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Nocardia choroidal abscess

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Abstract

***Nocardia* is a Gram positive, aerobic, filamentous branching micro-organism that rarely causes human infection. When infection does occur it usually takes the form of a subcutaneous abscess or a pneumonia-like illness. We describe a case of a patient with chronic lymphocytic leukaemia who developed painless loss of vision in the right eye secondary to a choroidal abscess after a prolonged course of treatment on several immunosuppressive agents. The patient also complained of right shoulder pain that was unresponsive to conventional therapy, and had been admitted and treated for several episodes of 'pneumonia'. A diagnostic transvitreal fine-needle aspiration biopsy of the ocular lesion was performed which demonstrated *Nocardia asteroides*. This allowed for appropriate antibiotic therapy to be instituted early in the course of the infection and prompted the systemic work-up which also demonstrated central nervous system and arthropic nocardial infection.**

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Nocardia is an aerobic, Gram positive, branching filamentous micro-organism that is found with ubiquity in the soil. Human infection is rare and usually occurs in the form of a subcutaneous abscess or a pneumonia-like illness. Haematogenous dissemination of the organism, particularly in an immunocompromised host, may occur to any organ system and there is a predilection for the central nervous system.[1] We describe a patient with chronic lymphocytic leukaemia (CLL) in whom nocardiosis was initially diagnosed by a fine-needle aspiration biopsy of a choroidal abscess.

Case report

A 63-year-old white male presented with a 2 week history of painless loss of vision in his right eye. He was diagnosed in 1985 with CLL and had been controlled by several chemotherapeutic regimens, most recently fludarabine and prednisone. He did give a history of several episodes of pneumonia that were believed to be bacterial, and responded slowly to antibiotic therapy. Four weeks before our examination, he developed right shoulder pain that did not respond to indomethacin.

On initial ophthalmic examination, his best corrected visual acuity was 20/400 in the right eye and 20/20 in the left eye. Intraocular pressures were normal. The left eye was normal. Slit-lamp biomicroscopy of the right eye revealed normal findings except for cells in the anterior vitreous. Funduscopic examination of the right eye demonstrated a yellow submacular choroidal lesion with overlying intraretinal and subretinal haemorrhage (Fig 1). Localised retinal thickening and subretinal fluid were noted. There were no cells in the posterior vitreous.

Ultrasonography of the right eye showed an acoustically hollow choroidal mass with low internal reflectivity measuring 3·0 mm in depth. Overlying subretinal fluid and superficial choroidal infiltration were noted. The lesion blocked choroidal background fluorescence in the venous phase of fluorescein angiography (Fig 2). Mottled areas of increased fluorescence developed within the lesion as the study progressed and there was diffuse staining of the surrounding retinal vessels. Progressive leakage from the lesion, and persistent blockage owing to the retinal haemorrhage were evident during the recirculation phase (Fig 3).

A transvitreal fine-needle aspiration biopsy was performed by a previously described technique to obtain diagnostic material from the lesion.[2] A bent 25 gauge needle was inserted through pars plana at 8 o'clock and passed in a transvitreal fashion into the lesion under indirect ophthalmoscopic guidance. The needle was connected via plastic tubing to a 10 ml syringe and a small amount of diagnostic material was aspirated into the needle bore. Aspiration was then stopped and the needle gently removed from the eye. Minimal haemorrhage at the biopsy site was curtailed with tamponade and

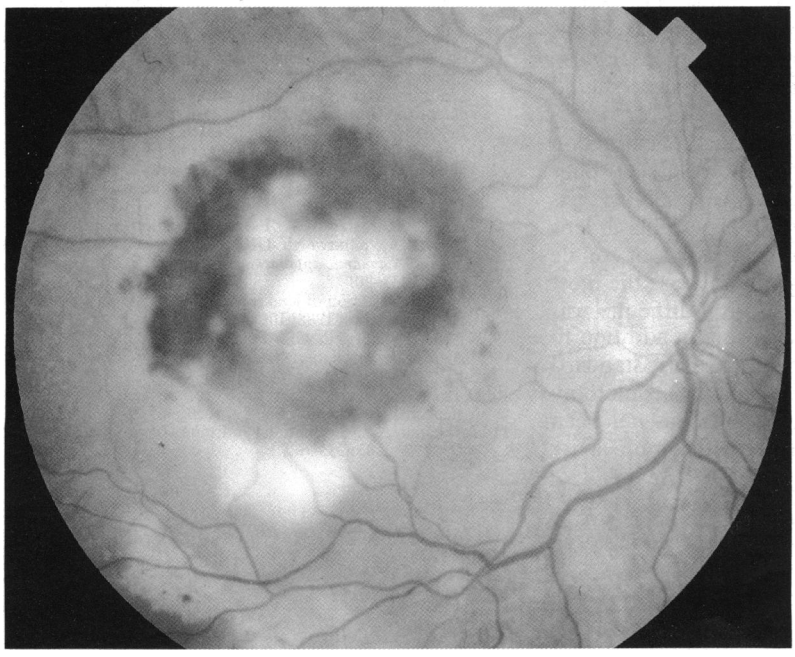


Figure 1 Fundus photograph showing submacular choroidal lesion of the right eye with overlying retinal haemorrhage.

