examination including dilated funduscopy may reveal choroidal secondaries which can be the first sign of disseminated diseases[6,22] and indeed may even be noted before the primary tumour is diagnosed.[23,24] Choroidal metastases are usually radiosensitive and palliative treatment can improve the vision by shrinking the lesion and promoting absorption of subretinal fluid.[24,25] Such treatment may prevent further ophthalmic complications and improve the patient's quality of life during a terminal illness.

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Sir,

Adenocarcinoma Metastatic to the Choroid: Diagnosis by Trans-scleral Biopsy

We report the use of trans-scleral choroidal biopsy in the diagnosis of a solitary, rapidly enlarging choroidal metastatic deposit, unresponsive to radiotherapy, in a patient with no evidence of systemic malignancy.

Case Report

A 68-year-old man in good general health was referred with a history of blurred vision in the inferior field of his left eye for 24 hours. There was no significant past medical or ophthalmic history. On examination, visual acuities were 6/9 right, 6/6 left. External and slit lamp examination of both eyes was normal, but funduscopy revealed a pale choroidal mass in the left eye (Fig. 1). The clinical features, fluorescein angiogram and ultrasound A-scan were suggestive of a metastatic deposit. Orbital CT showed thickening of the sclera, but no calcification or extraocular invasion (Fig. 2). A full general examination including chest radiograph, barium enema, isotope bone scan and abdominal ultrasonography revealed no evidence of systemic malignancy.

Over the following 2 months, the lesion showed rapid growth in all dimensions, and spread to involve the optic disc and macula (Fig. 3), despite external

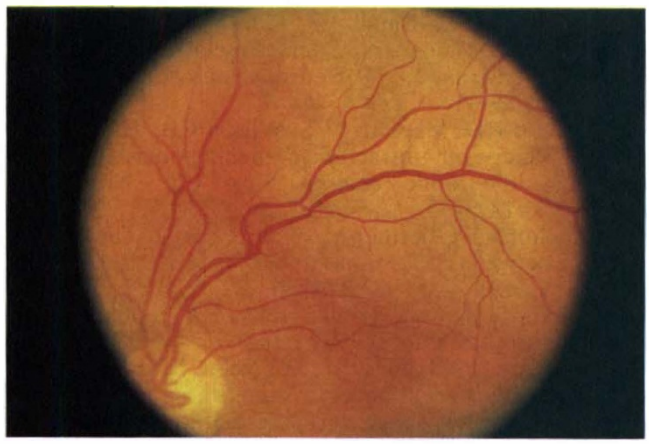


Fig. 1. *Left fundus at presentation, showing pale choroidal mass with associated shallow serous retinal detachment. Visual acuity 6/6.*

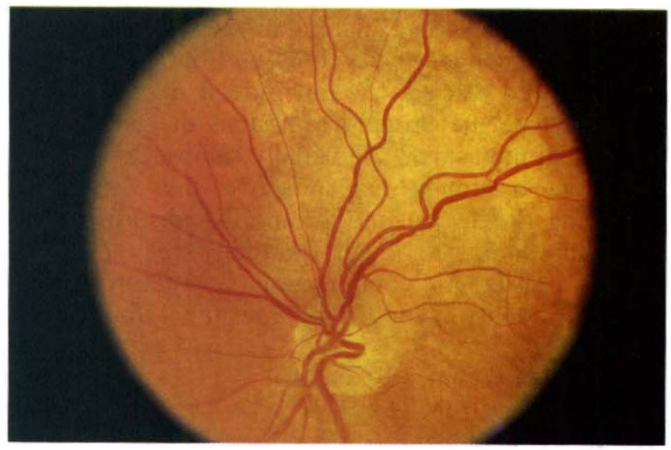


Fig. 3. *Three months following presentation, the choroidal mass has spread to involve the optic disc and macula. Visual acuity 6/60.*

