SUPERIOR OBLIQUE PALSY: A REVIEW OF 135 CASES

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Purpose. Paresis of the superior oblique muscle is a common isolated palsy of an extraocular muscle. The aim of this study is to investigate clinical findings and surgical approaches to this ocular motility imbalance.
Methods. We reviewed the records of 135 patients with superior oblique palsy who were examined in our Department of Ophthalmology over the period 2000- 2005 to evaluate the etiology, clinical patterns, surgical management and outcome.
Results. Congenital palsy were mostly unilateral (79%), traumatic palsy bilateral (70%). An excyclotropia of greater than 15 degrees was highly suggestive of bilaterality. Our patients reported diplopia more frequently in acquired (60%) than in congenital (21%) superior oblique palsy. The surgical procedures were performed according to Knapp's classification of superior oblique palsy. In 47 cases (35%) tucking of superior oblique alone corrected the full deviation. In 14 cases tucking of superior oblique was combined with weakening of inferior oblique when the deviation exceeded 30 prism dioptres. In 60 cases (45%; Knapp class 8th) tucking the superior oblique was performed concurrently with recession of superior rectus.
Conclusion. In our experience surgical treatment of superior oblique palsy, according to Knapp's classification, is not as difficult or unpredictable as that of horizontal strabismus; in fact if one uses a well thought out plan of diagnosis and treatment the results are most gratifying to the patient and to the surgeon.
Key Words. Superior oblique palsy, Strabismus, Excyclotropia

INTRODUCTION

Paresis of the superior oblique muscle is a common isolated palsy of an extraocular muscle (1); because of its long intracranial course, the IV nerve is highly vulnerable to insult. The aim of this study is to investigate, the etiology, clinical findings surgical approach and outcome to this ocular motility imbalance since then haven't there been any studies evaluating the surgical correction of superior oblique palsy according to Knapp's classification.
We reviewed the records of 135 patients with superior oblique palsy who were examined in our Department over the period 2000-2005 to evaluate the etiology, clinical patterns, surgical management and outcomes.

METHODS

The study was a retrospective interventional case series report. The age of our patients ranged between 5 and 65 years. All patients undergo pre op head tilt, torsion with the Maddox double rod test, and a prism cover test in the 9 positions of gaze in relation to fitting all cases into Knapp's classification, divided cases of superior oblique palsy according to where the deviation was greatest and assigned a surgical plan to each class. The age of the patients with diplopia ranged between 13 and 65 years. Patients with a history of a previous surgery were excluded from this study. The etiology of superior oblique palsy is listed in Table I.

Table I. Etiology of superior oblique palsy: 135 cases

	Number	Unilateral	Bilateral	Male	Female
Traumatic	40 (30%)	12 (30%)	28 (70%)	35 (87%)	5 (13%)
Congenital	88 (65%)	70 (79%)	18 (21%)	50 (56%)	38 (44%)
Idiopathic	7 (5%)	5 (71%)	2 (29%)	5 (71%)	2 (29%)
Total	135	87	48	90	45

In congenital cases were also included examinated longstanding and decompensating deviations and congenital cases examinerd while the patients were still children. In our series childhood photograph of head posture was helpful in many cases. The congenital preponderance was related to those patients in whom the onset of strabismus or torticollis dates back to infancy as per history or photographs. The male preponderance extended not only to the traumatic group but was present in all other etiologic categories as well. Congenital palsy were mostly unilateral (79%), traumatic palsy were mostly bilateral (70%); some patients were initially diagnosed as having unilateral palsy, the bilaterality became apparent after surgery. The main criteria in order to confirm a bilateral superior oblique palsy were reported in Table II.

Table II. Clinical patterns in 48 cases of superior oblique paresis

V pattern	35 (73%)
HTT positive to either side	40 (83%)
Left hypertropia to the right Right hypertropia to the left	48 (100%)
Excyclotropia > 15 degrees	46 (96%)

All patients with bilateral palsy had a right hypertropia in left gaze and a left hypertropia in right gaze. In our experience because of typical asymmetrical involvement of superior oblique muscle the diagnosis may be missed if careful measurements in the lower fields of

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gaze at near are not performed. Because of V pattern the typical head posture in our patients was a chin depressed assumed so that the patients can fuse in upgaze.
Our patients reported diplopia more frequently in acquired (60%) than in congenital (21%) superior oblique palsy. The prevalence of head tilt in our series (70%) is similar to that encountered by other authors (3). Our surgical procedures, followed Knapp's classification of superior oblique palsy and its surgical management and are (4, 5) reported in table III: tucking of superior oblique tendon on the temporal side of the superior rectus was the procedure of choice (89% in our series). Recession of the ipsilateral superior rectus (combined with tucking the superior oblique) was performed in 67 cases (50%; Knapp class 8th). The 8th class consisted of a large vertical deviation in all fields, frequently more on the non paretic side. (Personal communication 1987).

