

Surgical results of intermittent exotropia

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Abstract: Intermittent exotropia is disease of outward deviation of the eye. The choice of treatment is surgery. In this study, we check the factors affecting the outcome of the surgical procedure and compare the results with and without the use of adjustable sutures in surgery periodically. In this cross-sectional study, which analyze a nonrandomized convenient record of 238 patients who underwent surgery between 2006 to 2012 in Rasoul-Akram hospital. Follow up was two times, first one day after operation and next in the last visit. At each follow-up examination, strabismus and size of the deviation was determined. At the first follow up a significant correlation was found between the success rate of surgery and type of the sutures used, also at the last follow up visit significant difference found between the success rate of surgeries by adjustable and non-adjustable sutures. According to the results obtained in this study, surgical success was independent of the age. The study also showed that the success rate of the operation is independent of the type of surgical techniques. However, the success rate of the surgery and the correction of strabismus in patients who had surgery with adjustable sutures were significantly greater than in patients that operated with non-adjustable sutures.

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1. Introduction

Crossed eyes or strabismus is defined as any deviation of the eyes from the correct order. Strabismus occurs in 4% of children, and the signs of this disease don't relieve spontaneously. Exotropia is determined as outward deviation of the eye. Intermittent exotropia is a subtype of exotropia in which, the severity of disease alternates between constant exotropia and exophoria. Onset of the disease is approximately between ages 1 to 4 years. Unlike other types of strabismus, patients with intermittent exotropia can live long periods with normal vision(Wei, 2011). Intermittent exotropia can cause headaches, blurred vision, double vision and reading problems(Shanker, 2012). A prevalence of approximately 32 cases per 100,000 persons that aged less than 19 years is estimated (Mohny, 2007). Surgical treatment of intermittent exotropia prevents from disease conversion to constant exotropia , and also improves visual acuity (Adams, 2008). Surgical treatment can results in complete remission of the

disease (Saunders and Trivedi, 2008), but bad timing of the treatment can cause some problems(Pratt-Johnson, 1977; Abroms, 2001; Asjes-Tydemans and Groenwoud, 2007; Koklanis and Georgievski, 2009; Richard and Parks, 1983). Surgical procedure should only be done in patients that just suffering from an eye disease (Yamada, 2012).The surgery improves long-term signs and stables the external bilateral rectus muscles too (Pérez-López, 2011). Results of a study which evaluates the outcome of surgery with two different technique after 2 years, indicates that there is no difference between bilateral lateral rectus recess and unilateral resect and recess procedure (Choi, 2012). Strabismus angle varies after surgery, the angle get higher, but there isn't any fixed interval for these changes. However, in patients aged 5 years and older, in one year follow up after the operation, we do not see a significant change in the angle of strabismus(Kwon, 2012). A study in 2012 stated that 35% of patients underwent surgery for exotropia, showed both motor and sensory improvement, Good

results were seen in 28% of cases and 37% of patients had poor results. In this study, the success rate of the surgery at a longer follow up time are increased to 65%(Buck, 2012). Another study showed Intermittent exotropia surgery can cure all symptoms (Shanker, 2012). However, another study in 2011 showed that the result of this surgery is unpredictable (Pineles, 2011). Another study which aimed to examine the possibility of the disease reversal, concluded that after two years the disease may recur by a very little chance, but in long-term this chance isn't defined for us yet (Choi, 2011). According to the high prevalence of the disease, side effects and controversial results, we aimed to investigate the factors that influence surgical outcomes and compare the results of surgeries with and without the use of adjustable sutures.

2. Material and Methods

In this cross-sectional study, we reviewed medical records of 238 patients with exotropia who underwent surgery between 2006 to 2012 in Rasoul-Akram hospital, retrospectively. Patients information and ophthalmic examination notes were evaluated and useful data such as age, disease duration and preoperative ocular examination findings one day before surgery(which included visual acuity, refraction, deviation pattern, Prism test, cover uncover test and Hirschberg Chrisman test) were recorded. surgeries were performed with various techniques (R & R, bilateral rectus muscle surgery, three muscle surgery, vertical muscle surgery, oblique muscle surgery) these techniques were classified as two groups, first group were the patients that the surgery was done with adjustable suture technique and the second group who non-adjustable sutures technique were used. Patient's follow up examinations were performed in two periods: first one day after operation and second at the last visit. At each follow-up we examined the patients' strabismus problems and also the angle of deviations. In this study we consider success in the surgery when the residual postoperative deviation was less than 10 diopters. Check list for each file was completed based on information contained in the document. Statistical analysis of the data was performed using SPSS 19 software. In statistical analysis of data we used chi-square test and paired T-test. This study was approved by the ethics committee of Iran University of Medical Sciences. Patient information between researchers will remain reserved.

