



5-fluorouracil vs. beta-irradiation in the prevention of pterygium recurrence

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SUMMARY

Aim: The aim of this study was to compare 5-fluorouracil (5-FU) with beta-irradiation in the prevention of pterygium recurrence.

Materials and methods: A retrospective non-randomised review of cases of fleshy pterygium treated with bare scleral excision and adjuvant 5-FU were compared with similar morphologically appearing pterygia, matched for age and sex, treated with bare scleral excision and adjuvant beta-irradiation. All surgeries were carried out at the university college hospital and Ojulowo eye hospital, Ibadan, Nigeria.

Results: Twenty-seven eyes of 24 patients who had pterygium excision with adjuvant treatment with 5-FU were compared with 31 eyes of 24 patients who were treated with excision and beta-irradiation. The mean age for the 5-FU group was 46.1 years while that for the beta-irradiation group was 46.9 years. Both sexes were equally represented, 12 males and 12 females. There were seven (25.9%) initial recurrences in the 5-FU group but four of these became atrophic, and therefore, cosmetically acceptable leaving three eyes (11%) with unacceptable recurrent pterygia. The beta-irradiation group, however, had seven (22.5) initial recurrence but five of these became atrophic and fell short of the cornea, leaving two (6.5%) with clinically unacceptable recurrence. The difference was, however, not statistically significant ($Z_c = 0.74$ and

$p > 0.1$). The associated complications were mostly mild in both groups and included cornea opacity of 10 (37%) complications, conjunctivitis of three (11%) complications, sclera granuloma of three (11%) complications and conjunctiva necrosis of one (3.7%) complication for the 5-FU group, and while the beta-irradiation group had corneal opacity of one (3.7%) complication and conjunctivitis of three (11%) complications.

Conclusion: The non-statistical significance of a lower-terygium recurrence rate with use of beta-irradiation for the treatment of fleshy pterygium compared with 5-FU may have been partly due to the small number of patients studied. A randomised-controlled study using a larger sample size is therefore proposed. However, the fact that over half of those with initial recurrence in the 5-FU group became atrophic (and therefore cosmetically acceptable) over time as well as less cost implication in the purchase of 5-FU relative to Strontium-90 association with few and mild complications makes it a desirable adjuvant therapy in depressed economies. However, beta-irradiation still has a place when cost issue is not an inhibiting factor in view of its clinically superior outcome.

Keywords: Pterygium recurrence; 5-fluorouracil; beta-irradiation; complications of pterygium treatment

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INTRODUCTION

Pterygium is a degenerative lesion presenting as a fibrovascular conjunctival growth in the palpebral aperture of the eye with corneal extension. The aetiology of pterygium has been linked to exposure to ultraviolet irradiation, chronic irritation by dust, wind and other environmental factors (1). Thus, it is more commonly seen amongst certain occupations predom-

inantly involved with outdoor work, such as field workers, beach combers and surfers. Other occupations with high prevalence include saw-millers and welders (2,3).

Pterygium may be responsible for disturbance of vision by its astigmatic effect or by growing so large as to occlude the visual axis. It could also be a cause of much ocular irritation as well as being cosmetically unacceptable for many people, especially, when fleshy or inflamed. The treatment for pterygium is surgical excision. However, due to high recurrence rate with simple excision, which could be as high as 40% in some cases (4), the use of adjunct therapy such as beta-radiation, conjunctiva auto-graft and anti-metabolites such as mitomycin-C and 5-fluorouracil (5-FU) have been advocated (4,5).

Beta-radiation has been shown to reduce recurrence to as little as 6.9% or less, but a limiting factor for its use is the cost

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of the equipment as well as associated complications in inexperienced hands (6,7). Both mitomycin-C and 5-FU have been shown to cause a reduction in recurrence rate of pterygium (8,9), but 5-FU is much cheaper and more readily available than mitomycin-C, and it also has fewer associated complications. Thus, it was the drug chosen as adjuvant therapy for the treatment of fleshy pterygium at the ophthalmology department of the university college hospital, Ibadan in late 1999; prior to this time, all excised fleshy pterygia had been sent to Ojulowo eye clinic for adjuvant beta-radiation treatment. This review has, therefore, been done with the aim of comparing the outcome of using 5-FU for the adjuvant treatment of fleshy pterygium with that of beta-radiation at the study centres.

