

Pediatric cataract surgery in Madagascar

HCL Randrianotahina, HE Nkumbe¹

Salfa Eye Clinic Fianarantsoa, Fianarantsoa, ¹Salfa Eye Project Antananarivo, Antananarivo, Madagascar

Abstract

Background: Cataract is the main cause of blindness among children in Africa, having replaced vitamin A deficiency and measles. The management of childhood cataract in Africa, especially francophone countries, is inadequate.

Aims and Objective: The objective is to study the age at presentation of children diagnosed with cataract, their visual outcomes, and follow-up patterns after surgery in Madagascar.

Materials and Methods: This was a retrospective case series of children operated on for cataract in one of the busiest eye hospitals in Madagascar between September 1999 and July 2009. Data were obtained from theater logs and patient case notes and entered in a Microsoft Excel spreadsheet. Data entry was carried out using Microsoft Excel and analysis using Intercooled Stata version 9.0. Student *t*-test and Pearson's Chi-square were used to test associations where appropriate.

Results: A total of 60.5 percent of the 86 children operated on during the study period were boys. The mean age at presentation was 6.9 years (\pm SD 4.3) for congenital cataract, 13.1 years (\pm SD 2.9) for developmental cataract and 9.4 years (\pm SD 4.0) for traumatic cataract. A total of 36 children (41.9%) came back for follow-up, while 72 children (83.7%) were lost to follow-up 5 weeks after surgery. The mean follow-up period was 5 weeks (\pm SD 17.9). Children, who were brought back for follow-up were younger than those who were not. Although 64 (74.4%) of children had refraction during their encounters with the eye care facility, only 3 (3.5%) were provided with glasses. At last documented follow-up, 2.7% of the children had 6/18 vision or better.

Conclusions: In Madagascar, presentation for congenital and developmental cataract is very late, visual outcome poor and follow-up inadequate. There is an urgent need for a childhood blindness program to effectively deal with pediatric cataract, an avoidable cause of blindness and visual disability in children on the island nation.

Key words: Amblyopia, childhood blindness program, childhood cataract, Madagascar

Date of Acceptance: 28-Mar-2013

Introduction

World-wide, the number of children who are blind is estimated to be 1.4 million, 190,000 of them from cataract.^[1] Cataract is also the main cause of blindness among children in Africa, having replaced vitamin A deficiency and measles.^[2,3]

Cataract in children can be classified as congenital, developmental or traumatic.

Congenital cataract presents either from birth or shortly thereafter, while developmental cataract usually refers to cataract that appears after the age of two.^[4]

Surgery is currently the only known treatment for visually significant cataract. In order to optimize a child's chances of recovery of visual potential, two conditions need to be met. First, surgery has to be undertaken as soon as possible after detection of cataract, to reduce the risk of amblyopia. This is especially true for congenital cataract, younger children, and unilateral cataracts. Secondly, following surgery, there is a need for regular follow-up, in some cases throughout the child's life, to correct the residual refractive error, provide low vision services if

Address for correspondence:

Dr. Henry Ebong Nkumbe,
Africa Eye Foundation, P.O. Box 3774, Yaoundé, Cameroon.
E-mail: hnkumbe@yahoo.fr

Access this article online

Quick Response Code:



Website: www.njcponline.com

DOI: 10.4103/1119-3077.122824

PMID: *****

needed as well as detect and manage any post-operative complications.^[2,5-7]

Madagascar is one of 26 countries identified by VISION 2020 as needing support to ensure implementation of national VISION 2020 plans.^[8] Although no survey on childhood blindness has ever been conducted in Madagascar, we believe that based on current estimates,^[9] and a total population estimated at 21.3 million,^[10] there are approximately 2,000 children blind from childhood cataract on the island. Furthermore, based on a conservative estimate of 30 incident blind children per million population per year due to non-traumatic cataract^[9] and a total population estimated at 21.3 million,^[10] there should be more than 600 new cases of non-traumatic (congenital and developmental) childhood cataract in Madagascar each year.

In this study, we sought to review the age at which children present for various types of cataract, visual outcome and follow-up patterns after successful cataract surgery, as well as associated factors such as gender, age of children at presentation and distance from eye hospital. The public health aspects of this work have previously been reported on.^[11]

Materials and Methods

This was a retrospective case series of all children aged 15 years and below, who received cataract surgery at one of the busiest eye clinics in Madagascar between September 1999 and July 2009. The eye clinic also runs a very good community eye care program.

A list of all children, who had been operated on for cataract during the study period, was obtained from the theater logs and their medical records were retrieved. The following data were extracted from the medical records: Medical records number, age, sex, diagnosis, time between detection of the problem with the eye of the child and consultation at the eye hospital, date of surgery, insertion of intra ocular lens, visual acuity before and after surgery, last recorded date of follow-up, number of follow-up visits recorded in the medical records, refraction and prescription of spectacles.

Data entry was carried out using Microsoft Excel while analysis was carried out using Intercooled Stata version 9.0. Student *t*-test and Pearson's Chi-square were used to test associations where appropriate.

Results

Eighty six children (114 eyes) were operated on during the 10 year period under review, 52 (60.5%) of them boys. The age and sex distribution is summarized in Table 1 below. Twenty nine (33.7%) of the children had bilateral

cataracts. The diagnosis was congenital cataract in 53.5%, traumatic cataract in 25.6%, developmental cataract in 8.1% and uveitis in 5.8% of the children. The diagnosis was not available in the medical records for 7% of the children.

An intra-ocular lens was inserted in 95 (83.3%) of the 114 eyes operated on in the study, representing 70 (81.4%) of the 86 children operated on. Surgical technique was extra-capsular cataract extraction.

