

## ORIGINAL ARTICLE

## ISOLATED INFERIOR OBLIQUE MYECTOMY FOR HYPERTROPIA

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**Background:** Hypertropia is a condition in which one eye is elevated relative to the other, either intermittently or constantly. It causes significant problem either cosmetically or by abnormal head posture and thus needs to be corrected surgically. This study was conducted to evaluate the success rate and complications of isolated inferior oblique myectomy in patients with hypertropia. **Methods:** Patients having hypertropia (Deviation  $>6$  prism diopters [PD]) associated with inferior oblique over-action were included in this observational Case-series, conducted from July 2011 to December 2012, at Al Ibrahim eye Hospital, Karachi. Patients underwent unilateral inferior oblique myectomy. Final outcome was considered at the end of three months at which achievement of  $\leq 2$  PD of hypertropia was considered as a success. **Results:** During the study period, 58 patients were included. Hypertropia was most commonly associated with exotropias 23 (39.7%) followed by esotropias in 18 (31%). Mean angle of hypertropia was reduced from  $13.55 \pm 4.43$  prism diopters to  $0.48 \pm 1.08$  prism diopters. Out of 58 patients, 55 (94.8%) had achieved success after surgery while only 3 (5.2%) patients had residual hypertropia of greater than 2 prism diopters ( $p=0.001$ ). No direct complications of procedure observed intra-operatively or up to 3 months post operatively but significant overcorrection of residual horizontal deviation observed after horizontal squint surgery in these eyes. **Conclusion:** Isolated inferior oblique myectomy is highly successful and safe surgical procedure for correction of hypertropia.

**Keywords:** Hypertropia, Inferior oblique myectomy, outcome

J Ayub Med Coll Abbottabad 2014;26(2):134-6

## INTRODUCTION

When one eye is elevated relative to the other, either intermittently or constantly, is termed as Hypertropia. Hypertropia is much less common than horizontal deviations, but even then, it can cause significant problem either cosmetically or by abnormal head posture and thus needs to be corrected surgically. In one study, the incidence of hypertropia in patients younger than 19 years of age was reported to be 12.9 per 100 000 patients.<sup>1</sup> This study also reported the prevalence of hypertropia to be approximately 0.26%,<sup>1</sup> it can also be stated as 1 in 391, of all patients younger than 19 years of age had hypertropia. Hypertropia can be due to either post traumatic or congenital 4<sup>th</sup> cranial nerve palsy,<sup>2,3</sup> idiopathic superior oblique palsy, concomitant with exotropia<sup>4</sup> or concomitant with esotropia and isolated inferior oblique over action. Correction of hypertropia surgically, will help patients' achieve binocularity and prevents diplopia along with the correction of cosmetic abnormality.

Multiple studies have been done previously on other squint surgeries but very few studies are available on isolated inferior oblique myectomy and no work has been carried out locally on the outcomes of this procedure. The aim of our study was to find out the success rate and complications of the isolated inferior oblique myectomy surgery in hypertropia in local setup. The rationale of the study is that, the results will help us in decision making regarding

the surgical correction of hypertropia and its complications.

## MATERIAL AND METHODS

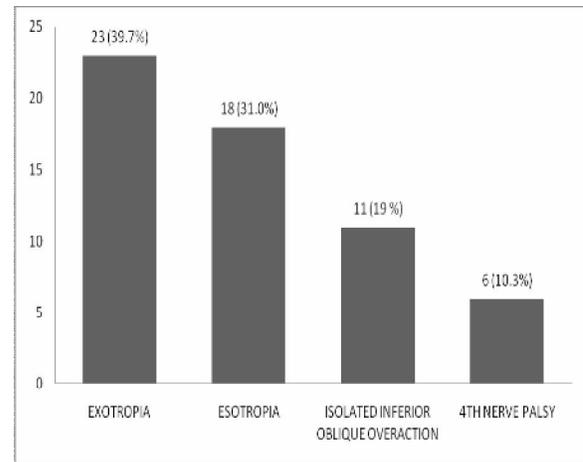
It was a case-series descriptive study, conducted from January 2011 to December 2012, at Al Ibrahim eye Hospital, Karachi. Patients were selected using non-probability purposive sampling. Ethical approval was taken from the ethical committee of Isra Postgraduate Institute of Ophthalmology. Patients having Hypertropia (Deviation  $>6$ PD) were included in the study, while, patients with history of previous extra-ocular muscle surgery for correction of hypertropia such as superior rectus recession or inferior rectus resection, other ocular disease such as congenital cataract, retinal detachment and any other cause of sensory visual deprivation were excluded from the study. After informed consent, the patients were selected from the squint clinic of Al-Ibrahim eye hospital, Karachi, diagnosed and reconfirmed by the consultant ophthalmologist. All the patients underwent detailed ophthalmic examination including best corrected visual acuity, cycloplegic refraction, funduscopy and squint assessment including measurement of squint using prism cover technique. Patients having concomitant exotropia or esotropia underwent horizontal muscle corrections 3 months after they were operated for hypertropia. Surgery was done under local anaesthesia in adults but children were operated under general anaesthesia.