MATERIALS AND METHODS

A retrospective non-randomised review of patients with fleshy pterygia who had surgery by bare sclera technique followed by adjuvant treatment with 5-FU between October 1999 and December 2002 (a period of 39 months) was done using records from case notes. The findings were compared with those of morphologically similar cases, matched for age and sex but treated with bare sclera pterygium excision and adjuvant beta-radiation at Ojulowo eye hospital, Ibadan, between January and October 1999 (before 5-FU was introduced to the department of ophthalmology in October 1999; prior to this time, the surgeries were done at the university college hospital and sent to Ojulowo for adjuvant beta-radiation). All consecutive patients with morphologically similar (fleshy) pterygia treated with 5-FU were included, but only those who belonged to the same age group and sex and had received beta-radiation were included for comparison in the review; the others and all atrophic pterygia not treated by either methods were excluded. The outcome measures included type of complications related to the procedures, recurrence rate and post-operative change in visual acuity. All patients had pterygium excision by either of the three surgeons (C.O.B. A.M.B or B.G.K.A) who were all trained in the university college hospital, Ibadan, according to the method by D'Ombain (9). Those receiving beta-radiation had application of between 25,000–3,500 rads in fractionated doses by one surgeon only (B.G.K.A) using Strontium 90 applicator as earlier described (6).

The 5-FU group after an initial pterygium excision had the bare scleral area of the pterygium bed exposed to a section of a Weck-cel sponge soaked in 25 mg/ml of 5-FU for 5 min, during which there was intermittent wetting of the sponge for every minute with a drop of 5-FU, and at the end of 5 min, the sponge was removed and discarded and the eye copiously irrigated with saline solution for about 1 min (17). The cut conjunctiva ends were anchored to sclera with 8–0 silk, 6–0 vicryl or Dexon suture, leaving the bare sclera

exposed, antibiotic ointment was instilled and the eye padded over night. Steroid drops were commenced after 24–48 h when epithelium over the corneal wound would have healed. Patients were subsequently seen at 2–3 weeks, and thereafter at 1–3 monthly intervals. The mean follow-up period for the 5-FU group was 8.7 months (range 2 weeks–2 years), and for the beta-radiation group, mean follow-up was 10.3 months (range 2 weeks–4 years).

RESULTS

Twenty-seven eyes of 24 patients who had pterygium excision with adjuvant treatment with 5-FU were compared with 31 eyes of 24 patients who were treated with excision and beta-irradiation. The mean age for the 5-FU group was 46.1 years while that for the beta-irradiation group was 46.9 years. Both sexes were equally represented in the two groups, 12 males and 12 females. There were seven (25.9%) initial recurrences in the 5-FU group but four of these became atrophic, and therefore, cosmetically acceptable over time ranging from 4 months to 1 year, leaving three eyes (11%) with unacceptable recurrent pterygia. The beta-irradiation group, however, had seven (22.5%) initial recurrence but five of these became atrophic and fell short of the cornea, leaving two (6.5%) with clinically unacceptable recurrent pterygia. The difference was, however, not statistically significant ($Z_c = 0.74$ and $p > 0.1$). Figure 1 compares the recurrence rates between the two groups. The associated complications were mostly mild in both groups and included cornea opacity of 10 (37%) complications, conjunctivitis of three (11%), conjunctiva necrosis of one (3.7%), sclera granuloma of three (11%) for the 5-FU group, while the beta-irradiation group had corneal opacity of one (3.7%) complication and conjunctivitis of three (11%) (Figure 2). There was improvement in post-operative visual acuity of two or more Snellen lines in nine eyes and a reduction of 1–2 lines in two eyes of the 5-FU group. There were no changes in the visual acuity of the beta-irradiation group.

