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RESEARCH ARTICLE

MOBILE STRATEGY AND MANUAL CATARACT SURGERY BY SMALL INCISION: CONGOLESE EXPERIENCE

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ABSTRACT

Introduction: We report the results of a mobile cataract surgery using the technique of manual small cataract surgery.
Methods: The study included patients with cataract who were recruited during a mobile surgery campaign and made available by a local NGO. Some ophthalmic equipment has been added. All patients were operated on by manual small cataract surgery, with the incision site being the most refractive axis. In the absence of astigmatism, a temporal incision was systematically performed.
Results: Mean postoperative visual acuity without correction was 0.5 ± 0.25 (range 0.05-1). Mean postoperative visual acuity with the best correction was 0.72 ± 0.25 (range 0.05-1). Of the patients, 73.3% had good postoperative visual acuity without correction, of which 40.36% had visual acuity greater than or equal to 0.6. As for the best correction, it was found in 78.3% of them, postoperative visual acuity being greater than or equal to 0.6.
Conclusion: The mobile strategy of cataract surgery is still relevant in our countries, which still have large ophthalmic deserts. These results seem better by the CMCPI compared to the old techniques.

INTRODUCTION

Cataract is the leading cause of blindness in the world. To eliminate blinding cataracts, the rate of surgery must reach or exceed the Cataract Surgery Rate (CSR) which is a rate of cataract surgery to be performed per million inhabitant year. The CSR is estimated between 6000 and 4000 in developed countries (Venkatesh *et al*., 2012). However, it can go down to 2,000 interventions in countries with fewer elderly people, particularly in Africa where the population is relatively young. While in Europe cataract surgery coverage reaches CSR, in Africa this coverage is still estimated at 500 interventions per million inhabitants per year (Foster, 2000). This low surgical coverage leaves behind a back log (arrears) of cataracts worsening the prevalence of cataract blindness (OMS, 2006-11). In addition, the practice of surgical techniques such as intra capsular extraction (EIC), still maintain about 45% of patients already operated in blindness (Bourne *et al*., 2007). There is also a problem for ophthalmologists trained in the most effective techniques, most of which are installed in cities with ophthalmic deserts on nearly 80% of the territory of developing countries.

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Mobile units then become a logical solution for these often poor and landlocked populations. However, the results of these mobile units are variously appreciated, mediocre for Harba (2017) for example, and good for Djiguimdé (Djiguimdé *et al*., 2015). We report the experience of a mobile strategy of cataract surgery through a health caravan in Congo Brazzaville. The aim is to assess the results of this strategy in countries with few eye surgeons.

METHODS

Framework of the study

This is a prospective study, conducted for 2 months in Oyo, in the department of the basin in central Congo. This department is located 500 kilometers north of the first eye surgery center located in Brazzaville in the south of the country. On the other hand, more to the north of this center, on more than 500km there is no center practicing the endocular surgery.

Equipment

We had a mobile hospital of the company LAMBOO, certified company in the manufacture of mobile medical units, made available by a local NGO. We added some ophthalmic equipment. Thus, the material consisted of:

- an operating room with a sterilization unit;

- an operating room;
- an anesthesia room and a room with surgical trough;
- a complete consultation unit with a Topcon KR 800 autokerato-refractometer

The operating room had a Topcon OMS 90 operating microscope, and a Nidek All Scan (Ocular Ultrasound System with Biometric Probe and B-Mode Ultrasound Probe), which was installed in the anesthesia room. for biometrics. This allowed the calculation of implant and eliminated a possible organic pathology visible on the ultrasound mode B.

Patients

Given the extent of the ophthalmic desert in which we had settled and because of the free interventions, corresponding to a strong demand for surgery, white cataracts were preferred. All patients had preoperative visual acuity with light perception. Of the 400 operated patients, only 166 operated during the first week and followed for 6 weeks by the entire ophthalmic team were selected

Methods

The ophthalmic team consisted of 6 ophthalmic technicians (OST) and 2 ophthalmologists including a surgeon. The four OSIs selected patients; those who had a white cataract, were referred to the ophthalmologist for confirmation of the diagnosis, in order to eliminate contraindications to surgery before their scheduling for surgery. The surgical team consisted of two OSTs and an ophthalmologist. All patients were operated on the technique of manual small cataract surgery (CMCPI). The site of the incision was that of the most refractive axis; in the absence of astigmatism, a temporal incision was systematically performed.

