



## OUTCOME OF HIGH-VOLUME CATARACT SURGERY AT AN ACADEMIC HOSPITAL

J Surka, S Hussain

**Objective.** This study aimed to review the results of high-volume cataract surgery performed at Umtata General Hospital, an academic hospital, during an 'eye surgery camp' held over a weekend.

**Subjects and design.** Ninety-eight cataract operations were performed over 3 days at Umtata Hospital during an eye camp to reduce backlog of cataract surgery in the Eastern Cape. After media announcement, patients were selected for cataract surgery and comprehensive pre-operative evaluation was done. Three qualified surgeons operated on the patients.

**Outcome measures.** Patients were reviewed at day 1 and at 3- and 6-week intervals in order to study the outcome of such operations.

**Results.** A total of 92.4% of patients achieved visual acuity of 6/60 or better at 6 weeks postoperatively. The surgical complication rate was minimal and overall satisfactory surgical outcome was observed in these cases.

**Conclusion.** Teaching hospitals with dedicated ophthalmic operating facilities can be utilised for high-volume cataract surgery over designated short-term periods and can provide a good alternative to mobile eye camp surgery. Until primary and secondary care facilities are optimal for cataract screening and surgery, such camps are recommended to reduce backlog of cataract surgery in the country.

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The Eastern Cape, one of the most disadvantaged provinces in South Africa, has a population of around 7 million. Umtata General Hospital serves as a referral hospital for the population of about 3.5 million people inhabiting the northern regions (regions D and E) of the province. It also serves as a teaching hospital for undergraduate and postgraduate students of the faculty of health sciences at the University of Transkei.

Prevalence of cataract blindness among South Africans who cannot afford private medical care in this province is estimated at 0.54%, with an incidence rate of 0.1% (unpublished data).

Department of Ophthalmology, University of Transkei, Umtata

J Surka, MB BS, MS (Ophth), FCS (SA) (Ophth)

S Hussain, MB BS, DO

There is a backlog of around 19 000 cataract cases in the catchment area of Umtata Hospital, with 3 500 new cases added every year (Table I). At present the cataract surgery rate (CSR) (cataract surgery/million people/year) for the province is 532, while the required CSR to eliminate the backlog of cataract cases should be around 2 000. To achieve this goal, 13 000 cataract operations need to be performed in the province every year.

**Table I. Demographic distribution of cataract cases, June 1997**

	Population (millions)	Total no. of cataract cases
South Africa	48	259 200
Eastern Cape	6.5	35 000
Regions D + E (Umtata)	3.5	19 000

South Africa is undertaking a new initiative to eliminate cataract backlog in the country with the assistance of the government and non-governmental organisations (NGOs). Unitra have supported this initiative and as part of the national programme to reduce the backlog of cataract surgery, we conducted high-volume 'cataract surgery camps' in 1997 so as to increase the CSR by at least 25% in that year. On one such camp, held at Umtata Hospital in June 1997, we performed 98 cataract operations over a period of 3 days. It is envisaged that until required eye surgery centres are established at district level, such camps will continue at major eye care centres in the province.

This study was conducted to establish the success rate of such a camp in an academic hospital.

### METHODS

The programme for the high-volume cataract surgery (eye camp) was announced in the media, mainly over the radio for the benefit of the rural population, which does not have access to TV or newspapers. One hundred and two patients were selected for cataract surgery from 474 patients who arrived for the camp (Table II).

Relevant data were extracted from the patient records. Age, gender, and local and systemic conditions such as diabetes and hypertension were noted.<sup>10</sup>

All enrolled patients were examined and data were obtained before surgery for visual acuity (VA) in each eye, intra-ocular pressure and full ophthalmological examination. Fundus

**Table II. Screening and selection of patients for the eye camp at Umtata Hospital, June 1997**

Total attendance (N)	474
Patients admitted (N)	102
Patients selected for surgery (N)	98



examination of the other eye was done whenever possible. The presence of pre-existing ocular conditions in the anterior segment (corneal scars, iridocyclitis, pseudo-exfoliation, squint and pupillary abnormalities) and posterior segment (macular degeneration or retinopathy) were noted. The condition of the other eye was noted, with special reference to bilateral cataract, aphakia or pseudophakia.

Four patients were excluded, 2 on the basis of uncontrolled diabetes, 1 because of acute conjunctivitis and 1 as a result of uncontrolled glaucoma.