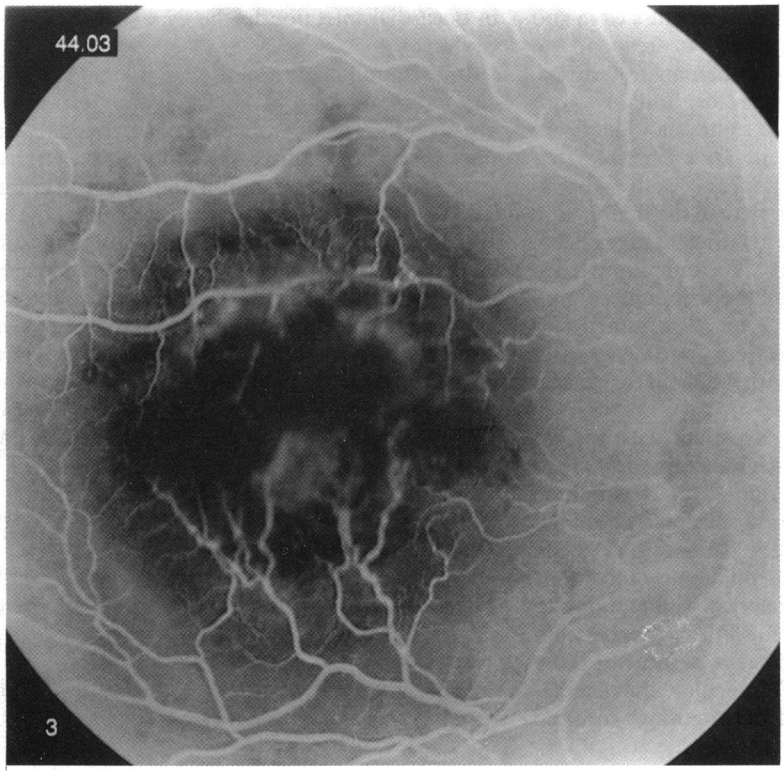
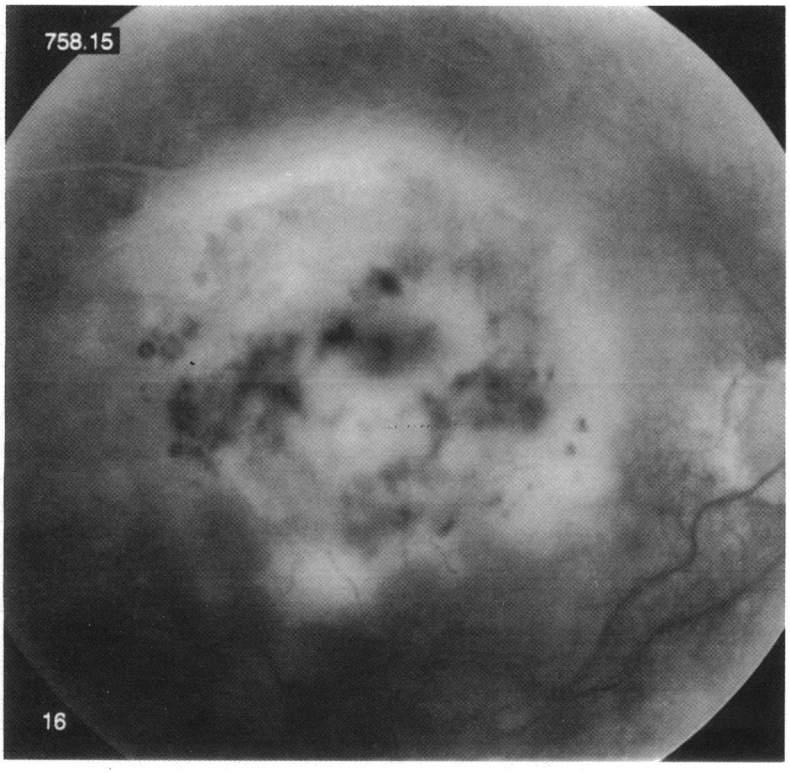


