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Foster Kennedy syndrome secondary to a giant prolactinoma with a remarkable response to cabergoline

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Summary

Pituitary adenomas are intracranial neoplasms, usually demonstrating a benign phenotype. We present the case of 21-year-old male with an 18-month history of reduced visual function (acuity and field) in the left eye. Based on neuroimaging and endocrine profile, a giant prolactinoma causing hypogonadotropic hypogonadism was diagnosed and cabergoline was commenced. After a month of treatment, the tumour size reduced, and visual function improved to normal; however, he developed Foster Kennedy syndrome with a swollen right optic disc. After almost 1 year of follow-up, he regained full visual functioning. Two years since his diagnosis, his prolactin remains normal with no adverse effects or further visual complications.

Learning points:

- Foster Kennedy syndrome is a rare entity but can be a feature of pituitary adenomas.
- Visual deterioration secondary to a compressive optic neuropathy can be reversible, provided that diagnosis and treatment are prompt.
- This case highlights the importance of frequent monitoring of visual function during follow-up of these lesions, particularly when there are deficits at diagnosis.

Background

Giant prolactinomas are a rare (1–5%) (1) subset of pituitary tumours which are larger than 4 cm in size, with significant extrasellar extension and very high prolactin levels (>1000 µg/L) (2). They are commonly seen among men and clinically present with subtle endocrine manifestations, which are often overlooked. Extensive tumours tend to present with associated neurological manifestations such as cranial nerve palsies, hydrocephalus, or temporal lobe epilepsy (2). Inherent prolactin assay analytical flaws can further confound the diagnosis of this rare entity.

Despite their seemingly aggressive nature, most giant prolactinomas show remarkable responsiveness to dopamine agonists, making this the first line of therapy (2). A subset of patients may need multimodal treatment with surgery and/or radiotherapy to achieve treatment goals (2). The diagnostic and therapeutic challenges warrant a multidisciplinary management approach.

Foster Kennedy syndrome, defined as ipsilateral optic atrophy with contralateral optic disc swelling secondary to an intracranial mass (3), can be the presenting feature of pituitary tumours (4).



Case presentation

A 21-year-old gentleman of Asian ethnicity was referred to our pituitary service with worsening visual function in the left eye for at least 18 months. He experienced daily temporal headaches, dizziness, and fatigue. In addition, he had erectile dysfunction and a lack of facial hair. He did not report galactorrhoea. There was no past medical history or ophthalmic history other than mild myopia corrected by spectacles.

On examination, his BMI was 43.5 kg/m². He had sparse facial and trunk hair. There was mild provoked right galactorrhoea. His left and right testes were 25 mL and 20 mL, respectively. The remainder of the clinical examination did not reveal remarkable findings.

Detailed ophthalmic examination demonstrated a definite left optic neuropathy with reduced best corrected visual acuity (BCVA) of 0.84 LogMAR. He was able to see the nasal aspect of the first Ishihara colour vision plate only, and temporal constriction of the Goldmann visual field was present (Fig. 1). A left relative afferent pupillary defect and temporal pallor of the optic disc were also present. Although the right visual acuity, colour vision, and Goldmann visual field were full, there was also evidence of structural damage of the right optic nerve with mild inferotemporal retinal nerve fibre layer loss.

Investigation

MRI of the brain with contrast revealed a large heterogenous sellar mass measuring 6 × 7 × 6.5 cm with a multi-cystic component and a central solid component, which extended to the cavernous sinuses, suprasellar area with chiasmal compression, and the left lateral and anterior cranial fossa (Fig. 2).

Hormonal assessment revealed prolactin at 229 503 mU/L (83–325 mU/L), hypogonadotrophic hypogonadism, normal thyroid hormones, and normal insulin-like growth factor 1. There was also adequate response of the cortisol on the short Synacthen test. In addition, he had microcytic hypochromic anaemia.

Treatment

The patient was commenced on cabergoline 250 µg twice per week and was gradually (within a 6-week period) increased to 1 mg twice per week. One month after starting cabergoline, he regained full visual function (BCVA of 0.0 LogMAR with full colour vision and visual fields); however,

Foster Kennedy syndrome developed with mild swelling of the right optic disc (Fig. 3).

With continued cabergoline treatment, he maintained full visual function and the optic disc swelling gradually resolved, with complete resolution of the disc swelling at 4 months after the introduction of cabergoline. The prolactin normalized to 211 mU/L (83–325 mU/L), and the tumour reduced in size as noted on neuroimaging (Fig. 4).

During a 24-month follow-up period, the patient remained stable with no side effects from the cabergoline or further complications.