beam irradiation of the tumour to a total of 30 Gy in divided doses. Four months after initial presentation, the patient complained of increasing left orbital pain and diplopia. Visual acuity in the left eye was 6/60, and examination showed a partial left VI nerve palsy. A reduced corneal reflex and infraorbital nerve anaesthesia was also present on that side. A repeated CT examination showed no orbital or intracranial abnormality. In order to obtain a tissue diagnosis, choroidal biopsy was performed via a trans-scleral approach (Figs. 4, 5). Histopathological examination of the biopsy specimen revealed infiltration of the choroid by moderately differentiated adenocarcinoma (Fig. 6), and electron microscopy showed mucus secretion granules in association with the malignant cells (Fig. 7), confirming the diagnosis of metastatic mucus-secreting adenocarcinoma. Cranial MRI was performed, and revealed an intracranial lesion involving the left side of the clivus and left cavernous sinus (Fig. 8).

A third cranial CT scan was now undertaken, 4 months after the second scan which had revealed only scleral thickening. On this occasion, a retro-orbital mass was seen within the muscle cone, involving the lateral rectus insertion, and also a soft tissue mass in the posterior sphenoid sinus with adjacent bone erosion (Fig. 9). Further systemic investigations including upper gastrointestinal endoscopy, chest radiograph, abdominal ultrasonography and whole-body bone scan were all normal. A course of palliative low-dose cranial irradiation was commenced, but the patient died 11 months following his original presentation. Permission for autopsy was refused.

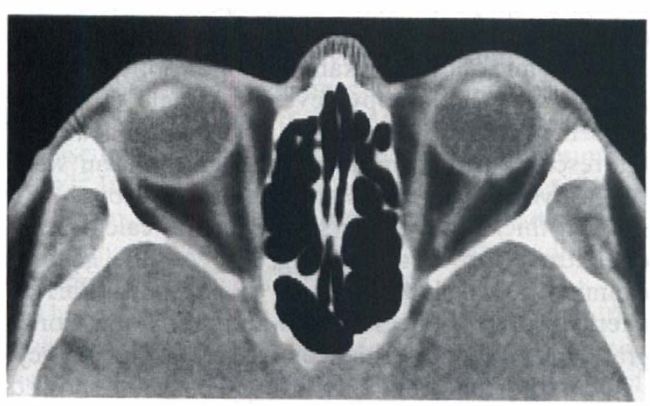


Fig. 2. *Orbital CT scan at presentation, showing thickening of left sclera.*

Discussion

Once considered a rarity, metastatic tumours to the eye are now recognised as the most common intraocular malignancies,[1,2] and may be the presenting feature of systemic carcinoma in up to 46% of patients.[2–4] Our patient presented with a rapidly enlarging solitary choroidal mass unresponsive to radiotherapy. Clinically, the differential diagnosis included primary amelanotic melanoma or a solitary choroidal metastatic deposit, yet extensive investigation revealed no evidence of systemic malignancy. In view of the rapid growth of the tumour, invasive

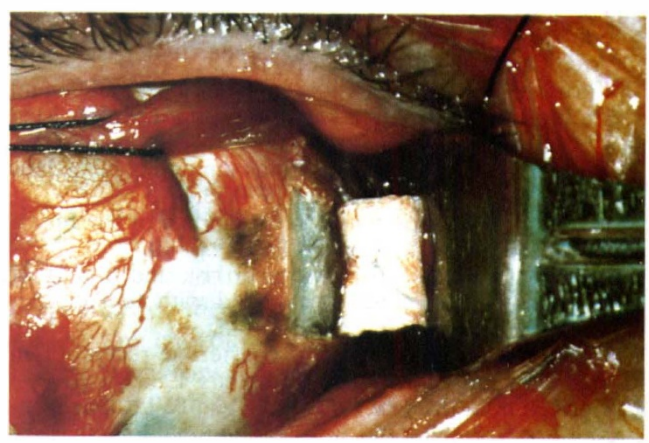


Fig. 4. *Trans-scleral choroidal biopsy. A 6 × 6 mm three-quarter thickness scleral flap has been raised posterior to the equator prior to the excision of a 2 × 2 mm block of scleral and choroidal tissue. The scleral flap is then sutured closed.*

