Isolated Ocular Motor Nerve Palsies: Abnormal neuroimaging outcomes are independent of age.

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Introduction

Neurologically isolated ocular motor nerve palsies (IOMNPs) often present a management dilemma. Underlying sinister intracranial pathology is thought to be more prevalent in patients <50 years without coexisting ischaemic risk factors and patients in this subgroup are more likely to be offered neuroimaging[1,2]. With rapidly ageing populations and advanced neuroimaging becoming more readily available, we investigated abnormal neuroimaging outcomes in the traditionally low risk ≥50 years group.

Methods

We conducted a retrospective cohort study of all patients who presented to our Neuro-Ophthalmology service at the Singapore National Eye Centre.
Patients diagnosed with IOMNPs from Jan 2015– Dec 2018 were identified from our database based on diagnostic coding. Clinical records were manually reviewed to obtain demographic and clinical information including prior risk factors, neuroimaging results and disease resolution. Patients with multiple nerve palsies or unavailable clinical data were excluded.
Aetiology was ascribed based on clinical course and outcome of investigations. Specifically, ischaemic aetiology was ascribed if the patient had ischaemic risk factors, the palsy was of acute onset and resolved spontaneously within 6 months.

Conclusions

1. Abnormal neuroimaging outcomes are similar in the ≥50 years and <50 years age groups.
2. Presence of ischaemic risk factors does not reliably predict absence of abnormal neuroimaging.
3. Prompt neuroimaging should be considered even in the traditionally 'low-risk' patient who presents with no other risks except coexisting ischaemic risk factors.
4. Patients with a prior history of cancer have a fivefold higher risk for a malign structural cause of their IOMNPs and should always be offered neuroimaging.

References
1. Pineles SL, Velez FG. Isolated Ocular Motor Nerve Palsies. J Binocul Vis Ocul Motil. 2018 Jul 3;68(3):70–7.
2. Galtrey CM, Schon F, Nitkunan A. Microvascular non-arteritic ocular motor nerve palsies - What we know and how should we treat? Neuro-Ophthalmol. 2015;39(1):1–11.

Key Findings

1. >85% of IOMNP patients are ≥50 years old

	Total (n = 353)	CN III (n=70)	CN IV (n=118)	CN VI (n=165)
Mean age	63.0	64.0	62.2	63.2
<50	51 (14%)	8 (11%)	20 (17%)	23 (14%)
≥50	302 (86%)	62 (89%)	98 (83%)	141 (86%)

Patients ≥50 years old made up the vast majority of patients with IOMNPs both overall and in each type of cranial nerve affected.

2. IOMNPs are predominantly ischaemic but other aetiologies differ by cranial nerve

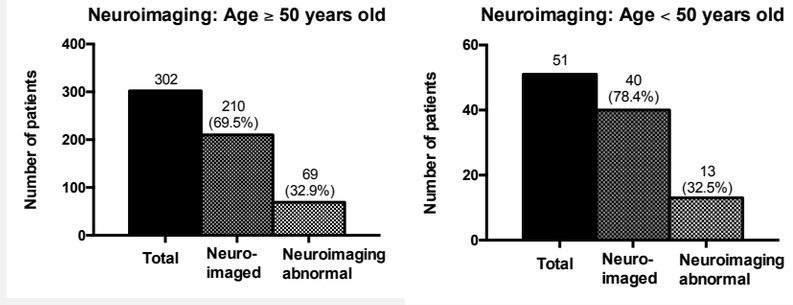
	CN III (n=67)	CN IV (n=112)	CN VI (n=155)
1st	Ischaemic (57%)	Ischaemic (60%)	Ischaemic (64%)
2nd	Compressive tumour (15%)	Trauma (16%)	Compressive tumour (18%)
3rd	Compressive non-tumour / trauma (9%)	Congenital (13%)	Other intra-cranial (8%)

Ischaemic aetiology accounted for more than half of the IOMNPs (excluding patients lost to follow-up). However, significant numbers had clinically important non-ischaemic aetiologies diagnosed on neuroimaging, including intra-cranial tumours and aneurysms. The prevalence of aetiologies varied depending on the cranial nerve involved, with isolated CN IV palsy in particular having a high prevalence of cases attributable to trauma and decompensated congenital palsy.

3. Presence of ischaemic risk factors does not predict normal neuroimaging

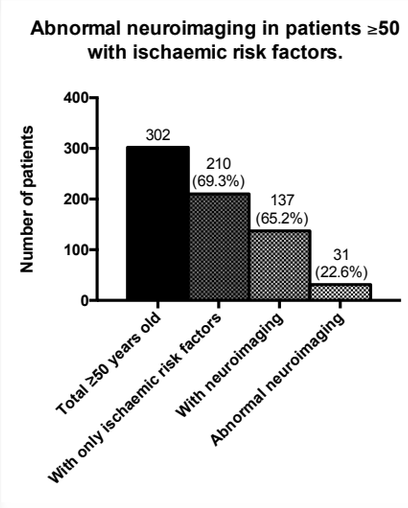
Multivariate analysis was carried out on all known risk factors included in our data. The presence of ischaemic risk factors had no significant effect on outcome (OR 0.63, CI 0.4-1.1). However, a prior cancer history was a strong independent predictor of abnormal neuroimaging (adj. OR 5.08, CI 2.5-10.3).

4. Abnormal neuroimaging is equally prevalent in the ≥50 and <50 years age groups



Rates of neuroimaging were not significantly different between the two age groups (69.5% vs 78.4%). Of those neuroimaged, the rate of abnormal findings was statistically equivalent between the two age groups. This held true even after controlling for patients with a prior cancer history (who always had neuroimaging performed), who were more prevalent in the older age group.

5. Neuroimaging is abnormal in one-fifth of IOMNP patients ≥50 years despite coexisting ischaemic risk factors.



Patients ≥50 years with co-existing ischaemic risk factors and no other risk factors for non-ischaemic aetiology are less likely to undergo neuroimaging. We analysed this subgroup of patients and found that of those neuroimaged, 22.6% did have abnormalities on neuroimaging that explained their IOMNP.