency and, critically, high recurrence rates. Histologically clear margins do not guarantee a cure, with recurrence rates reported as high as 33%-56% after primary excision.^{6,9} This underscores the presence of subclinical disease, a challenge directly encountered in our case, where initial histology revealed dysplastic cells at all surgical margins.

This paradigm has established topical chemotherapy as a fundamental pillar of modern OSSN management, serving as either a primary treatment or, as in this case, a vital adjuvant. Adjuvant therapy targets the ocular surface for subclinical disease and can reduce post-surgical scarring. It can be applied pre-, intra-, or post-operatively to improve outcomes.⁷ The choice of agent involves a balance of efficacy, cost, and side-effect profile. While interferon alpha-2b has an excellent safety profile, it is costly. Mitomycin C is potent but can cause significant ocular surface toxicity. 5-fluorouracil (5FU) presents a middle ground: it is the least expensive option and has a moderate, generally tolerable side-effect profile, making it particularly suitable for resource-constrained settings.⁷

Our management of this invasive SCC with positive margins demonstrates a successful application of this rationale. Following wide excision, we employed a two-stage 5FU protocol: intraoperative application to the scleral bed and a planned four-week postoperative course. This approach achieved the desired outcome: a subsequent biopsy confirmed complete histological resolution with no clinical recurrence at the three-month follow-up, and no signs of limbal stem cell deficiency. The patient tolerated the regimen well, reporting only mild conjunctival hyperemia. The authors acknowledge that the follow-up period is short because OSSN can recur much longer after 3 months; long-term patient follow-up is highly advised.

Conclusion and recommendations

In summary, this case report illustrates that a protocol of wide excisional biopsy with intraoperative and extended postoperative topical 5FU is effective in achieving complete histological clearance of invasive SCC, even in the presence of positive surgical margins. The low cost and manageable side effect profile of 5FU make it a relevant and sustainable treatment option in resource-limited settings. Areas for further research include long-term follow-up studies among black population to evaluate late recurrence rates and potential long-term complications of topical chemotherapeutic agents as well as comparative studies to identify patient-specific or lesion-specific factors that predict optimal response to 5FU versus other agents.

References

1. Gichuhi S, Sagoo M. Squamous cell carcinoma of the conjunctiva. Community eye health. Community Eye Heal J. 2016;29(95):52–3.
2. Modabber M, Lent-Schochet D, Li J, Kim E. Histopathological rate of ocular surface squamous neoplasia in clinically suspected pterygium specimens: 10-year results. Cornea. 2022;41(2):149–54.
3. Gichuhi S, Sagoo M, Weiss H, Burton M. Epidemiology of ocular surface squamous neoplasia in Africa. Trop Med Int Heal. 2013;18(12):1424–43.
4. Shields C, Chien J, Surakiatchanukul T, Sioufi K, Lally S, Shields J. Conjunctival tumors: review of clinical features, risks, biomarkers, and outcomes—The 2017 J. Donald M. Gass Lecture. Asia Pac J Ophthalmol. 2017;6:109–20.
5. Vempuluru VS, Pattnaik M, Ghose N, Kaliki S. Bilateral ocular surface squamous neoplasia: A study of 25 patients and review of literature. Eur J Ophthalmol. 2021;32:620–627.
6. Alvarez O, Zein M, Galor A, Karp C. Management of ocular surface squamous neoplasia: Bowman Club Lecture 2021. BMJ Open Ophthalmol [Internet]. 2021;6:e000842. Available from: <https://doi.org/10.1136/bmjophth-2021-000842>
7. Al Bayyat G, Arreaza-Kaufman D, Venkateswaran N, Galor A, Karp C. Update on pharmacotherapy for ocular surface squamous neoplasia. Eye Vis. 2019;1:1–2.
8. Midena E, Degli Angeli C, Valenti M, De Belvis V, Boccato P. Treatment of conjunctival squamous cell carcinoma with topical 5-fluorouracil. Br J Ophthalmol. 2000;84(3):268–72.
9. Yolcu D. Outcomes of the ocular surface squamous neoplasia following primary excision with narrow margins and cryotherapy. J Exp Clin Med. 2023;40(4):729–33.
10. Mendoza P, Grossniklaus H. Conjunctival intraepithelial neoplasia. [Internet]. PathologyOutlines.com. 2021 [cited 2025 Jun 24]. Available from: <https://www.pathologyoutlines.com/topic/eyecinconj.html>

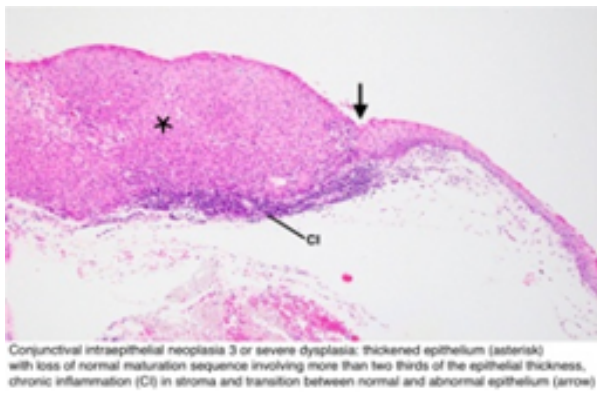


Figure 1: Source - <https://www.pathologyoutlines.com/topic/eyecinconj.html>



Figure 2 – Intraoperative photograph

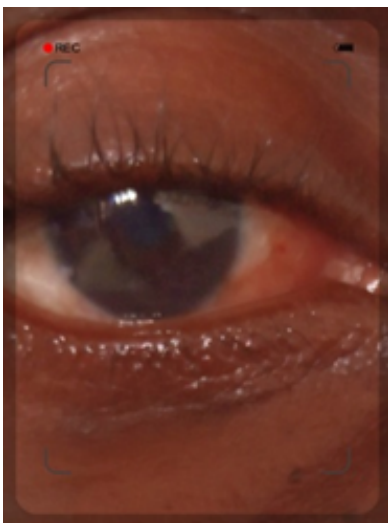


Figure 3 – Post-operative picture