RESULTS

A positive head tilt test to either side was elicited in 83% of patients with bilateral palsy; the presence of a V pattern (73% in our cohort) strongly suggests bilaterality (2) (Table II). Excyclotropia of greater than 15 degrees is highly suggestive of bilaterality. Bilateral paresis of superior oblique in our series was usually related to a close head trauma; the patients complained diplopia due to esotropia in downward gaze; he rarely spontaneously awared of torsional components.
In 47 cases (35%) tucking of superior oblique alone corrected the full deviation. In 14 cases the tucking of superior oblique was associated with a weakening of the inferior oblique when the deviation exceeded 30 Prism dioptres. In 60 (45%) cases tucking of superior oblique was associated with the recession of the superior rectus according to Knapp class 8th . An overcorrection of tucking was not observed at anytime in the follow up period. In two cases the initial postoperative measurements showed a mild overcorrection that spontaneously recovered in few weeks. Weakening the inferior oblique alone was performed in 7 cases (Knapp class 1). In two cases recession of the contralateral inferior rectus was performed; the final result was an overcorrection and this procedure was not performed in subsequent cases. When a V-pattern exceeded 40 prism dioptres (5 cases in our sample, 3,5%), surgery on all four oblique muscles was necessary to eliminate the pattern (Table III).

Table III. Surgery performed
in superior oblique paresis: 135 cases

Unilateral superior oblique Tucking	47	35 %
Unilateral superior oblique Tucking + Unilateral Disinsertion inferior oblique	14	10 %
Unilateral superior oblique Tucking + Unilateral Recession superior rectus	60	45 %
Unilateral Disinserzion inferior oblique	7	5 %
Bilateral superior oblique Tucking + Bilateral Disinserzion oblique superior (V pattern more than 40 p.d.)	5	3,5 %
Unilateral Recession yoke inferior rectus	2	1,5 %

The percentage reduction in deviation between the pre op and the post op was about 90% (this goal was set for a success). Any patient required re-operation.

DISCUSSION

In this series tucking superior oblique tendon (89%), alone or in combination with other surgical procedures, was the procedure of choice according to Knapp's classification of superior oblique palsy. Recession of the ipsilateral superior rectus muscle (50% in our cohort), was always performed in conjunction with a superior oblique tuck according to Knapp class 8th . Advantages of the superior oblique tucking operation are that it straightens the head, reduces hyper-deviation and it has no effect on the width of the lid fissure. In our series overcorrection is rare and unusual (6).Under-correction is due to failure in pre-op testing to elicit full deviation that had been hidden by fusion, or can be related to the fear of overcorrection or to not knowing how much to tuck. Relatively few precautions must be taken to avoid the so-called Brown's syndrome, limiting elevation in adduction. Sometimes a tuck of the superior oblique always produces a transient Brown's syndrome. In our series with a tuck alone, not combined with a disinsertion of the inferior oblique, if care is taken to tuck the tendon alone, the limitation in elevation in adduction is mild and transient: in other words care must be taken that the various layers of subconjunctival tissue are kept out of the tuck. In cases where a gentle search fails to find superior oblique temporally to the superior rectus, the tendon can be searched medially and then moved and tucked temporally. If this is done one can do the proper amount of tuck (until there is resistance in tightening up the tucker). If one can not find the tendon after such a search, it is wiser to stop and do an alternative procedure rather than producing scar tissue in this area.
In conclusion in our experience, the surgical treatment of superior oblique palsy according to Knapp's classification is not as difficult and unpredictable as that of horizontal strabismus; in fact, if one uses a well thought-out diagnosis and treatment plan the results are most gratifying to the patient and to the surgeon.

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