Discussion

Foster Kennedy syndrome, named after neurologist Robert Foster Kennedy (1884–1952) who first described it in 1911, is defined as ipsilateral optic atrophy with contralateral optic disc swelling from an intracranial mass (3). It is postulated that optic atrophy is the result of the direct compression by the mass ipsilaterally, whereas contralateral optic disc swelling is secondary to raised intracranial pressure. The majority of reported cases are caused by meningiomas of the olfactory groove, sphenoidal wing, or subfrontal regions. Other causes include frontal lobe abscess, frontobasal tumours, and craniopharyngiomas (4).

It is rare for pituitary adenomas to present with Foster Kennedy syndrome, and indeed only two cases have been previously reported in literature (5). In our case, however, Foster Kennedy syndrome developed after a month of starting medical treatment despite the achieved reduction in the prolactinoma size on imaging. To our knowledge, this is the first case describing a delayed presentation of Foster Kennedy syndrome following treatment in a patient with a skull base tumour. The reason for the delayed presentation is evident in the neuroimaging (Fig. 2). Direct compression of the left optic nerve caused left optic atrophy. The intracranial pressure (ICP) was elevated at presentation and still elevated 1 month after cabergoline; however, at presentation (Fig. 2A), compression at the right orbital apex by the tumour restricted the flow of cerebrospinal fluid (CSF) to the orbit and, therefore, the disc was not swollen. Shrinkage of the tumour 1 month later, secondary to cabergoline therapy, caused some tumour shrinkage, thereby decompressing the right orbital apex and allowing the transmission of CSF to the orbit (Fig. 2B). Since the ICP was still elevated at this stage, the disc appeared swollen.

Dopamine agonists have shown promising results in cases of giant prolactinomas (normalization of prolactin, shrinkage of tumour size, and improvement of vision and

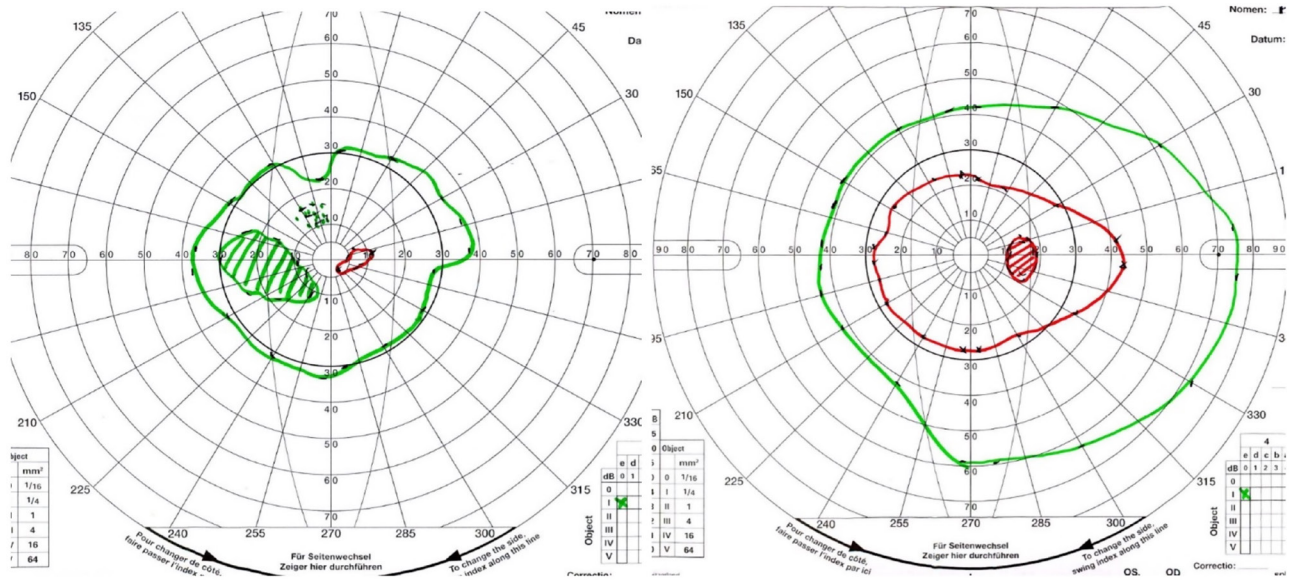


Figure 1 Goldmann visual fields before treatment. The right visual field is full. There is a left temporal defect and constricted residual I2e isopter.

visual fields). Cabergoline has resulted in significant and rapid reduction of prolactin in most series with >60% of the patients achieving normoprolactinaemia (6, 7). Similarly, tumour shrinkage has shown to be striking with more than 50% of patients demonstrating 50% reduction in size within 6–12 months of therapy (8). Visual field improvement is seen in a majority of patients on cabergoline within a few days after starting treatment (2, 9). The dose of cabergoline mostly used is in the range of 1.5–5 mg week (7).