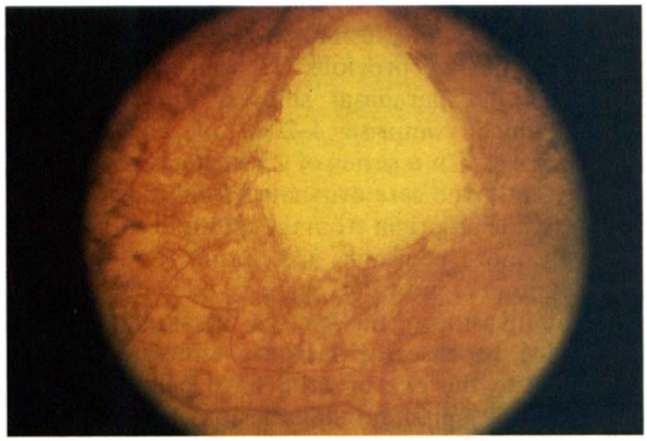
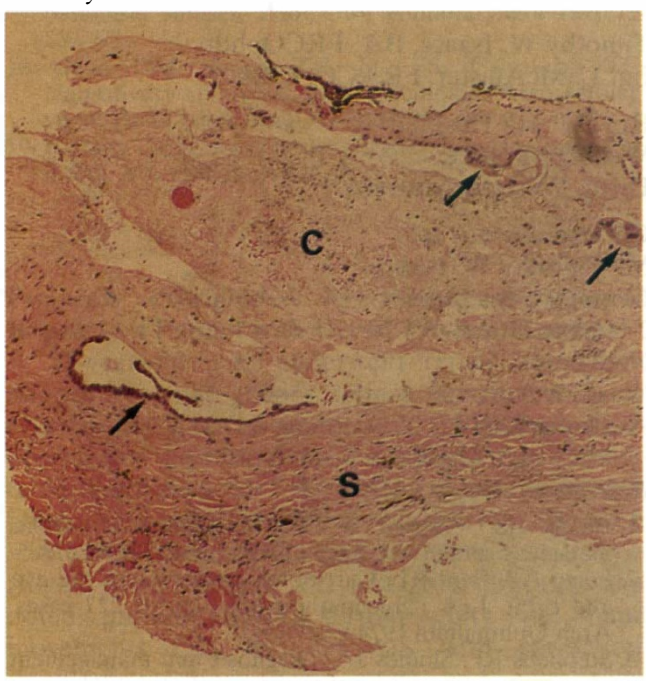
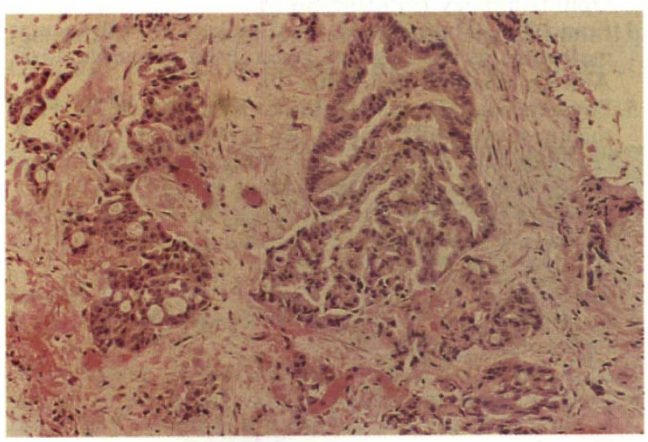


Fig. 5. *Healed choroidal biopsy site. Adjacent tissue is relatively undisturbed.*



(a)



(b)

Fig. 6. *Choroidal biopsy specimens. (a) Nests of malignant epithelial cells (arrowed) within largely necrotic choroid (C) and sclera (S). (Haematoxylin and eosin, negative magnification, ×50.) (b) Adenocarcinoma cells in glandular configuration within loose fibrovascular choroidal tissue. (Haematoxylin and eosin, negative magnification, ×100.)*

