CASE REPORT

Relapsing-Remitting Sixth Nerve Palsy in Association with Ollier's Disease

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ABSTRACT

Relapsing-remitting sixth nerve palsy is usually due to ophthalmoplegic migraine (recurrent cranial nerve palsy) in younger patients and microvascular disease in older patients. There have been isolated reports, however, of it occurring in the presence of a skull base tumour. We report a 20-year-old woman with Ollier's disease who presented with a relapsing-remitting sixth nerve palsy. Neuro-imaging revealed a skull base enchondroma.

Keywords: Enchondroma, ollier's disease, sixth nerve palsy

INTRODUCTION

The annual incidence of sixth nerve palsy has been estimated at 11.3/100,000 per year.¹ There is a wide differential diagnosis, principally due to the long course of the nerve.² When spontaneous recovery occurs in an isolated sixth nerve palsy in a young person, the aetiology of the nerve palsy is usually due to demyelination or ophthalmoplegic migraine (recurrent cranial nerve palsy). Relapses can occur in particular in ophthalmoplegic migraine.^{3,4} There have, however, been a number of reports of relapsing-remitting sixth nerve palsies in patients with skull base tumours.^{5–9} We present the case of a 20-year-old woman with Ollier's disease who developed a relapsing-remitting sixth nerve palsy secondary to a dorsum sellae enchondroma.

CASE REPORT

A 20-year-old woman was referred to the neuro-ophthalmology clinic with a 5-day history of horizontal diplopia. She had a history of Ollier's disease, with peripheral enchondromas affecting the middle finger of her right hand (Figure 1). Examination revealed a right lateral rectus paresis, measuring 25 prism dioptres. The rest of the ocular and neurological examination was normal. Magnetic resonance imaging (MRI) (Figure 2) and subsequent computerised tomography (CT) (Figure 3) showed a 7-mm lesion in the posterior portion of the right cavernous sinus on the right; appearances consistent with an enchondroma of the dorsum sellae.

Her double vision spontaneously resolved over the next 4 weeks. Repeat MRI at 4 months post

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FIGURE 1 (a) Colour photograph of the patient's right hand, demonstrating fusiform enlargement of the middle finger. (b) Plain radiograph and (c) coronal fat-saturated T2-weighted magnetic resonance imaging of the right hand showing expansile lesions within the proximal and middle phalanges of the middle finger consistent with enchondromas.

FIGURE 2 Gadolinium-enhanced coronal T1-weighted magnetic resonance imaging showing an enhancing lesion in the posterior portion of the right cavernous sinus (arrow).

FIGURE 3 Coronal computerised tomography scan confirming that the lesion arises from the dorsum sellae (arrow).

presentation showed no significant change in the cavernous sinus lesion.

Six months following the initial presentation, however, she suffered a relapse of her sixth nerve palsy, measuring 6 prism dioptres, which again lasted for about 4 weeks. To date, she has had no further episodes of diplopia. Follow-up MRIs at 1 and 2 years post presentation revealed stable intracranial appearances.

Two years after her initial presentation she developed increasing pain in her right middle finger. Since this was suggestive of malignant transformation and as she was having functional problems due to the finger deformity, she underwent an amputation of the middle finger and its associated metacarpal.

Histological examination of the amputated finger confirmed the diagnosis of Ollier's disease with the presence of multiple, variably sized cartilaginous tumours within the medulla and subperiosteally. The tumours ranged from small atypical enchondromas with increased cellularity and myxoid matrix through to grade 1 and grade 2 chondrosarcomas with higher cellularity, nuclear atypia, and permeative growth (Figure 4). A chest CT scan did not show any signs of metastases. She remains under follow-up.