3. Results

238 patients included in this study, 116 women (48.7%) and 122 men (51.3%) with Mean age of 19.43 ± 11.8 . Minimum age of patients was 6 months

and maximum age was 62 years. Surgery performed in 5 groups: 84 patients (35.3%) underwent bilateral rectus muscle recession, in 85 patients (35.7%). Medial rectus resection and lateral rectus recession in one eye were done, 39 patients (16.4%) underwent 3 horizontal muscle surgeries, in 19 patients (8%) vertical muscles surgery and in 11 patients (4.6%) oblique muscles surgery were performed.

Outward deviation in 15 patients (6.3%) were A pattern, in 68 patients (28.6%) V pattern and 155 (65.1%) had no pattern. Of all surgeries were performed, 135 patients (56.7%) had surgery with adjustable sutures and 103 patients (43.3%) had surgeries with non-adjustable sutures. There was not any significant relation between the age of the patients and the success rate in this study($p=0.233$).

At the first follow up visit, which was performed one day after surgery, 117 (88%) surgeries of adjustable sutures and 74(75.5%) surgeries of non-adjustable sutures were seen to be successful. A significant correlation was found between the success rate of surgery and type of sutures used ($p=0.013$). There wasn't significant difference in success rate among five different surgical techniques were used ($p=0.955$).

At the last follow up, which was the last time that patient visited us, 84.4% of patients who had been operated by an adjustable suture, had successful surgery, and 63.3% of patients with non-adjustable suture surgery had successful surgery, so significant difference between the success rate of these two groups were found($p=0.0001$). There wasn't significant difference between the success rate of the various techniques at last follow up visit too ($p=0.902$).

4. Discussions

In a study which done on 511 patients to evaluate factors influencing the success rate of the surgery reported that the possibility of the regression in bilateral lateral rectus surgery, increases when the age of the patient increase. The study was analyzed using logistic regression($p<0.05$) (Lim, 2012). In another retrospective study on 89 cases, that it's purpose was to measure the angle of strabismus in patients one to five years after surgery, showed that patients with more than 5 years old, who are undergoing surgery, had not significant possibility in returning the strabismus within 1 year. However, in other ages reported this returning, but not in fixed time intervals(Kwon, 2012). The results of the present study noted surgical success, independent of the patient's age.

In a case report in 2012 a patient who had been suffering from intermittent exotropia from a long time ago, the surgery to correct bilateral eye spasm

were done and the signs of patient had fully recovered (Shanker, 2012). In a study that evaluate the association between surgical success and surgical factors preoperatively in patients with intermittent exotropia, 87 children under the age of 11 years were enrolled. 35% had good results, 28% fairly good results and 37% poor results at the first follow up after operation. In the final survey, 65% of patients had good results and 20% had no change in results. This study represents that the type of surgery and operative conditions have no impact on operating results (Buck, 2012). In another study, the surgery's positive effect on improving symptoms was confirmed (Pineles, 2011). In a study that is about comparison between bilateral external rectus surgery and lateral rectus surgery, they concluded there isn't significant difference between techniques of surgery (Choi, 2012). In the present study it was shown that the success of the operation is independent of the type of surgical technique. However, the success rate of the surgery and the rate of the strabismus correction were significantly greater in patients who had surgery with adjustable sutures compared to non-adjustable sutures. Findings in the first visit just one day after the surgery and last follow up visit had similar results.

In a study performed on 81 patients, that involved non-randomized conveniently, the possibility of disease returning was examined. The possibility of returning was not specified (Choi, 2011). Retrospective review of surgical results in 18 patients with intermittent exotropia who had undergone surgery of bilateral lateral rectus recess showed that at long-term patients are faced with the problem of returning symptoms (Pérez-López, 2011). As the presenting study was also obtained conflicting results, we suggest investigating the symptoms of recurrence after surgery in long term follow up (over 2 years).

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