Surgical technique

A 6.5 to 7.5 mm scleral tunnel is constructed through a straight scleral incision. A service incision was made in peripheral cornea at 30 ° to the right of the tunnel, to facilitate manipulation. A capsulotomy in wide rexcis (6 to 6.5mm) is performed after anterior capsule coloring with Tripan blue, and the nucleus dislocated in anterior chamber. The viscoelastic product is injected all around and below the nucleus. The latter is then expelled in whole or in part through the corneo-scleral tunnel. The residual cortex is extracted by manual irrigation-aspiration using a Simcoe-type cannula, and a 5.5 or 6 mm PMMA implant introduced into the capsular bag. The miosis is obtained at the end of the intervention thanks to the injection of pilocarpine in anterior chamber. An injection of solution by the service incision ensures the tightness of the tunnel. In the absence of sealing one or two stitches with monofilament 10-0 are laid. An injection of 10 mg in 1ml of cefuroxime is performed in the anterior chamber, before a dressing is applied to an ophthalmic corticosteroid ointment. Patients were reviewed on D1, D7, D15, D30 and D45 to assess the immediate postoperative outcomes in the medium and long term. The WHO criteria (Pararajasegaram, 2002) were used for the evaluation of functional results. Thus, the functional result is judged: good if the visual acuity is at least 0.3; mediocre if visual acuity is between 0.1 and 0.3 excluded; bad if the visual acuity is strictly less than 0.1. The analysis of the data was carried out with the software EPI INFO 7. The comparison tests used were those of Chi² with a 95% confidence limit.

The averages of the IOPs were compared by the Paired Student Sample Test performed with the Excel software analysis utility.

RESULTS

More women than men were our sample, with a sex ratio of 0.6 (Table 1).

Table 1. Distribution of patients by sex

Sex	Effective	%
Male	61	36.7
Female	105	63.3
Total	166	100

The mean age of the patients was 61.0 ± 15.3 years (range: 19-83 years). However, the average age of women was higher than that of men: 64.9 ± 10.2 years versus 57.8 ± 18.1 years, with no significant difference between the two sexes. On the other hand, there were almost as many right eyes as left eyes (Table 2).

Table 2. Distribution of patients by operated eye

Eye	Effective	%
Law	82	49.4
Left	84	50.6
Total	166	100

The average power of the implant was 21.88 ± 2.33 diopters (range: 5-27 diopters). That observed in women was close to 22.35 ± 1.93 diopters, compared with 21.08 ± 2.7 diopters in men ($p < 0.05$). In a 32 year old patient, the axial length was 30.5 mm, for a calculated implant of 5 diopters. His contralateral eye already operated with a standard implant was myopic of -15 diopters. Mean postoperative visual acuity without correction was 0.5 ± 0.25 (range: 0.05 -1): 0.47 ± 0.24 in women versus 0.54 ± 0.27 in men ($p>0.05$, Table 3).

Table 3. Distribution of patients according to visual acuity without correction (VAPO SC)

Variation of the VA PO SC	Effective	%
VA≤ 0,6	67	40.4
VA between 0.6 and 0.3 inclusive	72	43.4
VA between 0.3 and 0.1	12	7.2
VA≥ 0.6	15	9.0
Total	166	100

Abbreviation: VA, visual acuity

Mean postoperative visual acuity with the best correction was 0.72 ± 0.25 (range 0.05 - 1): 0.69 ± 0.25 for women versus 0.77 ± 0,25 in men ($p>0,05$). In addition, 73.7% of patients had good AVPO SC, 40.3% of whom had visual acuity greater than or equal to 0.6 (Table 4). With the best correction, 78.31% of subjects had an VAPO AC greater than or equal to 0.6.

Table 4. Distribution of patients by postoperative visual acuity with correction (VAPO AC)

Variation of the VA PO AC	Effective	%
VA ≥ 0,6	130	78.3**
VA between 0.6 and 0.3 inclusive	21	12.7
VA between 0.3 and 0.1	9	5.4
VA≥ 0,6	6	3.6
Total	166	100

