Diagnosis and management of IV cranial nerve palsy

Ali Yagan explores diagnosis and treatment of fourth nerve palsy, also known as trochlear nerve palsy.

Aetiology:

Trochlear nerve palsy can be divided into acute or congenital. Congenital trochlear nerve palsy is usually noted in childhood with development of abnormal head posture. Various pathologies can lead to acute IV nerve palsy, most commonly trauma. Other causes include vascular (ischaemic), inflammatory (demyelination), neoplastic and aneurysms.

Signs and symptoms:

It is very important to differentiate acute IV cranial nerve (CN) palsy from longstanding but decompensating one. Patients usually present with sudden onset, intermittent or constant vertical diplopia. Full orthoptic assessment is essential to confirm the condition. The assessment will show that the affected eye is hypertropic and this hypertropia increases on contralateral gaze and on ipsilateral head tilt (3 step test). It is also important to obtain a Hess chart as well as assessing the patient on the synoptophor looking for subjective torsion. Fundus photography looking at the position of the fovea relative to the optic nerve head is a way of detecting objective torsion.

Common features of longstanding IV nerve palsy:

1. Extended vertical fusion range
2. Lack of subjective torsion
3. Development of muscle sequelae on Hess chart
4. Longstanding head tilt to the contralateral side.

Common features of bilateral IV cranial nerve palsy:

1. Reversal of the vertical deviation on side gazes
2. Torsion of more than 10 prism dioptres in primary gaze
3. V pattern
4. Chin up position instead of head tilt.

Investigations:

Once confirmed as acute onset, several investigations are recommended including neuro imaging (MRI), blood tests such as ESR, CRP, FBC, glucose, lipids, U&Es. Other tests for autoimmune antibodies, ACh-R antibodies are done if felt necessary.

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Management options:

It is important to fully investigate the patient and treat any pathology if possible or control risk factors for vascular disease. Symptomatic treatment to address diplopia includes patching, prisms and surgery.

Non-surgical options:

These include patching one eye or using Fresnel prisms in order to avoid diplopia, it is also important to tell patients to avoid driving and inform the DVLA about their diplopia.

Knapp classification:

This is a useful way of classifying IV nerve palsy as it helps planning surgical treatment options.

Class I: greatest hypertropia in ipsilateral inferior oblique (contralateral up) field
Class II: greatest hypertropia in ipsilateral superior oblique (contralateral down) field
Class III: greatest hypertropia in entire contralateral field
Class IV: greatest hypertropia in entire contralateral field and across the lower field
Class V: greatest hypertropia across lower field
Class VI: bilateral IV palsy
Class VII: traumatic paresis combined with Brown's syndrome.

Surgical options:

It is important to have a period of stable measurements of at least six months before embarking on surgery. The surgical option depends on the angle of deviation in primary position, area of maximum deviation and presence of torsion.

Torsion can be corrected by the Harada Ito procedure, Knapp class I can be addressed by ipsilateral IO recession, class II can be addressed by ipsilateral SO tuck, class III can benefit from either options and class IV and V might need also a contralateral inferior rectus recession. It is important to counsel the patient about the possibility of unmasking a bilateral IV palsy following surgery on one eye then needing further surgical intervention. Adjustable sutures could be utilised in adults' surgery.

Complications:

It is important to avoid over corrections by staging the surgery or using adjustable sutures. Other specific complications include inducing a Brown syndrome following SO tuck and it is important to counsel patients regarding this possibility. IR muscle surgery can induce lower lid malposition.

References

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