Keratometry and A-scans were performed using the Humphrey A-scan in the patients identified to receive intra-ocular implants. Selection was done on the basis of the patient's age, unilaterality of the cataract and pseudophakia in the other eye.

Three ophthalmologists and two trainee doctors performed the 98 operations.

**OPERATIVE TECHNIQUE**

All patients were operated on under peribulbar anaesthesia. No pre-operative sedation was given to these patients. Acetazolamide 500 mg was administered orally to all patients 2 hours before surgery.

Eyelashes were trimmed, and patients fasted on the morning of surgery. Mydriasis was achieved using Cyclomydril eye drops.

Surgeons administered the peribulbar anaesthesia themselves. An equal mixture of 2% lignocaine with adrenaline and 0.5% bupivacaine was used. 150 IU of hyaluronidase was used as an adjunct.

Pressure was applied to the eye with the intra-ocular pressure reducer for around 15 - 20 minutes.

Extracapsular cataract extractions were done in 92 cases. Thirty-six of these patients received intra-ocular implants.<sup>127</sup> Six cases, with either subluxated or morgagnian cataracts, were operated using intra-capsular extractions with no implants (Table III).

A scleral incision 2 mm posterior to the limbus was effected and a scleral tunnel was made to enter the anterior chamber. Can-opener capsulectomy was performed using a cystotome. Manual irrigation and aspiration was done with a Simcoe cannula after removal of the nucleus. Monofilament nylon suture (10/0) was used to close the wound using either seven interrupted stitches or continuous shoelace suture.

Table III. Cataract procedures used at the eye camp (N)

Procedure	Number of patients
ICCE	5
ECCE	93
With PC IOL	70
Without PC IOL	23

ICCE = intracapsular cataract extraction; ECCE = extracapsular cataract extraction; PC IOL = post-chamber intra-ocular lens.

Subconjunctival injection of gentamicin and Decadron was administered to all patients.

Postoperatively antibiotic and steroid combination eye drops were used four times a day for 6 weeks. Acetazolamide 250 mg, three times a day was used for 2 days.<sup>8,9</sup>

All intra-operative complications<sup>9</sup> were noted in detail following a set format. Postoperatively patients were examined on day 1 and then at 3- and 6-week intervals.

Best corrected VA was recorded at each visit.

**RESULTS**

Complete baseline, pre-operative, intra-operative and postoperative information was available on the 98 patients operated on at this camp.<sup>4,10,11</sup>

Fig. 1 shows the age and gender distribution of the patients. Sixty-four patients (65.3%) were female, and 34 (34.7%) were male.

The mean age of patients operated was 68 years (male patients 70 years, female patients 66 years).

Tables IV and V show systemic and ocular pathology found in the 98 cases.

Forty-seven cases had bilateral mature cataracts. Of the remaining 51 unilateral cataract cases, 24 were aphakic in the other eye, 8 were pseudophakic, 4 had normal other eyes, and 2 were one-eyed patients with the other eye totally and irreversibly blind. The remaining 13 cases had unilateral cataracts (Table VI, Fig. 2).

Table VII highlights the operative and postoperative complications seen in these patients.<sup>9</sup>

Three patients had vitreous disturbances, while 4 others had inadvertent posterior capsule rupture during surgery. Two of these patients were to receive a posterior chamber intra-ocular lens (PC IOL), which had to be deferred.

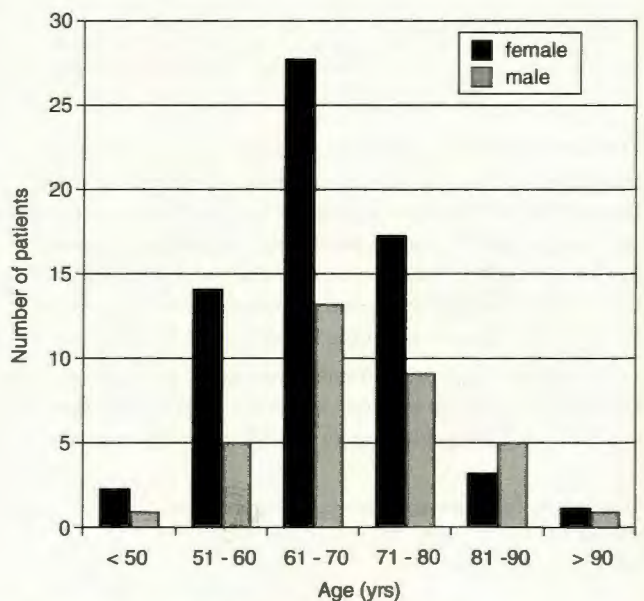


Fig. 1. Age and sex distribution of selected patients.