DISCUSSION

5-FU is a fluorinated pyrimidine analogue that inhibits fibroblast proliferation by competitive inhibition of thymidylate

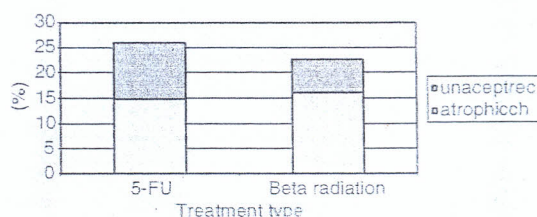


Figure 1 Pterygium recurrence following treatment with 5-FU compared to beta-radiation

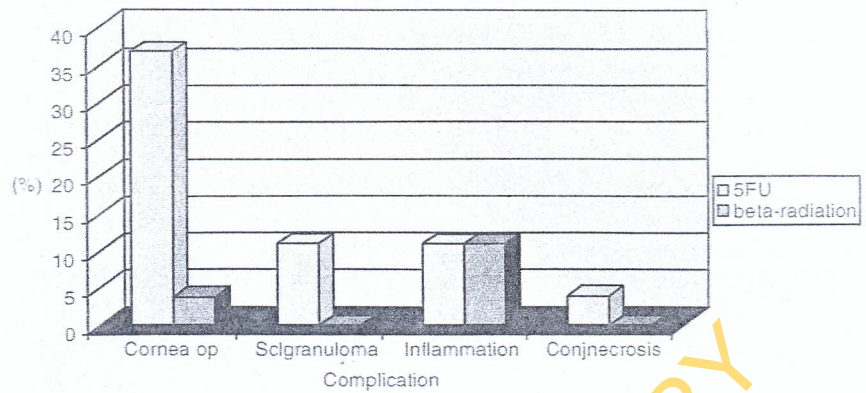


Figure 2 Complications of 5-FU vs. beta-radiation in pterygium treatment

synthetase (10), its use in the prevention of bleb failure from excessive scarring during filtration surgery has long been established (11,12). It has also been used to prevent pterygium recurrence through post-operative injections of the drug (9). This study produced an initial recurrence rate of 25.9% for 5-FU, which was not statistically different from the 22.5% initially produced by the beta-radiation group; however, over half of both groups became atrophic with time such that only 11.1% of the 5-FU group and 6.5% of the beta-radiation group had clinically unacceptable recurrence and would actually need a repeat surgery. The complications were also mild in both groups but were slightly more significant for the 5-FU group with corneal opacity and sclera granuloma being the more problematic. It, therefore, appears as if beta-radiation has an edge over 5-FU clinically, the difference though not statistically significant could become significant with the involvement of more patients in a randomised-controlled study. A recent study from Benin city (5) using high-dose 3-min single application of intraoperative 5-FU for pterygium treatment was not effective in preventing recurrence, and they advised that the duration of application be extended or additional injections to be given post-operatively. To our knowledge, no study has compared the efficacy of 5-FU to beta-radiation in the treatment of pterygium, but literature abound of studies comparing mitomycin-C to beta-radiation in which mitomycin-C was been found to be superior (8). However, limiting factors against the use of mitomycin-C include cost, non-availability and the risk of associated complications. The fact that over half of those with initial recurrence in the 5-FU group became atrophic (and therefore became cosmetically acceptable) over time as well as less cost implication in the purchase of 5-FU relative to Strontium-90 association with few and mild complications makes it a desirable adjuvant therapy in depressed economies. However, beta-irradiation still has a place when cost issue is not an inhibiting factor in view of its clinically superior outcome and proven efficacy (15,16).

Other modalities of pterygium treatment which have been reported to have good effect at preventing recurrence, and therefore, worth further research include excision plus con-

junctiva auto-graft, which has been found to be superior to bare sclera excision alone (13) and excision plus grafting with amniotic membrane (14).

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