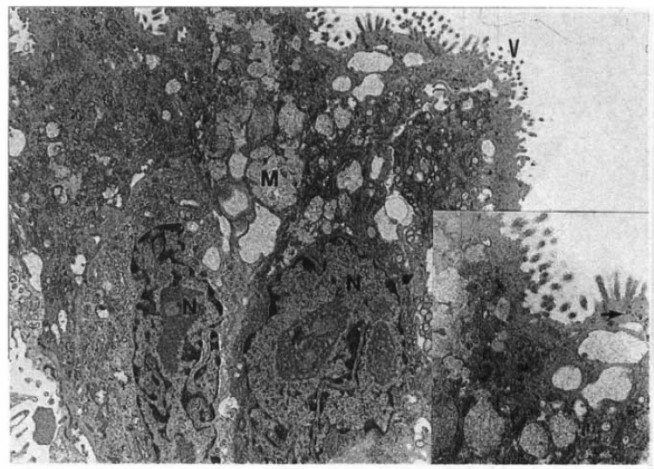


Fig. 7. *Electron micrograph of choroidal biopsy specimen. Main picture: Neoplastic epithelial cells, demonstrating highly atypical, irregularly indented nuclei (N), surface microvilli (V) and mucin secretion granules (M). magnification ×8190. Inset: Detailed view of surface microvilli and external glycocalyx layer. Junctional complex is arrowed. Magnification ×23 650.*

intraocular biopsy was considered justified in order to provide a tissue diagnosis.

The technique of chorioretinal biopsy was first reported by Peyman *et al.* in 1975, initially in experimental animals,[5] and then subsequently in humans.[6,7] The procedure enables a block of retina and choroid to be safely removed from the eye while maintaining the structural integrity of the globe, and has proved valuable in the investigation of selected cases of inflammatory, infectious and malignant

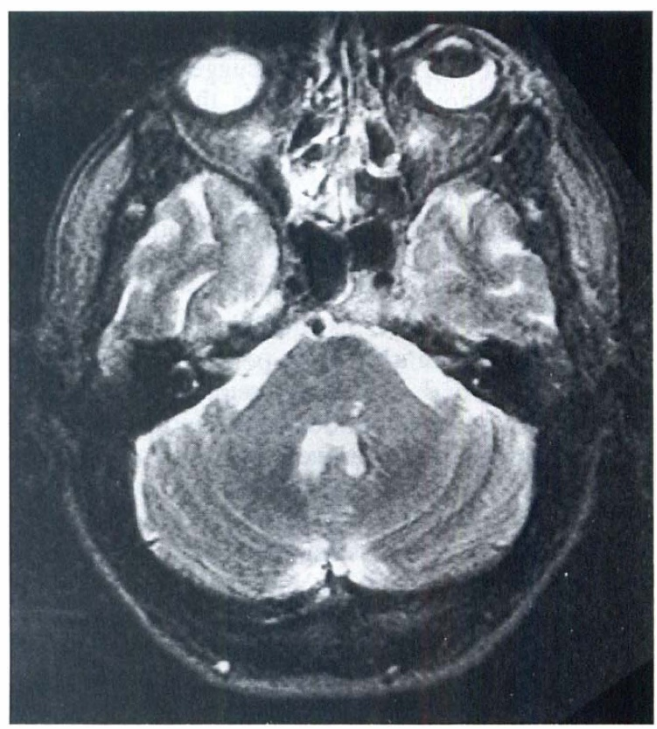


Fig. 8. *MRI scan showing the destructive lesion involving the left side of the clivus with extension into the left cavernous sinus.*

