Management of Superior Oblique Palsy

Trochlear nerve (IV cranial nerve) palsy is a common ocular motility defect. Most commonly it is congenital in nature, but it can also be seen after road traffic accidents. Superior oblique is an intorter, depressor and abductor, hence its palsy results in excyclotropia, hypertropia and esotropia.

It may be

(a) Mild - Hypotropia only in tertiary position.
(b) Moderate – Hypotropia in adduction (without depression)
(c) Severe – Hypotropia in primary position also.

There is ipsilateral inferior oblique overaction and in long standing cases inhibitional palsy of the contralateral superior rectus can also be seen.

Classification: It may be classified as either congenital or acquired.

(a) Congenital superior oblique palsy: Congenital superior oblique palsy accounts for approximately three fourths of cases, but may not necessarily present in childhood. Patients with congenital superior oblique palsy may develop large vertical fusional amplitudes. Old photographs may help in diagnosis. The exact cause of congenital superior oblique palsy is not known.

(b) Acquired: This occurs due to the insult or damage to trochlear nerve anywhere along its course. Road traffic accidents are the most common cause of traumatic superior oblique palsy.

Evaluation of superior oblique palsy

(a) Symptoms – There may be complaint of diplopia which can be vertical or torsional. If chief complaint is torsion, bilateral palsy should be considered. Other non-specific complaints may include asthenopia or cervical discomfort.

(b) Signs – Compensatory head tilt to opposite side is the most common sign. There can be chin down position

Figure 1: Diplopia Charting in Right Superior Oblique Palsy
in bilateral cases. Facial asymmetry in the form of mid facial shallowing (on the side of head tilt) between lateral canthus and angle of mouth can be seen in congenital Superior oblique palsies.

Unilateral Versus Bilateral Superior oblique palsy: Suspect bilateral superior oblique palsy if –
(a) History of closed head trauma.
(b) Subjective complaints of torsion.
(c) Objective torsion more than 10 degrees.
(d) Alternating hypertropia on alternate head tilt.
(e) V-pattern esotropia.
(f) Chin down head posture.

Diagnostic Tests
(a) Parks three step test - (for right superior oblique palsy)
   (i) Hypertropic eye in primary position – Right
   (ii) Hypertropia increases on gaze to - Left
   (iii) Hypertropia increases on tilt to – Right
(b) Torsion (Excycloptopia) assessment -  
   (i) Subjective assessment- Double Maddox Rod, Synaptophore.
   (ii) Objective assessment – Indirect ophthalmoscopy (relative displacement of fovea and optic disc), Fundus photograph.
(c) Diplopia charting (Figure 1)
(d) Hees/Lees’ Charting (Figure 2)
(e) Imaging-In cases of acquired palsy and signs and symptoms suggestive of neurological involvement.
(f) Aid in diagnosis- 

<table>
<thead>
<tr>
<th>Class</th>
<th>Maximum involvement of gaze</th>
<th>Management</th>
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<tbody>
<tr>
<td>1</td>
<td>Levoelevation</td>
<td>RIO recession</td>
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<tr>
<td>2</td>
<td>Levodepression</td>
<td>RSO tucking LIR recession or modified Harada-Ito</td>
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| 3     | All levoversion positions   | Hypertropia < 25 pd RIO recession 
                                 | Hypertropia > 25 pd RIO recession + RSO tuck |
| 4     | All downgaze and levopositions | As in class 3 + LIR recession/RSR recession |
| 5     | All downgaze positions      | RSO tuck + LIR recession |
| 6     | Bilateral with V-pattern    | Bilateral IO weakening or modified Harada Ito |
| 7     | All downgazes, primary position and levoversion | Explore trochlea |

(i) FAT-Scan (Family album tomography-scan) in cases of congenital palsies.

(ii) Exaggerated forced duction test described by Guyton- With the surgeon sitting at patient’s head end and the eyes anesthetized, with two toothed forceps limbus is grasped diagonally (2 & 8 O’clock position in left eye and 4 & 10 O’ clock position in right eye), the eye is rotated up into an elevated, adducted position simultaneously pushing the globe into the orbit. It is then brought temporally while continuing to push it back into the orbit, a normal or taut superior oblique would cause the globe to “pop up”. It is an important intra-operative test, which influences the surgical plan.

Differential Diagnosis
1. Skew deviation- This is usually an acute hyperdeviation, with episodic see-saw like presentation with alternate elevation-depression of two eyes with rotary nystagmus. Measurable torsion is usually absent, which help in differentiating it from Superior oblique palsy.
2. Thyroid related ophthalmopathy - Inferior rectus is most commonly involved, restriction of which may give false clinical picture of SO palsy in other eye.
3. Primary Inferior oblique overaction - It may be differentiated from SO palsy by the absence of
hypertropia in primary position, absence of subjective torsion and negative head-tilt test.

**Management**

(a) **Non Surgical** - Prisms are used in cases where there is small, comitant hypertropia or in cases which are not fit for surgery.

(b) **Surgical** – Surgical management depending on type of palsy as per Knapp’s classification\(^2\). (Table 1)

**References**


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