

Surgical management of primary exotropia in Cameroon

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Aim: To assess the results of surgery of primary exotropia in Cameroon.

Patients and Methods: This is a retrospective study of all patients operated for primary exotropia in the Reference Hospital, Douala-Cameroon, between January 1992 and December 2005. Each case was operated once. The preoperative squint angle was measured the previous evening to surgery and the postoperative angle one year after surgery. The result was considered good when the postoperative angle was less than 10 prismatic dioptries (PD < 10).

Results: 61.3% of the 41 patients operated had good results. The average age of patients at the time of surgery was 18.7 years $\pm$ 11.2. 80% of the patients had bilateral recession of the lateral recti and resection of the medial rectus of the more squinting eye under general anesthesia. The average preoperative angle of deviation was 44 $\pm$ 9.5 PD and the average postoperative angle was 7.4 $\pm$ 6.6 PD. None of the following factors affected the postoperative result: age at which squint manifested, preoperative angle, age at surgery, surgical technique, presence of amblyopia and whether the squint was intermittent or constant.

Conclusion: Our results are encouraging and reinforce our plea for the training of more ophthalmologists and the equipment of more hospitals for squint surgery.

Keywords: exotropia, surgical treatment, postoperative angle

Introduction

Strabismus is an ophthalmic syndrome characterized by a deviation of the visual axis of one eye relative to the other. It may be constant or intermittent, concomitant or not, with primary or secondary sensory changes due to the deviation. In Black Africa, strabismus is poorly understood and seen by most people as a calamity. Due to ignorance and the lack of equipped centers, the bulk of patients remain untreated and the few who are treated do so very late. Furthermore, traditional beliefs, customs, cultural and socioeconomic barriers hamper the acceptance of surgical treatment by patients (Ndongo 2006). Indeed, two strabismic patients out of three come to consultation for another ocular disease (Ebana et al 1996). In Cameroon, we have one strabismologist and 50 ophthalmologists for 20 millions inhabitants. That means 1 ophthalmologist for 400,000 inhabitants. In fact, 4 out of 5 ophthalmologists are in the 2 main towns (Yaoundé and Douala) and it is not easy for rural population to reach an eye care center.

In the West, divergent squint is known to be rare and causes less amblyopia as compared with convergent squint (Quéré 1993). In colored people, it is the more frequent, as confirmed in studies by Von Noorden (1980), Doutetien et al (1993), Ebana et al (1996, 2005). In a Cameroonian study of 147 consecutive cases of exotropia, Ebana et al (1999) found various degrees of amblyopia in 59.5% of the cases. This confirms that without treatment divergent squint can lead to amblyopia.

In our particular context, we ought therefore to pay special attention to divergent squint. This is why we undertook to evaluate the results of surgical treatment of primary

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exotropia in the Reference Hospital, Douala, Cameroon, which is for now the only centre in Cameroon that provides for the management of squint.

Material and methods

This is a retrospective study conducted in the Department of Ophthalmology in the Reference Hospital, Douala. The study involved all cases of primary exotropia operated within the period January 1992 to December 2005. All patients underwent one single operation. They all had a complete ophthalmic and squint assessment. None had a past history of ophthalmic surgery and all were operated by the same surgeon. We excluded any patient with a retraction syndrome, nystagmus, or a significant alphabetic syndrome defined here as any deviation above 10 prismatic dioptries (PD) for an 'A' syndrome and more than 15 PD for a 'V' syndrome between up-gaze and down-gaze. Also excluded was any patient with evidence of intra-ocular disease or neurological involvement.

We analysed the following parameters: sex, age at onset of squint, age at the time of surgery, corrected preoperative visual acuity (decimal scale), preoperative amblyopia (difference of 2/10 or more between the two eyes), preoperative angle of squint measured on the eve prior to surgery, the postoperative angle measured one year after the operation, and the operative technique.