DISCUSSION

Ollier's disease is the most common subtype of enchondromatosis.¹⁰ Enchondromas are benign, typically asymptomatic hyaline cartilage-forming neoplasms that occur most often in metaphyses and diaphyses of tubular limb bones.¹⁰ The incidence of Ollier's disease is estimated to be 1/1,000,000 per year.¹¹ It is a sporadic condition, thought to be secondary to a somatic mutation causing developmental anomalies in enchondral ossification. Enchondroma distribution is usually asymmetrical. The most commonly affected sites include the hands, feet, long tubular bones, and pelvis.¹¹ Since the skull base has a cartilaginous derivation, intracranial enchondromas can also occur, affecting the sphenoid bone, foramen lacerum, and parasellar region.¹¹

Complications of enchondromas include worsening bony deformity, pain, and pathological fractures. Malignant transformation of enchondromas to chondrosarcomas is well recognised and may occur in 5–50% of patients.¹⁰ Intracranial enchondromas/chondrosarcomas can present with headache, cranial nerve palsies, visual impairment, proptosis, hoarseness, dysarthria, facial dysaesthesia, and hearing loss.¹² In addition, Ollier's disease is associated with the development of glial cell tumours, including oligodendrogliomas and all grades of astrocytomas.¹³

FIGURE 4 (a) Haematoxylin and eosin–stained specimen of the patient’s right middle finger at $\times 100$ demonstrating an enchondroma with cellular atypia. (b) Haematoxylin and eosin–stained specimen of the patient’s right middle finger at $\times 50$ demonstrating permeation of an enchondroma into preexisting bone. Features shown in (a) and (b) suggest sarcomatous change in the enchondroma.

Volpe and Lessell reported seven patients with relapsing–remitting sixth nerve palsy in the presence of a skull base tumour. In six of the seven patients, spontaneous improvement of the sixth nerve palsy occurred on two to five occasions, whereas the last patient improved once before developing a fixed deficit. In two of the seven patients, the tumours were histologically confirmed as chondrosarcomas, with chordomas confirmed in three others.⁵ Subsequently, there have been further reports of spontaneous recovery or relapse and remission of sixth nerve palsies in the presence of skull-based tumours and neurovascular compression.^{6–9,12} In all cases there were no signs of raised intracranial pressure, which can cause a sixth nerve palsy as a “false-localising sign”.¹⁴

The mechanism by which a skull base tumour causes a relapsing–remitting sixth nerve palsy is unclear. Volpe and Lessell postulated several theories, including an alteration in tumour effects on the affected nerve over time or nerve recovery without change in the tumour (e.g., by remyelination, restoration of axoplasmic flow, or improvement in vascular insufficiency).⁵ In experimental optic nerve crush injuries in cats, early axotomy and demyelination occur. However, despite continued compression, restoration of conduction can occur. In one study, early recovery started at 2 weeks after compression and ended at about 4 weeks. This occurred before remyelination was visible histologically. It was felt that this stage of recovery was due to microtubule reorganisation. Later recovery started at about 7 weeks and finished about 11 weeks after the initiation of optic nerve injury. At this time remyelination was present.¹⁵ It is possible that similar processes are occurring in abducens nerve fibres subject to extrinsic compression. The rarity of the presentation of remission of sixth nerve palsy in the presence of compression may reflect the slow-growing nature of the types of tumours reported to cause this phenomenon.

There have been other reports of relapsing–remitting oculomotor nerve palsies occurring in the presence of intrinsic oculomotor nerve tumours, principally schwannomas.^{16–18} Schwannomas develop in type 2 neurofibromatosis due to a mutation in a tumour suppressor gene located on chromosome 22q12 that encodes the protein merlin. Merlin is involved in cell-to-cell interactions and both intracellular and intercellular signalling pathways. The mechanism behind remission in oculomotor schwannomas has been proposed to be due to merlin dysfunction leading to cellular instability before the development of fixed dysfunction as the tumour grows.¹⁶

This case emphasises the need for neuro-imaging in all young patients with sixth nerve palsy, even in the presence of spontaneous recovery.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Note: Figure 1 of this article is available in colour online at <http://informahealthcare.com/oph>.

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