In cases of giant prolactinomas resistant to dopamine agonist treatment, surgery is an alternative approach, the indication of which depends on the portion of the residual prolactinoma that is potentially resectable (2).

Surgical intervention is also indicated in tumours showing progression or regrowth while on dopamine agonist treatment. In such scenarios, post-operative radiotherapy is also considered (2). In cases of aggressive prolactinomas not responding to conventional management modalities, alternative medical treatments are potential options with temozolomide being the first choice (10).

In conclusion, pituitary macroprolactinomas should be considered in the differential diagnosis of Foster Kennedy syndrome. Close neuro-ophthalmic assessment of the optic nerve function (including visual acuities, pupillary assessment, colour vision, and visual fields) and monitoring of the optic discs by both fundoscopy and optical coherence tomography are crucial to determine

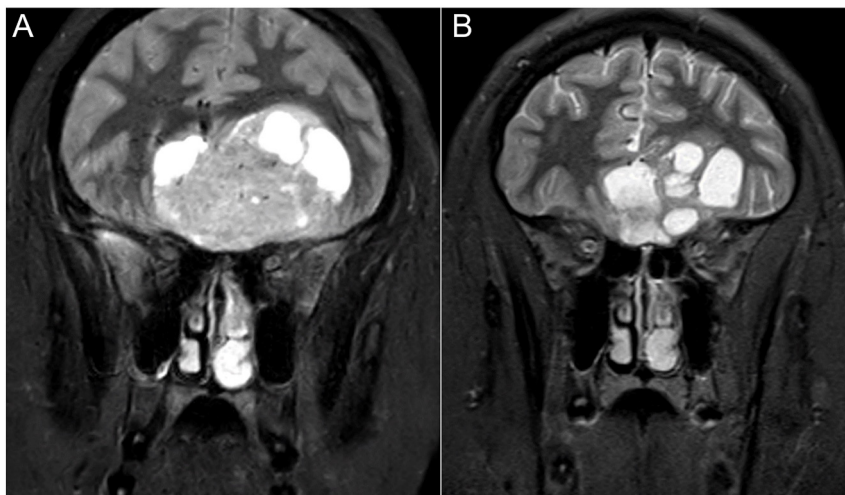


Figure 2 Coronal MRI fat-suppressed STIR sequences. Image A is at presentation and shows the absence of a CSF signal around the right optic nerve due to compression of the nerve at the orbital apex by the tumour. Image B 1 month after cabergoline was commenced shows that the tumour has reduced in size, decompressing the orbital apex, and therefore allowing the CSF to track along the optic nerve (perioptic space) resulting in swelling due to ongoing raised intracranial pressure.