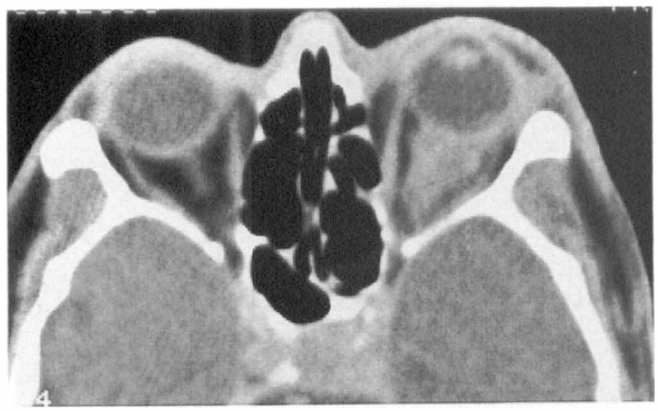


Fig. 9. *CT scan, 7 months after presentation, showing a left retro-orbital mass within the muscle cone extending to the insertion of the lateral rectus, and a soft tissue mass within the posterior sphenoid sinus with destruction of the dorsum sella.*

disease.[8–13] In this case, intraocular biopsy revealed malignant epithelial cells within the sclera and choroid, providing a diagnosis of metastatic mucus-secreting adenocarcinoma, and assisting the search for a primary source. In the event, the patient rapidly succumbed to his illness before such investigations could be completed, presumably due to the virulent nature of his disease, but, conceivably, the tissue diagnosis might have enabled more rapid identification of the primary tumour and the initiation of rational therapy. However, it should be remembered that a study of patient survival following the diagnosis of choroidal metastasis revealed a median survival time (MST) of just 236 days in 9 patients with an unidentified primary site.[14] This interval was not significantly different from the MST of patients with breast or lung cancer, and suggests that in any patient with choroidal metastasis the prognosis is poor.

In our patient the choroidal metastatic deposit proved unresponsive to radiotherapy, prompting the use of intraocular biopsy. However, other authors have reported greater success with this treatment modality.[3,15] Approximately half the series of 70 cases reported by Stephens and Shields[3] were treated with external beam irradiation to the involved eyes, often resulting in dramatic regression of the tumour, a reduction in subretinal fluid, and improved visual acuity. Complication rates were low, probably due to the relatively short survival time in most patients. In addition, Keates and Billig[16] have reported a case in which a choroidal metastasis responded favourably to systemic chemotherapy, and suggest that direct visualisation of ocular metastases permits the monitoring of the effectiveness of chemotherapy.

In view of the fact that an autopsy was not performed, it is possible only to speculate upon the possible site of the primary source. It is conceivable that the lesion identified by the third CT scan within the posterior sphenoid sinus represents the primary source, and that this lesion was present but simply not visible on two previous CT scans. Adenocarcinomas of the paranasal sinuses are uncommon lesions which comprise 4–20% of all sinonasal malignancies.[17] In a series of 13 such cases reported recently, only one case originated from the sphenoid sinuses, while an origin from the ethmoid sinuses was relatively more common, accounting for 9 cases.[18] These tumours tend to be aggressive locally, causing death by invasion of the base of the skull.[19] To our knowledge, no cases of paranasal sinus malignancy metastatic to the eye or orbit have been reported. However, the sphenoid sinus lesion in our patient may represent simply a further metastatic deposit from an unknown primary source.

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Sir,

Proptosis Precipitated by Retinal Detachment Repair in a Patient with Occult Pituitary Tumour

A 51-year-old man underwent repair of a right inferior rhegmatogenous retinal detachment using cryotherapy and circumferential plombage. Postoperatively the retina was flat and the eye comfortable. Four days later the patient presented with a painful, red right eye. There was extreme chemosis and congestion of the upper tarsal conjunctiva (Fig. 1) together with a 3 mm axial proptosis not noted pre-operatively. Visual acuity was hand movements OD and 6/6 OS with correction. Pupillary reactions were intact and extraocular movements were very painful and generally slightly restricted. The intraocular pressure was 22 mmHg OD and 16 mmHg OS and the anterior chambers were deep.

