

## WORLD VIEW

## Glaucoma in west Africa: a neglected problem

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Glaucoma in sub-Saharan Africa is a devastating disease which has not been fully addressed by the global ophthalmology community. The key issue is the lack of a satisfactory treatment.

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In sub-Saharan west Africa, glaucoma is a devastating and often neglected problem. It is a leading cause of blindness, second only to cataract. Those of us who work in Africa, and commonly see patients walk into an eye clinic blind from glaucoma, are constantly troubled by the human tragedy of glaucoma. The perspective in this article is gathered from the peer reviewed literature and my experience of treating glaucoma in Ghana over the past 14 years.

Although many similarities in glaucoma type, prevalence, and course exist in all peoples in sub-Saharan Africa, it is important to remember that there are also regional differences, presumably because of the obvious genetic heterogeneity among black Africans. For example, pseudoexfoliation syndrome is fairly common in east African and South African black people, but is rare in west Africa. Data from one region may apply to another one, but may also not be valid. Therefore, I am limiting my discussion to west Africa, rather than the whole of Africa, accepting the limitation that local variations also exist within west Africa.

Glaucoma in west Africa is predominantly open angle glaucoma (OAG). Chronic angle closure is seen occasionally but acute angle closure is extremely rare. OAG is weakly associated with onchocerciasis (author's data). In this population, OAG begins at an earlier age than in European derived people<sup>1,2</sup> and the disease typically advances rapidly. In the majority of cases diagnosis is made late—after loss of central vision in one or both eyes.<sup>2,4</sup> It is not unusual to see young people in their 30s or 40s with advanced glaucomatous vision loss.

Many anecdotal reports show a very high rate of OAG in west Africa, much higher than in a white population, although precise epidemiological data are lacking. We may assume the prevalence is similar to that found in the Caribbean among a population of individuals with west African ancestry. In Barbados 7% of people over 40 years old have OAG,<sup>5</sup> and in St Lucia at least 8.8% of people over 30 have OAG.<sup>6</sup> High prevalence, early onset of disease, and an aggressive course combine to produce a high rate of blindness secondary to glaucoma.

In spite of these facts, a limited amount of glaucoma treatment takes place in west Africa. Neither international nor local programmes have allocated large resources or publicity to management of glaucoma. For example, the "Vision 2020:

the right to sight" initiative to eliminate avoidable blindness does not even mention glaucoma as one of its priorities.<sup>7</sup> Effective funding organisations such as Sightsavers spend large resources on cataract eradication in Africa but little on glaucoma. Outside of Africa, the World Bank loaned over US\$100 million to India for cataract projects—nothing for glaucoma. More locally, in west Africa, the training for ophthalmologists stresses cataract surgery and puts little emphasis on glaucoma. The Ghanaian ophthalmologists that I know, with some exceptions, are frustrated by glaucoma and therefore tend to avoid surgical treatment of this disease.

Why is this? This is the case because no satisfactory treatment for glaucoma exists in west Africa (or in much of the developing world that has predominantly OAG). Neither patients nor healthcare providers will show enthusiasm for attempts at treatments that are unlikely to succeed. Nor can one generate excitement for developing screening programmes for early detection of glaucoma if there is no realistic place to refer patients for treatment. And then it follows that healthcare dollars will not go to prevention of glaucoma blindness—they will go to well defined eye problems such as cataract, vitamin A deficiency, and onchocerciasis, for which there are proved cost effective remedies.<sup>8</sup>

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The present methods of glaucoma treatment in west Africa comprise, as in Europe, medications and surgery. Unfortunately, for a number of reasons, treatment by chronic medication is doomed to fail in all but a small minority of patients. There is limited availability of medicines and they are generally expensive compared to patients' income—even generic  $\beta$  blockers and pilocarpine may cost more per day than basic necessities such as food. Refrigeration of medications is not practical. Ophthalmologists are few (1 per 1 000 000 population) and patients must often travel long distances for follow up examinations. All of these conditions conspire to guarantee poor compliance with medicines.