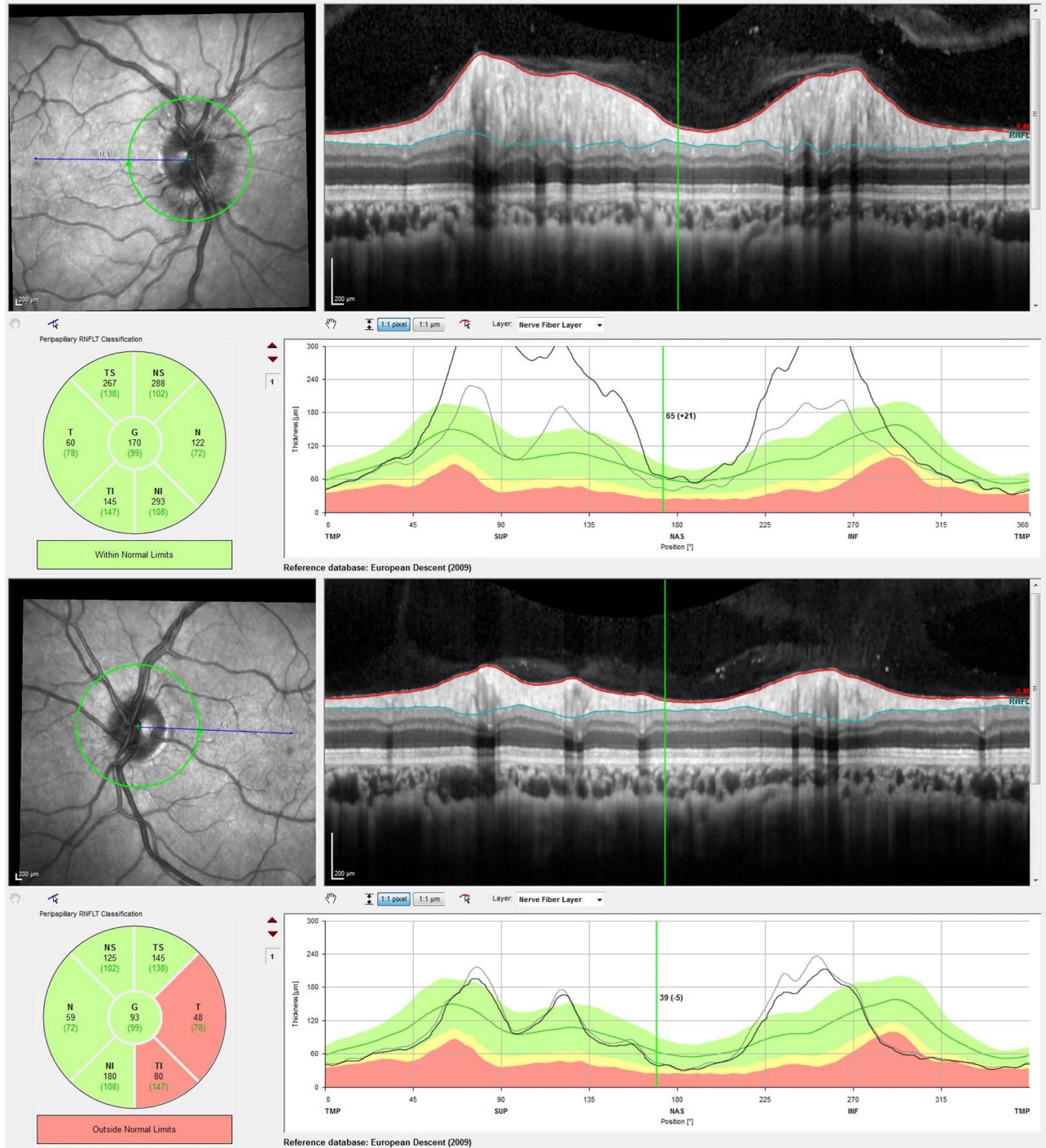


Figure 3 OCT scans of right (top) and left (bottom) optic discs 6 weeks after presentation showing increased thickness of the right RNFL consistent with optic disc swelling and left temporal/inferotemporal RNFL loss.

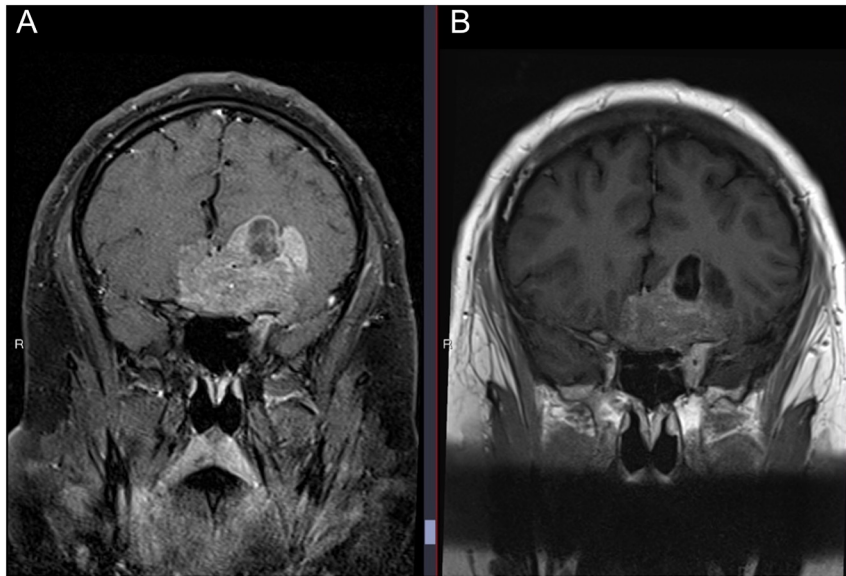


Figure 4
Coronal MRI with contrast comparing tumour size 1 month after starting cabergoline (image A) and latest scan in 33 months later (image B) showing further shrinkage with continuing cabergoline.

whether the response to medical therapy is adequate and maintained, and if surgical intervention is required.

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Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

Patient consent

Written informed consent has been obtained from the patient for publication of the submitted article and accompanying images.

Author contribution statement

U K, S S L and M W wrote manuscript. S C reviewed radiology images. N K and R B reviewed manuscript and approved final draft.

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