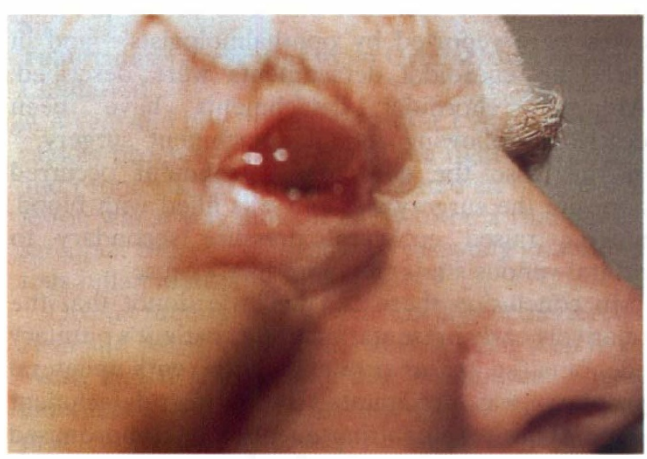

Fig. 1. *Gross chemosis and congestion causing prolapse of the upper tarsal conjunctiva.*

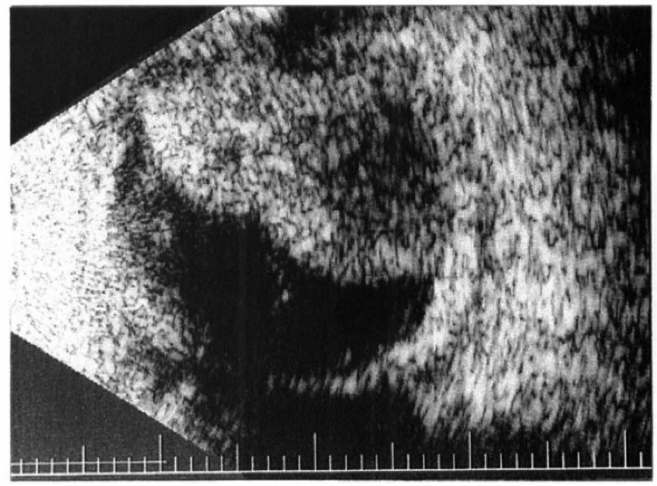

Fig. 2. *B-mode ultrasound scan (vertical section) showing a large superior choroidal detachment filled with a substance most likely to be blood. Also shown is a thickened posterior sclera with fluid in Tenon's space; this inflammation may be in part post-operative and in part secondary to infection.*

Funduscopy revealed a large superior choroidal detachment, the inferior retina being flat. Ultrasonography demonstrated the presence of a homogeneous echogenic substance (probably blood) filling the choroidal detachment completely, together with thickening of the posterior sclera (Fig. 2). The clinical signs improved somewhat with commencement of intravenous antibiotics but worsened when the intravenous route was substituted with oral antibiotics.

A diagnosis of orbital vein thrombosis was made and a CT scan with contrast showed a pituitary tumour invading and obliterating the right cavernous sinus (Fig. 3). A MRI scan demonstrated that the exact extent of the tumour was purely intracranial without orbital extension (Figs. 4, 5). The tumour was removed by a neurosurgeon and the absence of intraorbital extension confirmed. Histological examination revealed it to be a chromophobe adenoma.

Discussion

Extrasellar extension occurs in 14–22% of pituitary adenomas[1] and spread into the cavernous sinus may cause cranial nerve palsies and orbital venous statis.[1] Choudhury[2] suggests that secondary venous stasis in the orbit may produce oedema and congestion of the orbital tissues which may cause proptosis; this view is supported by some authors[3] while others[4] emphasise the combined role of venous occlusion and an inflammatory response in the pathogenesis of the proptosis. In our case marked congestion and chemosis were present as was raised intraocular pressure on the affected side (probably also attributable to orbital venous stasis causing raised episcleral pressure); there was also an inflammatory response, as documented by the thickened posterior