**Table IV. Systemic pathology in 98 cases (N)**

Diabetes with hypertension	1
Diabetes	3
Hypertension	6
Bronchial asthma	2
Cor pulmonale	1
Pericarditis	1
<b>Total</b>	<b>14</b>

**Table V. Ocular pathology in 98 cases (N)**

Subluxated lens	2
Pseudo-exfoliation	2
Climatic keratopathy	2
Morgagnian cataract	4
<b>Total</b>	<b>10</b>

**Table VI. Ocular condition of the other eye**

Ocular condition	Number
Bilateral cataract	47
Unilateral cataract	51
Aphakia	24
Immature cataract	13
Pseudophakia	8
Normal other eye	4
One-eyed	2

One patient showed cortex in the anterior chamber and another patient cortex in the posterior chamber the day after surgery. Iridocyclitis was observed in yet another patient. One patient showed moderate striate keratitis, while another had a gaping wound with a prolapsed iris following injury to the eye 7 days postoperatively.

**Postoperative visual status**

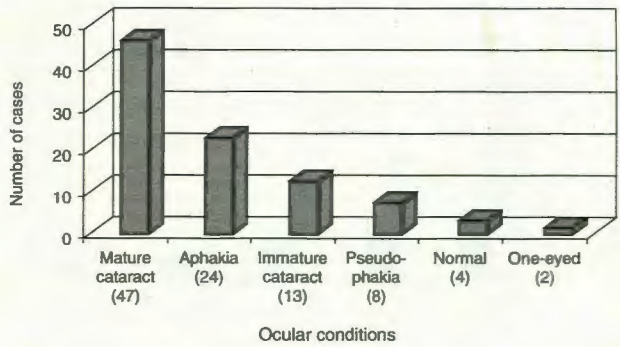
VA measured on the first day<sup>s</sup> postoperatively showed 86 patients with a VA of 6/60 or better.

Fig. 3 and Table VIII show the best corrected VA for 92 patients at 6 weeks.

**Table VIII. Visual acuity outcome for 92 patients**

Visual acuity	All patients (%)	Pseudophakic patients (%)	Aphakic patients (%)
6/6 - 6/12	45 (48.9)	36 (39.1)	9 (9.8)
6/18 - 6/24	24 (26.1)	17 (18.5)	7 (7.6)
6/36 - 6/60	16 (17.4)	13 (14.1)	5 (5.4)
5/60 - FC	6 (6.5)	2 (2.2)	2 (2.2)
Hand-movement vision	1 (1.1)	0	1 (1.1)
<b>Total</b>	<b>92 (100)</b>	<b>68 (73.9)</b>	<b>24 (26.1)</b>

FC = finger counting.



**Fig. 2. Ocular condition of the other eye.**

**Table VII. Operative and postoperative complications**

Complications	Number of patients
<b>Operative</b>	
Vitreous loss	3
Post-capsule rupture	4
<b>Total</b>	<b>7</b>
<b>Postoperative</b>	
Cortex in AC	2 Day 1
Iridocyclitis	1 Day 1
Keratitis	1 Day 1
Wound gape with iris incarceration	1 Day 7
<b>Total</b>	<b>5</b>

VA was measured in the operated eye. Forty-five patients (49%) achieved a VA of 6/12 or better, with 36 of the 45 receiving IOLs. Twenty-four patients (26%) improved to 6/18 to 6/24, with 17 of this number receiving PC IOLs. Sixteen patients (17.4%), including 13 pseudophakic patients, only improved to between 6/36 and 6/60. Six patients (6.5%) did not improve beyond 5/60, and 1 patient (1.1%) remained at hand movement vision only.