Data were available for three children on the time it took the family to bring them to the eye hospital after they had noticed that there was something wrong with the child's eye. This was 1 month, 3 months and 1 year respectively.

The mean age at presentation was 6.9 years (\pm SD 4.3) for congenital cataract, 13.1 years (\pm SD 2.9) for developmental cataract and 9.4 years (\pm SD 4.0) for traumatic cataract. No gender differences were observed for any type of cataract.

Table 2 below shows the follow-up pattern of the children. The mean number of follow-up visits per child was 2.4 (\pm SD 1.6). The mean follow-up period per child was 5.0 weeks (\pm SD 17.9), while 72 children (83.7%) were lost to follow-up 5 weeks after surgery.

Children brought back for follow-up were younger (mean age 6.8 years, \pm SD 4.7) than children, who were not brought back (mean age 9.4 years, \pm SD 3.9). The difference was statistically significant ($P = 0.0075$).

Table 3 shows the visual acuity of eyes before and after surgery. Although 64 (74.4%) of children had a refraction during their encounters with the eye care facility, only 3 (3.5%) were provided with glasses.

Table 1: Age and sex distribution of children

Sex	Number of children	Age (years) Mean \pm SD
Male	52	8.6 \pm 4.3
Female	34	7.9 \pm 4.5
Total	86	8.3 \pm 4.4

Table 2: Follow-up pattern for pediatric cataract surgery

Number of follow-up visits	Number of children	Percent
0	50	58.1
1	11	12.8
2	13	15.1
3	7	8.1
4	1	1.2
5	2	2.3
6	0	0
7	2	2.3
Total	86	100

Table 3: Visual acuity improvement after surgery

Visual acuity	Before surgery		After surgery (as at last documented follow-up)	
	Number of children	%	Number of children	%
6/18 or better	0	0	3	2.7
6/24-3/60	8	7.0	42	37.2
Worse than 3/60	88	77.2	13	11.5
Unknown	18	15.8	55	48.7
Total	114	100	113	100

Discussion

Congenital cataract is either present at birth or develops during the first two years of life. A mean age at presentation of 6.9 years therefore suggests very late presentation. It is also likely that children with developmental cataract, which is cataract presenting after the age of 2, also presented late given the mean age at presentation of 13.1 years. Possible reasons for these late presentations are lack of awareness that cataract in children should be treated early as well as living long distances from the eye care facility, high-cost of public transportation and poverty.^[2,4,12] The younger age at presentation for congenital cataract, compared to developmental cataract is likely to be due to the fact that children with the congenital cataract would generally be younger than children with the developmental cataract anyway. At the same time, this could also be explained by the fact that congenital cataract, especially if bilateral, would result in more profound visual disability than developmental cataract and has a more rapid onset.^[13] The latter observation may also explain why younger children were more likely to be brought back for follow-up than older ones, especially given the likelihood of persistent amblyopia despite surgery.

Although data on the duration of cataract prior to consulting with the eye care facility was only available for 3 children, the data obtained from them corroborates the hypothesis of late presentation, since one of children with the congenital cataract presented 1 year after the family realized that there was something wrong with his eyes.

Lack of data in the medical notes suggests inadequate history taking and poor documentation during the period under review. This has been drawn to the attention of the clinic senior management and is being addressed. One of the solutions has been the introduction of an electronic medical records system in 2011.^[14]

Only 41.9% of children came back for follow-up, averaging 2.4 visits per child. Both figures are very small and are probably due to the fact that the hospital does not have a special childhood blindness program. Such programs, where they exist have been known to improve follow-up rates.^[15]

Although three quarters of the children had one or more refractions, only 3.5% were provided with glasses, according to the medical records. Following surgery, 2.7% of operated eyes had 6/18 vision and better, while 49.9% had 3/60 or better. Before surgery, none of the eyes had 6/18 vision or better, while 7% had 3/60 vision or better. Postoperative visual outcome was less favorable than was observed in Kenya.^[2] Possible explanations are the late presentation for surgery, lack of glasses to correct residual refractive error, lack of low vision services at the hospital during the study period and poor follow-up to detect and promptly manage post-operative complications.^[2]

Childhood cataract surgery is technically more challenging than adult cataract surgery. Yet, the hospital had an ophthalmologist trained in the surgery of childhood cataract during 2 of the 10 years under review. This, coupled with lack of adequate technology for childhood cataract surgery could also have contributed to the poor outcome observed.

Our study limitations include incomplete data in the medical records, surgeons with the different skill levels operating on the children and non-standardized surgical techniques. All these are inherent to the retrospective nature of the study. However, this being one of the busiest eye clinics in Madagascar and the only one providing pediatric cataract surgical services for about 30% of the country, it gives a good best case scenario of the management of pediatric cataract in Madagascar during the period under review.

This study suggests that children with cataract in Madagascar present very late for surgery, visual outcome is not satisfactory and follow-up after surgery is inadequate. It underscores the need for a childhood blindness program which will identify and address the barriers to childhood cataract surgical services in Madagascar.^[12] Evidence from East Africa suggests that such a program, which includes elements of a properly trained and equipped team, early detection of children with cataract in the community, counseling services, reimbursement of transportation, free cataract surgery, refractive, and low vision services can effectively deal with cataract as a cause of childhood blindness.^[2,4,15]

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How to cite this article: Randrianotahina H, Nkumbe HE. Pediatric cataract surgery in Madagascar. *Niger J Clin Pract* 2014;17:14-7.
Source of Support: Nil, **Conflict of Interest:** None declared.

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