Abbreviation: VA, visual acuity; **, $p<0.05$

DISCUSSION

Of the 166 patients retained, 36.75% were men versus 63.25% women, which is a ratio of 0.6 to 0.6%. Djiguimda (2007) found 50.38% of women, Guirou (2013) 51.9% of women. In exchange, Isawumi (2009) in Nigeria found 60.1% of men versus 39.9% of women for a sex ratio of 1.5. The prevalence of men or women varies among studies, however, there is no predictive effect of cataract surgery taking gender into account (1998). The average age was 61.04 ± 15.35 with extremes of 19 to 83 years. The average age was higher in women at 64.92 ± 10.25 years with extremes of 42 to 83 years, while it was 57.76 ± 18.09 with extremes of 19 to 77 years at men's. Djiguimdé (2015) found an average age of 62.47 years with extremes of 14 to 98 years. Isawumi (2009) also had a mean age of 62.2 years. We had to operate almost as many right eyes as left eyes with 49.40% of the right eyes versus 50.60% of the left eyes. The choice of the operation concerned the most affected eye, if it was not possible to determine it clinically, then the patient was left to the designer himself according to his gene. Some authors in cases of bilateral involvement preferentially selected the right eye, and found a predominance of the right eye in their samples (Djiguimdé *et al*., 2015).

The average power of the implant was 22 diopters with extremes of 5 and 27 diopters. This average power was 22.5 in women against 21 in men. Djiguimdé (2015) found an average power of 23.11 with extremes of 11 to 28 diopters. Like us, her average implant power was higher in women with 23.63 diopters than in men with 22.59 diopters. The average postoperative visual acuity without correction was 0.5 ranging from 0.05 to 1. This average postoperative visual acuity was higher in men at 0.54, compared to 0.47 in women, but this difference was was not statistically significant. With the best correction, this visual acuity was 0.72 with an average of 0.77 in men versus 0.69 in women. At six weeks postoperatively, 84% of patients had a good postoperative result without correction, ie, visual acuity greater than or equal to 0.3. With the best correction, 91% of patients had visual acuity greater than 0.3. These results are within the range of WHO recommendations recommending 80% of results greater than 0.3 without correction and 90% of results above 0.3 with the best correction (Pararajasegaram, 2002). In the context of advanced strategies, our results are close to those found by Djiguimdé (2015) who worked almost under the same conditions as us, with 57.7% of patients with visual acuity greater than 0.3 without correction and 79,6 at the pinhole. The review of the literature on the CMCPI allowed us to find the following results:

Venkatesh (2005), 82% of eyes with visual acuity greater than 0.3 without correction and 98.2% with the best correction. Gogate (2005), 71.1% of patients without correction at 6 weeks and 98.4% with the best correction. Ruit (2007) recorded 89% of patients without correction and 98% with correction. As for Guirou (2013.) in Mali, he found 45.5% of patients with a visual acuity greater than 0.3 without correction and 63% with a pinhole. For all surgical techniques combined, it can be seen that 75.3% of CMCPI patients had corrected visual acuity greater than 0.3. And this rate could still be improved if one excluded patients operated by ophthalmology students, who had poorer results. Norregaard (1998.) in 1998, analyzing results in developed countries, found in the United States 95.6% of patients with visual acuity greater than 0.3; in Canada, this rate was 91.3%, compared to 88.8% of patients in Denmark. Barcelona had 82% of patients with visual acuity greater than 0.3. At that time, approximately 32.7% of patients were operated by extra capsular extraction in the United States and 97.5% in Barcelona. Since then, surgical techniques have evolved considerably in these countries (2011). The CMCPP gives better results than the EIC or EEC with or without implant. These results are close to phacoemulsification, but with greater postoperative astigmatism. But the CMCPP is faster and costs at least half as much, less technology and fewer complications (Gogate *et al*., 2015; Venkatesh *et al*., 2010). As a result, the results of these operations with several mixed surgical techniques are less important (Harba *et al*., 2017; Guirou *et al*., 2013; Isawumi *et al*., 2009; Dandona *et al*., 1999). In addition, the fact of operating large numbers of patients has no impact on the result (Venkatesh *et al*., 2005). Poor results are related to refractive errors, surgery or patient selection (Harba *et al*., 2017; Guirou *et al*., 2013; Dandona *et al*., 1999). Finally, the particular case of our patient with 5 dioptres of implant power, illustrates through the standard implants and reminds the need to make an implant calculation.

Conclusion

The mobile strategy of cataract surgery is still relevant in our countries, which still have large ophthalmic deserts. These results seem better by the CMCPI compared to the old techniques. This technique meets WHO targets, including achieving a recommended coverage rate while maintaining quality postoperative outcomes.

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