Trabeculectomy is the standard method of surgical treatment in west Africa today. Intraoperative antifibrotics, either 5-fluorouracil or mitomycin C, have been shown to safely increase the rate of success of primary trabeculectomy for OAG, and should be used routinely because of the tendency for filtering blebs to fail more frequently in black people than in white. In a randomised, prospective study in Ghana, intraocular pressure (IOP) fell to 20 mm Hg or less in 83% of eyes

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receiving intraoperative fluorouracil compared to 39% of eyes receiving no antifibrotic agent.<sup>4</sup> Intraoperative fluorouracil has obvious practical advantages over postoperative injections. Mitomycin is slightly more effective than fluorouracil,<sup>9</sup> but this advantage must be balanced against the disadvantages—mitomycin is much more expensive and must be refrigerated. Two other prospective studies, one in South Africa<sup>10</sup> and one in Kenya<sup>11</sup> have also supported routine use of intraoperative antifibrotics in primary trabeculectomy in Africa. In the west African population, potential late complications of antifibrotic medicines such as hypotony or endophthalmitis seem to be rare.<sup>12</sup>

In spite of its efficacy, trabeculectomy has shortcomings and is not performed in large numbers in west Africa. Patient acceptance of the procedure is poor—I find that patients are often put off or refuse surgery until they have severe vision loss. A Tanzanian study, with results probably also relevant to west Africa, found only 46% of patients accepted trabeculectomy—even though they were offered free surgery, hospitalisation, and food.<sup>3</sup> Word of mouth referral is missing because patients are often disappointed that their vision has not improved after surgery. Even worse, many patients lose vision, at least temporarily, and cataracts often become worse<sup>3</sup> with up to 29% of eyes requiring cataract surgery after 5 years.<sup>13</sup> Trabeculectomy is a relatively cumbersome operation taking longer to perform and requiring much more postoperative care than cataract surgery. Late failures of the bleb may occur and require repeat surgery. In interactions and discussions with west African ophthalmologists, one finds an understandable reluctance to do trabeculectomies because of poor patient acceptance, the difficulty of postoperative care, and uncertain results. In fact, most ophthalmologists do not glaucoma surgery. One builds a successful practice by cataract and IOL surgery, not by trabeculectomies.

Argon laser trabeculoplasty has not been fully studied but appears to have a limited role. It makes no impression on many eyes and only 20%–30% of eyes have a satisfactory IOP after 1 year, even with adjunctive medical therapy (written communication from Stephen Akafo, MD, Korle-bu Teaching Hospital, Accra, Ghana).

We desperately need a more effective means of treating glaucoma in west Africa. A medicine that could be taken once or twice a year could achieve patient compliance and revolutionise the treatment of glaucoma, as once or twice a year dosing of ivermectin has for onchocerciasis. Alternatively, and probably more realistically, a simple, rapid, inexpensive, and effective surgical procedure would be of great benefit. What is needed is a procedure for glaucoma that is as reliable and cost effective as modern cataract and IOL surgery.

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Although no operation yet meets these criteria, a few new surgical approaches have been proposed, including cyclophotocoagulation, non-penetrating drainage procedures, and drainage implants.

Transscleral cyclophotocoagulation with a diode laser as a primary surgical treatment of primary open angle glaucoma has recently been studied in Ghana and was found to be safe in terms of not causing visual loss or hypotony.<sup>14</sup> It has tremendous appeal in that the procedure can be done in a few minutes and does not require a sterile operating theatre. Also, patient acceptance of laser treatment was high—over 90%. However, with the low energy levels used and few re-treatments, it was not effective enough to be clinically

important—IOP decreased 20% in only 47% of eyes and final IOP was 22 mm Hg or less in 48% of eyes. An atonic pupil was an unexpected complication. Further investigations with different energy parameters should be done to find out if cyclophotocoagulation can become more useful. Studies in Ghana are now looking at the possibility of multiple retreatments to improve efficacy while maintaining safety.

Non-penetrating, drainage surgery has been used in South African patients.<sup>15,16</sup> Stegmann *et al* reported excellent results with viscocanalostomy: an IOP of 22 mm Hg or less was achieved without medical therapy in 83% of eyes.<sup>15</sup> It is not known if similar results could be obtained in west Africa, nor have any studies been done to show a clear advantage over trabeculectomy with antifibrotic agents. Also, a drawback of this surgery is that it is technically more complicated than trabeculectomy and does not meet the requirement for a simple, rapid procedure.

Setons, tube implants, and valves may play a part. My experience in Ghana is that traditional tube implants generally fail to lower IOP enough and they are not inserted quickly. A small injectable implant, which is quickly inserted, is effective in lowering IOP safely, may be desirable,<sup>17</sup> in part because it could be repeated easily. Research on such devices should be pursued in Africa.

None of these very different approaches has yet risen to supersede trabeculectomy. But given enough emphasis, research into innovative ideas along these lines and others may soon find an acceptable rapid, inexpensive, and effective treatment. A more satisfactory treatment must come before we will see an improvement in the management of glaucoma in west Africa.

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