One limitation of this study is the non-healing nature of this laboratory model, which does not allow an assessment of the long-term stability of the wound and efficacy of the procedure in terms of reducing intraocular pressure.

In conclusion, we have shown here that scleral dissection for NPDS surgery can be accurately achieved using a femtosecond laser. Further investigation on an animal model with clinical correlations is needed.

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Pulmonary tuberculosis presenting with central retinal vein occlusion

Tuberculosis remains a major international public health concern, with the global incidence rate increasing approximately 0.4% per year, but much faster in sub-Saharan Africa and Eastern Europe;¹ the effect that HIV has on incidence is also highly significant.² Within the UK the incidence of tuberculosis varies considerably between regions and ethnic groups, with rates increasing significantly among recent immigrants.³

Figure 1 Image of left retina showing central retinal vein occlusion and retinal haemorrhage.

This case describes a patient who presented with central retinal vein occlusion (CRVO) who was subsequently diagnosed with tuberculosis.

Case report

A 28-year-old Asian woman presented with transient obscuration of her vision. She had no other eye symptoms, central nervous system or systemic symptoms. She had no history of fevers or night sweats. There were no respiratory symptoms. There was no past medical history. She had lived in the United Kingdom for 18 months and had an apparently normal chest X-ray in her home country before leaving to come to the United Kingdom. She was a non-smoker with no significant family history of illness.

On examination she was thin but she did not report significant weight loss. There were small lymph nodes in her left cervical chain. Fundoscopy revealed CRVO (see fig 1). Initial investigations showed normal urea and electrolytes, white cell count of 6.4×10^9 cells/L, haemoglobin 12.2 g/dL, platelets 318, normal clotting screen, C-reactive protein 3.6 mg/L, erythrocyte sedimentation rate 38 mm/hour, total protein was elevated at 87 g/L, plasma viscosity was elevated at 1.95 pa/s, IgG was 20.51 g/L. She had negative results for the following: rheumatoid factor, anti-nuclear antibody, lupus anti-coagulant, IgG and IgM phospholipid antibody, neutrophil cytoplasmic antibody (both anti-proteinase cytoplasmic

Figure 2 High resolution of computed tomography scan of thorax showing 'tree in bud' opacities in apical segments of upper lobes.

Learning points

- Any cause of central retinal vein thrombosis should be followed up and a medical cause sought, a chest X-ray being an appropriate baseline investigation.
- Early recognition of this association is vital to limit morbidity.
- Tuberculosis can present in a variety of ways and should be thought of in the differential diagnosis especially in recent immigrants to the United Kingdom.

and myeloperoxidase perinuclear antineutrophil cytoplasmic antibody), and cryoglobulins. Complement C3 and C4 levels were normal.

Chest X-ray showed very faint inflammatory shadowing in the left apex and a bulge in the contour of the right hilum possibly representing lymphadenopathy. She had a normal magnetic resonance imaging brain scan. A computed tomography scan of the abdomen and thorax (fig 2) was performed that showed significant lymphadenopathy in the cervical and supraclavicular region as well the right hilum, subcarinal and paratracheal regions. The subcarinal lymph nodes were heavily calcified. There were 'tree in bud' opacities in the apical segments of the upper lobes, suggestive of active pulmonary tuberculosis.

She had a bronchoscopy as she was unable to expectorate sputum. Bronchoscopic washings of the upper lobes showed scanty acid-fast bacilli. Fully sensitive *Mycobacterium tuberculosis* grew from the culture. This confirmed the diagnosis, central retinal vein thrombosis associated with active tuberculosis. She has made a full recovery on quadruple antituberculous therapy, with resolution of her eye symptoms.

Comment

In this case symptoms were caused by non-ischaemic CRVO, which on its own does not lead to blindness and carries a good prognosis. Ischaemic CRVO, however, is the second commonest sight-threatening vascular disorder; the pathogenesis remains unclear.⁴ The commonest associations are hypertension, diabetes mellitus, bleeding or clotting disorders, autoimmune conditions, glaucoma, head trauma or excess alcohol consumption. Many other aetiologies have, however, been reported including secondary to excess liquorice ingestion, renal cell carcinoma, multiple myeloma, herpesvirus 6, drugs (including sildenafil and rofecoxib) and as a result of paraneoplastic phenomenon associated with lung cancer.