Figure 2 Fluorescein angiogram of the right eye (venous phase) showing blockage of choroidal background fluorescence by the lesion.

balanced salt solution was injected to raise the intraocular pressure to normal. The needle was then removed from the connector tube and immediately immersed in saline solution. The saline was aspirated through the needle, flushing the material into the syringe. All material obtained was then submitted for microbial and cytological examination which showed acute and chronic inflammatory cells and red blood cells. No organisms or leukaemic cells were seen. The Gram stain showed Gram positive, branching, filamentous organisms consistent with *Nocardia*. *Nocardia asteroides* was isolated in a microbiological culture. The organism was sensitive to amikacin, cefotaxime, erythromycin, trimethoprim, and sulphamethoxazole. No other organisms were identified.

Therapy with parenteral trimethoprim/sulphamethoxazole was instituted and the patient was evaluated for systemic nocardiosis. Computed tomography (CT) revealed approximately 35 small presumed nocardial abscesses in the brain. It should be noted that at this time the patient was not experiencing any symptoms that were believed to be related to CNS nocardiosis. Additionally, synovial fluid aspirated from the patient's painful right shoulder demonstrated organisms compatible with *Nocardia asteroides*. The systemic nocardiosis responded somewhat during a 1 month period of intensive intravenous treatment. A repeat CT scan of the brain approximately 4 months later demonstrated resolution of the CNS lesions, and the right shoulder pain had abated. The choroidal abscess appeared to enlarge somewhat over the following 4 months and the patient was subsequently given intravitreal injections of amikacin (400 μg) and cephazolin (Ancef, USA) (2·25 mg). Over the next 3 months, the abscess became an elevated, subretinal fibrotic mass with a resultant visual acuity of hand movement in the right eye. Visual acuity in the left eye remained 20/20, with a normal ocular examination. Currently, the patient is maintained on oral co-trimoxazole and the visual acuity is unchanged.

Figure 3 Fluorescein angiogram of the right eye (recirculation phase) showing progressive leakage from the lesion.



Discussion

Historically, nocardial infections in humans are very rare and often self-limited. Their frequency and severity are increasing, however, as immunosuppressive and chemotherapeutic agents are used more frequently.[3] The use of cyclophosphamide and steroids in combination has been shown experimentally to increase susceptibility to nocardial infection.[1]

Nocardia asteroides, a member of the order Actinomycetales, is a slow growing, Gram positive, variably acid-fast, filamentous aerobic organism that inhabits the soil.[4] The organism grows readily over a wide temperature range and on relatively simple media. *Nocardia asteroides* and *Nocardia brasiliensis* are the two most common species that cause morbidity in humans with *N asteroides* accounting for about 90% of the cases. The infection is commonly acquired via the pulmonary route by inhalation of the organism, or subcutaneously by direct contamination of an open skin wound. The pulmonary lesions tend to simulate tuberculosis or histoplasmosis. Approximately 50% of patients with pulmonary nocardiosis have haematogenous dissemination, particularly to the brain.[5] Currently, trimethoprim-sulphamethoxazole is the drug of choice for treating nocardiosis. In cases of antibiotic resistance or allergy, either amikacin, minocycline, or ampicillin and erythromycin in combination have been found to be effective. *Nocardia* also shows susceptibility to some of the second and third generation

cephalosporins. Although our patient's CNS and arthropic infection appeared to respond to treatment, the ocular lesion demonstrated progression. Antibiotic resistance is unlikely since the brain abscesses and right shoulder pain resolved during treatment. It is possible that although both trimethoprim and sulphamethoxazole serum levels were in the therapeutic range, these levels may be insufficient to eradicate an intraocular infection. To our knowledge therapeutic levels of trimethoprim and sulphamethoxazole have not been determined for intraocular nocardial infections, nor have serum levels been correlated with aqueous or vitreal levels.

In the case presented, a patient with known CLL on immunosuppressive therapy developed decreased vision in his right eye. Ophthalmic examination disclosed a submacular choroidal abscess. Previously, the patient had been hospitalised for numerous pulmonary infections and more recently developed right shoulder pain. Though not proved, it is probable that *Nocardia* was a causative agent in some of these pulmonary infections. We speculate that haematogenous dissemination from the lungs resulted in nocardial infection in the eye, shoulder, and CNS.

In immunocompromised patients with chorioretinal infiltrative lesions, opportunistic organisms are frequently the causative agents. In this, and a previously described case,[5] transvitreal fine-needle aspiration biopsy of the lesion led to early, accurate identification of the organism. Appropriate antibiotic therapy and systemic work-up were then implemented early in the course of the infection. This is particularly important as a delay in appropriate therapy is associated with increased morbidity and mortality.

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