Management of A-V pattern strabismus

Essay

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مقال

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AES **A**nti**E**levation **S**yndrome

ANT **A**nterior and **N**asal **T**ransposition

ATIO **A**nterior **T**ransposition of **I**nferior **O**blique muscle

EOM **E**xtra**O**cular **M**uscles

ET **E**sotropia

IOM **I**nferior **O**blique muscle

IRM **I**nferior **R**ectus muscle

LRM **L**ateral **R**ectus muscle

MRM **M**edial **R**ectus muscle

N **N**asal

NFVB **N**euro**F**ibro**V**asular **B**undle

PD **P**rism **D**iopter

PITS **P**ulled **I**n **T**wo **S**yndromes

SOM **S**uperior **O**blique muscle

SRM **S**uperior **R**ectus muscle

T **T**emporal

XT **E**xotropia

Introduction

Alphabetic pattern strabismus, of which the most common examples are A and V pattern horizontal deviations, has gained a lot of importance during the last few decades. It belongs to the group of incomitant horizontal deviation with difference between upgaze and down gaze and is commonly associated with esotropia or exotropia **(Zorab et al, 2008)**

A variation in the angle of horizontal strabismus in vertical gazes was first described by *Duane in 1897*. *Costenbader and Albert* suggested the terms A-V patterns and A-V syndromes in *1955* and *1957* respectively.

(Harley et al, 2005)

In A- or V-pattern strabismus, there is a clinically significant difference in the horizontal deviation as the eyes move from upgaze to downgaze. This pattern can be seen in esotropia or exotropia. When the eyes diverge more than 10 prism diopter from up gaze to down gaze, an A-pattern is present. When the eyes converge more than 15 prism diopter from upgaze to downgaze, a V-pattern is present. This is due to the fact that an increase in convergence in looking down is normal. A- or V- pattern is present in about 15-25% of horizontal strabismus and most common with infantile esotropia **(Oya et al, 2009)**

Some patients with “A” or “V” pattern may have good alignment in the primary position but have an esotropia or exotropia in downgaze. Such patients may first become symptomatic as they become presbyopic **(Kushner, 2005)**

If a pattern needs to be eliminated, the treatment is surgery. However, first, it is necessary to determine whether the patient has a significant chin-up or chin-down head posture in order to fuse. A continuous change in the size of a deviation with alterations in gaze direction is destabilizing for binocular fusion. Clinically significant “A” or “V” pattern should be corrected, in children, if there is any likelihood of gaining some degree of binocularity. This is probably the situation in all children undergoing strabismus surgery, except those with dense amblyopia. Attention should be paid to the location of the pattern. The primary position and downgaze are the two most important fields of gaze.

Surgery is also done to decrease the excessive abducting force in the gaze direction in which the eyes diverge (upgaze for “V” pattern, downgaze for “A” pattern); decrease the torsion, which contributes to the pattern and may be an obstacle to fusion; and correct any cosmetically unacceptable upshoot or downshoot that occurs on adduction. One might ignore the pattern completely in an asymptomatic patient **(Kushner, 2005)**

There are various theories to explain the etiology of the A-V patterns. The oblique muscle dysfunction is the most popular theory. An

overaction of inferior oblique (in V-pattern) or superior oblique (in A-pattern) is the most common finding in cases of A and V pattern strabismus. Other causes of A-V patterns include:
horizontal recti muscle dysfunction, vertical recti muscle dysfunction and anomalies of muscle insertions or their pulleys **(Von Noorden and Campos, 2002)**

According to the variability of the etiological theories, surgeries are directed to the muscles believed to be implicated. If the pattern is related to overaction of the oblique muscles, these muscles should be weakened.

One of the weakening procedures of inferior oblique muscle is anteriorization. Results of the graded anteriorization have been excellent with over 90% success rate for mild to severe inferior oblique overaction.

(Stager, 2003) proposed a technique, in which the inferior oblique muscle is transposed not only anteriorly but also nasal to the nasal border of the insertion of the inferior rectus muscle. This procedure seems particularly useful in patients with severe or recurrent congenital and acquired superior oblique palsies, particularly as a secondary procedure when other weakening procedures fail

Weakening the superior obliques nasally by any technique has a large effect and can correct up to 40 PD of exotropia in downgaze. Weakening the superior obliques temporally is a less powerful

operation, but also less likely to cause complications. The posterior tenectomy as popularized by **Prieto-Diaz** will cause a reduction of approximately 15–20 PD of exotropia in downgaze. A slightly more powerful operation is a complete disinsertion of the superior oblique tendon. Still greater effects can be obtained by a tenectomy of the superior oblique tendon near its insertion, or with a graded recession. Weakening the superior oblique muscles has no effect on upgaze. **(Kushner, 2005)**

“V” patterns with superior oblique underaction can be treated with superior oblique tucks. Because tucking the superior oblique is a less predictable surgical procedure than others, it is recommended that this operation be limited to surgeons who have experience with that procedure. **(Kushner, 2005)**

When A-or V- pattern strabismus occurs in the absence of oblique muscle overaction, the appropriate recession and resection of the horizontal recti is done with appropriate vertical transposition of the tendon. Medial rectus is shifted toward the apex of pattern (up for A-pattern and down for V-pattern) while the lateral rectus is transposed to the open or empty direction of pattern (down for A-pattern and up for V-pattern). The amount of displacement usually is one half to a full tendon width according to the size of pattern **(Oya et al, 2009)**

When A- and V-pattern were initially described, anomalous function of the vertical rectus muscles was proposed as a possible causative factor, to be remedied by shifting the vertical muscles (e.g. temporal displacement of the superior rectus muscles for A-pattern esotropia).

Results after this type of surgery are difficult to predict. If fusion is present, the horizontal, vertical and torsional aspects of the outcome must be considered. Most surgeons prefer to transpose the horizontal rectus muscles rather than to avoid the risk of anterior segment ischemia by operating on all four recti muscles at the same session **(Prieto-Diaz and Sousza-Diaz, 2000)**

Aim of work

The aim of this work to review the literature to study different types of surgery in management of A-V pattern strabismus.