A retrospective study of 103 cases of CRVO in young adults without diabetes who were followed for at least six months showed the majority (64%) to be men. Although vision was good approximately a third had vision of 20/200 or worse.⁵ In a series of 17 young UK patients with CRVO, ocular involvement was characteristically unilateral, with moderate degrees of retinal haemorrhage, little retinal ischaemia, and a tendency to optic disc swelling. Visual prognosis was found to be good and follow-up showed that most patients had good general health and no involvement of the other eye. Interestingly, an inflammatory aetiology or underlying vascular disease was not found in most patients.⁶

Tuberculosis associated with retinal vasculitis has been reported previously⁷ more than 20 years ago, although there was no evidence of vasculitis here. This case highlights the fact that CRVO can occur as a result of tuberculosis and transient visual disturbance should be appropriately investigated. With the increase in the incidence of tuberculosis, it is important to include it in the differential diagnosis list for CRVO.

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Maggot therapy following orbital exenteration

Orbital exenteration is a radical surgery reserved for the treatment of locally invasive or potentially life-threatening orbital tumours.¹ Complications occur after 20–25% of exenterations and include tissue necrosis (6%) and infection (3–4%).^{2–4} In the present report, we describe the management of a post-exenteration orbital infection by the use of maggots.

Case report

An 82-year-old multimorbid man presented with a fist-sized painless tumour of the left orbit (fig 1A). Computed tomography demonstrated an orbital mass clearly demarcated from the surrounding tissue (fig 1B). After biopsy, the neoplasm was classified as a borderline-malignant extrapleural solitary fibrous tumour. Therefore, a total orbital

Figure 1 (A) Preoperative photograph of patient with a fist-sized tumour of the left orbit. (B) Computed tomography showing a homogeneous orbital mass. Informed consent was obtained for publication of this figure.

exenteration was performed, and the wound was left open to heal by granulation. Postoperatively, the patient's general condition worsened because of an infection of the urinary tract and a transient ischaemic attack. In addition, orbital wound secretion became purulent by the twelfth postoperative day despite intensive local disinfection using hydrogen peroxide, treatment with gentamycin ointment, and oral application of ciprofloxacin 500 mg once a day. Microbiological analysis of the wound secretion revealed ampicillin-sensitive *Enterococcus* and *Bacteroides* species. The systemic antibiotic therapy was adjusted to intravenous application of ampicillin 1.2 g three times a day. Nevertheless, no reduction of the purulent secretion was observed. As the patient did not qualify for surgical debridement because of his poor general condition, we decided to place a small envelope of nylon gauze with 50 blowfly maggots (*Lucilia sericata*, BIOBAG 50; BioMonde GmbH, Barsbüttel, Germany) into the orbit (fig 2) while continuing systemic antibiotic therapy. Within this biobag the larvae come into contact with the wound fluids but they cannot escape. When the bag was replaced by a new one four days later, almost no purulent secretion was seen. By this time, maggots had grown from 3 mm to approximately 10 mm in size. After a second larval application of four days, the orbit was free of purulent secretion. To prevent new infection, wound treatment was continued by the local

application of azidamfenicol ointment two times a day.

Comment

Advanced age, multimorbidity, and drug-resistant bacteria are increasing challenges to wound care. Therefore, alternative ways for debridement and for the management of local infections in addition to the administration of antibiotics are helpful. Clinical observations provide evidence that maggots applied to wounds remove necrotic tissue, promote disinfection, and accelerate granulation tissue formation.⁵ The larvae ingest microorganisms and destroy them during their passage through the digestive tract.⁶ In addition, the excretions/secretions released by maggots exert antimicrobial effects and induce fibroblast migration.^{7–8} So far larval debridement therapy has proved successful in a variety of non-healing skin and soft tissue wounds, e.g. neuropathic and ischaemic foot ulcers.⁹ To our knowledge, however, this is the first report on the medical use of maggots in an ophthalmic patient. Potential complications of larval therapy, such as pain, pressure-induced ischaemia, and patient anxiety can be prevented by analgesics, spacious wound dressings, and patient education.¹⁰ None of these adverse effects was observed in our patient. The present case suggests that maggot therapy is a low-invasive, efficient and cost-effective option for the treatment of postoperative orbital infections in patients not responding to antibiotic therapy and not qualifying for surgical debridement.

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Figure 2 A small envelope of nylon gauze with 50 maggots was placed into the orbit. Within the biobag the larvae exert their antimicrobial and wound-debriding effects without the risk of escaping.