The study of the preoperative refraction was done by skiascopy after Atropine cycloplegia (1 drop morning and evening for 7days) for patients below 5 years of age; Cyclopentolate 0.5% alternating with Tropicamide: 1 drop into each eye every 5 mins for 25 mins for older patients.

The angle of deviation for far vision and for near vision was measured with a Berens prism bar. All measurements were done with and without correction. All patients operated were more than 3 years old.

The following surgical techniques were employed under general anesthesia:

1. Lateral rectus recession and medial rectus resection on one eye.
2. Combined lateral rectus recession in both eyes.
3. For large angle strabismus, combined lateral rectus recession in both eyes and medial rectus resection in the more squinting eye was done.

Lateral rectus recession varied from 7 to 9 mm, and medial rectus resection was between 7 to 8 mm.

In all cases, the sign of anesthesia and muscle elongation were done. These tests enabled proper adjustment of the degree of recession and resection in each eye.

The postoperative results were classified into 3 categories:

1. Residual exotropia: postoperative angle ≥ 10 PD
2. Good operative results: -consecutive esotropia < 10 PD
-orthophoria
-exotropia < 10 PD
3. Consecutive esotropia: ≥ 10 PD

All analyses were done on Microsoft Office Excel 2003 (Microsoft, Redmond, WA). We used the Chi-squared test for frequency comparison, the Yates corrected Chi-squared test for small samples, and Student's test for average comparison. Results were statistically significant if $p < 0.05$.

Results

During the period of study we recorded 232 cases of exotropia, of which 154 were primary and 41 underwent surgery. They were 21 men (51.2%) and 20 women (48.8%). The average visual acuity was 0.7 ± 3.7 . There were 9 cases of amblyopia (22%). The average age of appearance of squint was 3.1 years ± 4.2 . There were 4 cases of myopia, 14 cases of hypermetropia, 10 cases of hypermetropic astigmatism, 10 cases of myopic astigmatism and 3 cases of mixed astigmatism.

The preoperative angle was ≤ 30 PD in 4 patients (9.8%), above 30 PD and below 50 PD in 22 patients (53.6%), and ≥ 50 PD in 15 patients (36.6%). The average preoperative angle was 44 ± 9.5 PD. The squint was constant in 35 patients (85.3%) and intermittent in 6 (14.7%).

The average age at operation was 18.7 years ± 11.2 . Technique no.1 was applied in one case (2.4%), technique no.2 in 7 cases (17.1%), and technique no.3 in 33 cases (80.5%). We obtained 28 good results (68.3%) and 13 postoperative exotropias equal or above 10 PD (31.7%). The average residual exotropia was 15.1 ± 3.9 PD. We had no cases of postoperative esotropia.

The average postoperative angle was 7.4 ± 6.6 PD. Table 1 shows the post operative results as per technique. The difference between the results of the various techniques was not statistically significant ($p = 0.235$). We obtained good results in 7 of the 9 patients presenting with preoperative

Table 1 Results of surgery as per technique

	Technique No. 1	Technique No. 2	Technique No. 3	Total
Good results	1	3	24	28
Exotropia ≥ 10 PD	0	4	9	13
Total	1	7	33	41

Note: Technique No. 1: Lateral rectus recession and medial rectus resection on one eye. Technique No. 2: Combined lateral rectus recession in both eyes. Technique No. 3: Combined lateral rectus recession in both eyes and medial rectus resection in the more squinting eye.

amblyopia, 25 of the 35 cases with constant exotropia (71.4%), and 3 of the 6 cases of intermittent squint (50%). Nevertheless, the difference between the two was not statistically significant ($p = 0.296$). We studied surgical outcome relative to the degree of ametropia (Table 2) and the preoperative angle (Table 3). The type of ametropia ($p = 0.973$) as well as the preoperative angle ($p = 0.297$) did not influence the postoperative result.

Discussion

We operated on 41 patients representing 26.6% of our population of primary exotropia. There was a poor correlation between potential patients for operation and those operated. This is due to the lack of sufficiently specialized centers on one hand and other factors like poverty, lack of social security, fear and ignorance on the other hand. In reality, the only centre for the management of strabismus is located very far away from the majority of patients.

