Alternating Involvement of Bilateral Oculomotor Nerves in Recurrent Ophthalmoplegic Cranial Neuropathy

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INTRODUCTION

Recurrent ophthalmoplegic cranial neuropathy (ROCN), also known as ophthalmoplegic migraine, is a rare disorder of episodic unilateral headache with reversible paresis of ipsilateral cranial nerves III, IV, and/or VI. Almost exclusively, laterality is consistent between recurrences[1]. We report a case of alternating laterality of headache and oculomotor paresis between ROCN episodes.

CASE PRESENTATION

A 59-year-old male presented with acute diplopia and right-sided ptosis following 13 days of severe throbbing right-sided headache with nausea and photophobia. Systemically, the patient was well and there was no antecedent trauma or illness. There were no other symptoms of GCA. Past medical history included migraine, but no diabetes, hypertension, smoking, or thyroid disease.

Neuro ophthalmic examination revealed partial third nerve palsy on the right (Fig. 1a). Pupils were normal. Examination of other cranial nerves was normal. The patient was admitted due to pain. Extensive laboratory investigations (Table 1) and neuroimaging (Fig 2) were normal, aside from minimally elevated CSF protein. The headache resolved 3 weeks after onset.

The diplopia gradually improved until 6 weeks later when the patient re-presented with acute worsening of diplopia following 1 week of left-sided headache. There was a new left-sided pupil-sparing third nerve paresis and improved function of the right third nerve (Fig. 1b). Laboratory and imaging studies were stable. Based on International Classification of Headache Disorders criteria, ROCN was diagnosed (Table 2). The headache responded well to corticosteroid.

Four months later, ocular motility was significantly improved (Fig. 1c) and there has been no recurrent headache. Neuroimaging obtained 8 months after initial presentation remains normal (Fig. 3).

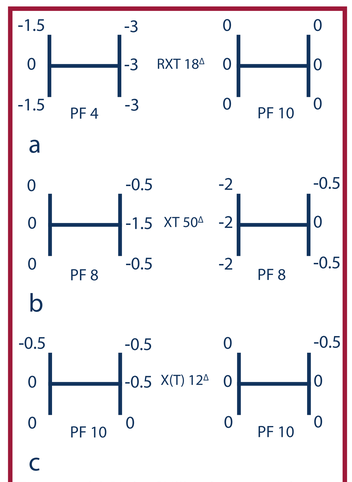

Figure 1: (a) Right CNIII palsy at initial presentation associated with ipsilateral headache. (b) Left CNIII palsy 6 weeks later following left-sided headache. Previous right-sided deficit reduced. (c) Minimal limitation persists at 8 month follow up. Pupils and extorsion were normal OU on all exams. (PF, palpebral fissure)

Table 1. Systemic investigations

Bloodwork		CSF	
A1c	5.5	LP: initial presentation	
ESR	2	Cell count	normal
hsCRP	2.5 (0-1)	Glucose	**4.0** (2.2-3.9)
Lyme	non-reactive	Protein	**0.75** (0.15-0.45)
Syphilis	non-reactive	Cytology	no malignant cells
TSH	2.0 (0.4-4.5)	Culture	no growth
Anti-AChR	<0.20	ACE	negative
Anti-MuSK	negative	HSV 1/2	not detected
ANA	negative	VZV	not detected
ANCA	negative	CMV	not detected
Paraneo	negative	qEBV	0
		Syphilis	non-reactive
Imaging			
CT chest/abdo/pelvis:		LP at re-presentation	
No evidence of malignancy, sarcoidosis.		Cell count	normal
		Glucose	**4.2** (2.2-3.9)
		Protein	**0.79** (0.15-0.45)
		Cytology	no malignant cells
		Culture	no growth
		ACE	negative
		HSV 1/2	not detected
		VZV	not detected

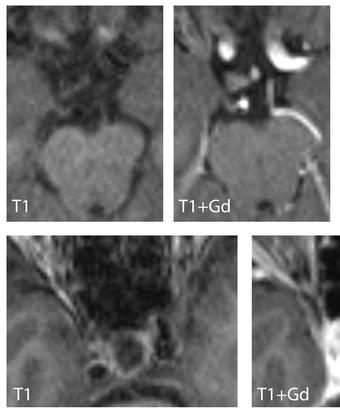

Figure 2. MRI at presentation shows no mass lesion or abnormal enhancement along the course of right CNIII at the level of midbrain and interpeduncular cistern (top), or cavernous sinus and orbital apex (bottom).

Not shown: CTA demonstrated normal Circle of Willis with no aneurysm.

Not shown: Repeat MRI at re-presentation with left-sided CNIII palsy showed no acute change or abnormality of either oculomotor nerve.

Figure 3. At 8-month follow up, bilateral oculomotor nerves (arrows) show similar caliber and no gadolinium enhancement. Persistent enhancement months following symptom onset has been reported in ROCN.

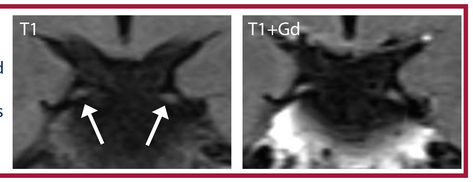

Table 2. Diagnostic Criteria: Recurrent Ophthalmoplegic Cranial Neuropathy[2]

A. At least two attacks fulfilling criterion B
B. Both of the following
  1. unilateral headache
  2. ipsilateral paresis of one, two or all three ocular motor nerves
C. Orbital, parasellar or posterior fossa lesion has been excluded by appropriate investigation
D. Not better accounted for by another ICHD-3 diagnosis.

DISCUSSION

ROCN is a diagnosis of exclusion. In this case, a broad differential for sequential painful CNIII palsies was considered, including:

- Microvascular ischemia
- Inflammatory: Vasculitis, Tolosa-Hunt Syndrome
- Infectious: VZV, Lyme, syphilis
- Antibody mediated: myasthenia, thyroid disease, paraneoplastic
- Sarcoid

This case illustrates typical features of ROCN:

- Headache preceding cranial nerve palsy by several days
- Resolution of headache with corticosteroids
- Resolution of cranial nerve palsy weeks after headache
- Normal neuroimaging (findings more common in children[3])

However, to our knowledge, this is only the second report of alternating laterality between episodes of ROCN, and the only reported case with normal imaging. Choi et al reported a case with alternating laterality of internal ophthalmoplegia with headache and gadolinium enhancement of bilateral oculomotor nerves[4].

There remains debate whether ROCN is a primary headache disorder or a neuropathy. The quality of headache and normal imaging in the present case may support a migrainous etiology.

REFERENCES

1. Smith S V, Schuster NM. Curr Pain Headache Rep 2018;22:50.
2. The International Classification of Headache Disorders, 3rd edition.
3. Lal V, Sahota P, Singh P, et al. Headache 2009;49:838–850.
4. Choi JY, Jang SH, Park MH, et al. Headache 2007;47:726–728.