Patients were re-evaluated at one week, one month and three months post operatively. Final outcome was considered at the end of three months at which achievement of  $\leq 2$  PD of hypertropia was considered as a success. Data was entered on a preformed *pro forma*. Analysis was done using SPSS-20. Qualitative data such as gender, associated condition and success were presented by their frequencies along with percentages. The continuous variables such as age and hypertropia in Prism Diopters before and after surgery were presented as mean and Standard Deviation. Stratification was done with regards to age, gender, degree of hypertropia (in Prism Diopter) and the types of squint associated in order to see the impact of these variables on the outcome.

**RESULTS**

During the study period, 58 patients were included according to inclusion and exclusion criteria. The mean age of the patients included in study was  $11.71 \pm 7.95$  years, with minimum age of 2 years and maximum age of 35 years. Out of these 58 patients, 31 (53.4%) were male, while the rest of 27 (46.6%) were female. Hypertropia was most commonly associated with exotropias followed by esotropias. Exotropia was associated in 23 (39.7%) of patients while esotropia was associated in 18 (31%) of patients. Other associated conditions are shown in figure-1. Mean angle of hypertropia before surgery was  $13.55 \pm 4.43$  prism diopters. Minimum angle of hypertropia before surgery was 6 prism diopters while maximum hypertropia was 24 prism diopters. After surgery mean angle of hypertropia was

$0.48 \pm 1.08$  prism diopters with maximum deviation of 4 prism diopters. Out of 58 patients, 55 (94.8%) had achieved success after surgery while only 3 (5.2%) patients had residual hypertropia of greater than 2 prism diopters ( $p=0.001$ ). Success rate with respect to age and associated conditions is shown in Table-1 & 2 respectively. No significant complications of procedure observed intra operatively and up to three months post operatively except conjunctival granuloma in one patient. Patients having associated horizontal squint shows overcorrection when they were operated for horizontal deviation. This is happened in 7 (12.1%) patients. All patients who need horizontal squint correction were operated at least 3 months after inferior oblique myectomy. Complications are shown in table-3



**Figure-1: Conditions associated with hypertropia (n=58)**

**Table-1: Success of inferior oblique myectomy in different age groups**

	Age groups			Total
	<10 years	10-25 years	>25 years	
Successful surgery	32	19	4	55
Residual hypertropia of >2 PD	2	1	0	3
Total	34	20	4	58

**Table-2: Success of inferior oblique myectome with respect to associated conditions**

	Associated conditions				Total
	Exotropia	Esotropia	Isolated inferior oblique over-action	4 <sup>th</sup> Nerve palsy	
Successful surgery	22	18	9	6	55
Residual hypertropia of > 2 PD	1	0	2	0	3
Total	23	18	7	4	58

**Table-3: Complications of isolated inferior oblique myectomy**

Complication	Frequency (%)	Management
Residual Hypertropia	3 (2 PD in 2 patients & 4 PD in one)	Only Counselling As Abnormal Head Posture Was Removed With No Abnormal Cosmetics
Conjunctival Granuloma	5 (8.6 %)	Successfully Treated With Mild Topical Steroids
Overcorrection of Horizontal Deviation After squint correction.	7 (12.1%)	Orthoptic Exercise, Re-PEAT Of Horizontal Surgery

**DISCUSSION**

Multiple surgical options have been attempted by many researchers to treat hypertropia. In one study, Multiple surgical options have been attempted by

many researchers to treat hypertropia. In one study, effects of isolated inferior oblique myectomy was observed in patients with superior oblique palsy, and the concluded an improvement of 11.91 prism

diopters  $\pm 1.38$  in all positions of gaze and for all age groups and both genders.<sup>5</sup> They recommended inferior oblique myectomy as a primary treatment for superior oblique palsy.<sup>5</sup> In another study, they compared the efficacy of inferior oblique myectomy with recession procedures.<sup>6</sup> They showed that the patients of inferior oblique myectomy had less postoperative hypertropia ( $p < 0.001$ ) compared to the patients who underwent recession procedure. The patients who underwent the myectomy had higher success rate as far as residual hypertropia is concerned ( $p = 0.056$ ). But they also pointed out that the difference in success between the two procedures was more pronounced ( $p = 0.005$ ) when patients had small to moderate hypertropia before surgery and this statistical difference was lost when patients had large hypertropia before surgery.<sup>6</sup> In another study they concluded that Isolated inferior oblique muscle weakening is an effective treatment, mean hypertropia decreased from 15 ( $\pm 9$ ) to 4 ( $\pm 4$ ) at the 1-year follow-up postoperatively.<sup>7</sup> These results are comparable to results in our study which showed reduction of mean hypertropia of 13.55 prism diopters ( $\pm 4.43$ ) to 0.48 prism diopters ( $\pm 1.08$ ) postoperatively.

These results and the results of our study shows that isolated inferior oblique myectomy can

successfully treat hypertropia without the need of any further surgical interventions. The main limitations of our study was that it was performed in only a single centre and only one ethnic group as study was performed in a single centre

## CONCLUSION

Isolated inferior oblique myectomy is highly successful and safe surgical procedure for correction of hypertropia.

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