People hardly accept surgery in children, more so when it concerns the eyes. This is why the average age at operation in our series is very high, 18.7 years. Moreover, the time lapse between diagnosis and surgery is very important and can aggravate the amplitude of the strabismus angle. In effect, patients who have witnessed operated cases are more motivated for surgery. This peculiarity on the management of strabismus locally had been highlighted by Ndongo (2006). However, according to Koo et al (2006) and Aslanis et al (2006), the age at operation of squint does not influence the postoperative result. The optimum age for surgery is when the child is able to undergo orthoptic assessment and/or when the functional and cosmetic symptoms become evident (Richard and Parks 1993; Keenan and Wilshaw 1994; Stoller et al 1994).

We obtained 68.3% satisfactory results, not far from what has been reported in the literature: Aslanis et al (2006) reported 69% success; Livir-Rallatos et al (2002) obtained 71%; Schwartz and Calhoun (1980) reported 77% and Stoller et al (1994) had 58% success.

With regards to the choice of operative technique, most authors prefer bilateral lateral rectus recession to all other

Table 3 Results of surgery in relation to preoperative angle

Preoperative angle in PD	Good results	Exotropia ≥ 10 PD	Total
≤ 30	3	1	4
$30 < \text{angle} < 50$	17	5	22
≥ 50	8	7	15
Total	28	13	41

methods. This allows them the possibility to improve on the results at a second operation (Schwartz and Calhoun 1980; Stoller et al 1994; Livir-Rallatos et al 2002). Like Aslanis et al (2006) we did not find any statistically significant difference between the various techniques ($p = 0.235$). In our circumstances where surgery is hardly accepted, it is wise to do a maximum correction at once because the patient is unlikely to accept a second operation. Even when the residual deviation is quite significant, the patient finds he or she is aesthetically much better and finds a second operation unnecessary. Especially as they are less mocked and better accepted by their entourage. The average residual exotropia in our series was 15.1 PD. Burke (1995) found that, within a consecutive esotropia of 16 PD and a residual exotropia of 20 PD, patients demonstrated excellent psychosocial results.

Exotropia of large magnitude are more common in our area. Indeed, our average preoperative angle was $44 \text{ PD} \pm 9.5$. This suggests that aesthetics is one of the principal motivating factors for accepting surgery. But in our series, like that of Aslanis et al (2006), the operative results were not affected by this factor (Table 3). Also, the age of appearance of squint and the presence of amblyopia had no influence on our results. This is observed also by Koo et al (2006). For some authors, intermittent exotropias have the best operative outcome (Richard and Parks 1993; Stoller et al 1994) whereas for others, there are no differences in the postoperative results of intermittent and constant exotropia (Aslanis et al 2006; Wu et al 2006). Similar to the later, we did not also find any differences in the surgical results in our series ($p = 0.296$). However, we cannot draw definitive conclusions on these different parameters because of the small size of our sample.

Conclusion

Despite the obstacles in the surgical management of strabismus in our milieu, our results were satisfactory and encouraging. In effect, we obtained an average post operative angle of 7.4 PD from an average preoperative angle of 44 PD. The patients thus get significant aesthetic improvement and

Table 2 Results of surgery in relation to ametropia

Ametropia	Good results	Exotropia ≤ 10 PD	Total
Myopia	3	1	4
Hypermetropia	10	4	14
Hypermetropic astigmatism	7	3	10
Myopic astigmatism	6	4	10
Mixed astigmatism	2	1	3
Total	28	13	41

satisfied with this, they are unwilling to undergo a second operation.

We hope that this work will strengthen our plea for the training of more ophthalmologists as well as equipping of our hospitals for better strabismus management. Meanwhile, we should intensify our mass education to let the population understand the crucial role of everyone in the screening and treatment of this illness. By so doing we hope to improve the management of strabismus in our country.

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