**DISCUSSION**

The cataract surgery camp was conducted as a part of the national programme for cataract backlog reduction. The National Committee for the Prevention of Blindness proposed that cataract surgery output should be increased by 25% annually. One of the strategies was to conduct high-volume

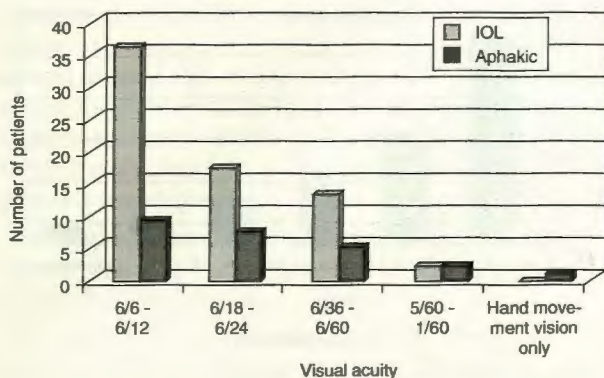


Fig. 3. Visual acuity outcome for 92 patients (IOL = intra-ocular lens).

cataract camps at the teaching hospitals in a controlled environment.

The camp was held over a weekend for a period of 3 days at Umtata Hospital. Patients were pre-selected after a screening process held on the Thursday. Two operating theatres were used for the entire day for each day of this camp. Five cataract surgeons were involved and an average of 33 operations were performed each day.

Comprehensive systemic and ocular examinations were carried out for all patients.<sup>10</sup> In 70 of these patients, extracapsular cataract extraction was done with implantation of posterior chamber polymethylmethacrylate lenses.<sup>12</sup> Two patients could not receive intra-ocular lenses because of posterior capsule rupture during surgery. Five patients with subluxated lenses or hyper-mature morgagnian cataracts underwent plain intracapsular cataract extraction.

Three patients had vitreous loss; main reasons for this were poor compliance due to extreme old age and restlessness during the procedure. In 4 patients the posterior capsule was partially ruptured without vitreous disturbance.

Two patients had cortex material in the anterior chamber on the first postoperative day. They were taken back to theatre and the cortex was aspirated, after which they did well. A patient with a moderate degree of striate keratitis responded to steroid and antibiotic combination drops instilled 4-hourly with clearing of the keratitis within 4 days postoperatively. One patient developed endophthalmitis and was treated with sub-tenon injection (20 mg methylprednisolone). He was also given intensive topical steroids and mydriatics along with systemic antibiotics and anti-inflammatory agents. It took more than a week to clear the inflammation moderately. However, the visual outcome was disappointing as the patient remained with hand-movement vision only. A pseudophakic patient with a quiet eye and VA of 6/24, with a slight wound gape and iris incarceration into the wound was left alone and did not present with any further complication on follow-up.<sup>6,9</sup>

VA measured on the first day postoperatively showed 86 patients with acuity of 6/60 or better. Ninety-two of these patients were followed up at 1 week, 3 weeks and 6 weeks. Six patients could not be followed up because of non-compliance — poor general health, long distances in rural areas and lack of resources could have been the reasons for this.

Best corrected VA was noted on each postoperative visit. In all patients, final VA with correction was measured at 6 weeks.

Patients with intra-ocular implants showed a better success rate than the patients without lenses and also better compliance.<sup>2</sup> Of the 6 patients who did not show a satisfactory outcome, 2 had old healed chorioretinopathy, and 2 showed deep glaucomatous cupping, although intra-ocular pressure was below 20 mmHg pre- and postoperatively. Two other patients had diabetic maculopathy with clinically significant macular oedema. The patient with postoperative endophthalmitis could not be improved beyond the level of hand-movement vision.

A part-time optometrist assisted in refraction work. Although 2 of the cataract surgeons did not have extensive surgical experience, this did not affect the success rate of the camp significantly. Complications resulting from the high volume of surgery at the camp were minimal.<sup>3,5</sup>

The World Health Organisation (WHO) defines success as a VA of 6/60 or better in the operated eye on the first postoperative day. Our success rate according to the WHO definition was 87.8%. Ongoing recovery during the postoperative period and subsequent correction increased the success rate at 6 weeks to 92.4%. This success rate compares well with results of similar studies conducted in other environments.<sup>1,5</sup>

Holding a high-volume cataract surgery eye camp in a teaching hospital over a weekend was a positive experience. It did not disturb the routine work of the department and it was conducted without incurring any additional cost.<sup>12</sup>

High-volume cataract surgery in a controlled environment is strongly recommended as a means of reducing cataract backlog in the country.<sup>13</sup> The CSR can be significantly improved in needy areas using this method, with little effort. Our study shows that the outcome was not adversely affected by the high volume of cataract operations performed over a short period of time.

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