

# ***Candida albicans* induced chorioretinitis and retinal vasculitis in an immunocompetent adult following tooth extraction**

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## **ABSTRACT**

Chorioretinitis is a sight-threatening condition that affects the fundus of the eye and may result in permanent vision loss if not appropriately treated. *Candida albicans* is a known causative organism for this condition in immunocompromised patients. We report the case of a 26-year-old healthy and immunocompetent man who presented with rapidly progressive, painless loss of vision in his left eye three days after undergoing a tooth extraction on the contralateral side. A swab from the site of tooth extraction isolated *Candida albicans*. Anatomical recovery was achieved after treatment with systemic fluconazole and prednisolone. However, functional recovery was poor. This case illustrates the need to consider a fungal cause of chorioretinitis and retinal vasculitis even in immunocompetent patients.

**Keywords:** Retinal vasculitis, fungal infection, *Candida albicans*, chorioretinitis

## **INTRODUCTION**

*Candida* is a group of single-cell yeast fungi. *Candida albicans* is the most species affecting the eye. *Candida albicans* may cause a spectrum of disease in the eye ranging from isolated chorioretinitis to endophthalmitis. The source of infection can be either exogenous, for instance due to ocular trauma or following eye surgery, or endogenous (usually by haematogenous spread from a remote source of Candidiasis elsewhere in the body). In general, endogenous ocular candidiasis is rare in

immune competent adults. Extreme young age, immune deficiency, intravenous alimentation and drug abuse are known risk factors. Two main clinical entities were previously reported in adults: chorioretinitis and endophthalmitis.<sup>1</sup> Chorioretinitis is evident in 2-9% of patients with systemic candidaemia.<sup>1,2</sup> *Candida* related retinal vasculitis has also been reported in neonates with candidaemia.

Oral candidiasis is a known source of candidaemia and ocular candidiasis. The association between dental procedures, such as tooth extraction and intraocular complications has been published several times in the medical literature.<sup>3</sup> We report a rare occurrence of

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**Figs. 1:** a) Coloured fundus photo of the left eye showing optic disc swelling, retinal vasculitis and extensive subretinal exudates with fluid levels, and b) Fluorescein Fundus angiography of the left eye at two days after initial presentation showing optic disc involvement and the severe vasculitic changes (arrows).

unilateral combined chorioretinitis and retinal vasculitis following tooth extraction in an immunocompetent patient with oral candidiasis.

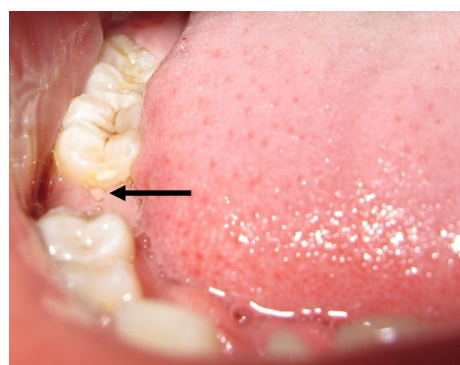
## CASE REPORT

A 26-year-old fit young man presented with a week history of painless, rapidly progressive, blurring of vision of his left eye. He had no known medical illnesses and was not on any medications. He gave history of travel to India a month earlier for a football match. Prior to this, he denied any history of trauma, surgical procedures, use of intravenous medications or systemic symptoms such as fever or headache.

Examination of his eyes revealed a visual acuity of 6/6 in the right eye but only limited to Counting Fingers (CF) in the left eye. The left eye had a relative afferent pupillary defect (RAPD) and defective colour vision. Anterior segment examination was normal in both eyes. Fundus examination of the left eye showed severe optic disc oedema and vasculitis involving both the supero-temporal and supero-nasal arcades. The vitreous showed no evidence of vitritis. There was ex-

extensive subretinal exudate involving the macula and the superior retina, extending nasally to the disc. Subretinal fluid levels were noted along the inferior edge of the exudative detachment (Figure 1a). Fluorescein Fundus Angiography confirmed the presence of vasculitis (Figure 1b).

A working diagnosis of left chorioretinitis with retinal vasculitis was made, and the patient was admitted to the Eye Ward for treatment. Urgent computed tomography (CT) scan of the orbit and brain, Mantoux test, chest radiography, full blood count, erythrocyte sedimentation rate (ESR) and renal pan-



**Fig. 2:** Photo of the oral cavity showing a whitish ulcer at the site of the previous tooth extraction (Arrow).

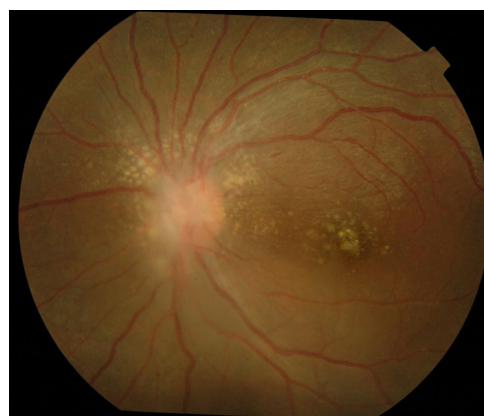
el, HIV screening, virology, Toxoplasma serology, VDRL and autoimmune screen were all negatives or within normal limits. The patient was then started on a trial of intravenous methylprednisolone 1 gm daily, with antibiotic coverage (IV Cefazidime 1gm twice daily). Despite two days on intravenous methylprednisolone, there was no improvement in the visual acuity, exudative detachment, optic disc swelling and vasculitis.

Further elaboration on history revealed a history of right mandibular molar tooth extraction three days before the onset of the symptoms, which the patient had overlooked when he was asked about surgical procedures earlier on. Examination of the oral cavity showed a whitish ulcer at the site of the tooth extraction (Figure 2). Swabs from the bed of the ulcer, as well as blood specimens, were sent for culture. In view of suspicion of a possible fungal underlying cause, the intravenous methylprednisolone was stopped, and intravenous Fluconazole 400mg/200ml daily was started. Dramatic reduction in the amount of subretinal exudate was seen over the next two days. Oral prednisolone acetate 60 mg daily was then started to control the vasculitis.

By the sixth day of admission, oral swabs culture isolated *Candida albicans*. Blood cultures, however, were negative for both fungi and bacteria. Therefore, the intravenous antibiotics were stopped, and treatment was continued with intravenous antifungal and oral steroids with monitoring of liver function.

## DISCUSSION

Chorioretinitis is an inflammatory process that involves the choroid, and invariably, the



**Fig. 3: Coloured fundus photo of the left fundus four months after initial presentation showing improvement but permanent damages to the retina.**

retina. Non-infectious causes include a range of systemic conditions such as Sarcoidosis, collagen vascular disorders, Vogt Koyanagi Harada syndrome and Behçet disease.<sup>4</sup> Possible infectious causes depend on the status of immunity. In immunocompetent patients, the most common infectious causes include Toxoplasmosis and parasitic infections.<sup>5,6</sup> Fungal, viral and tuberculous infections, on the other hand, are more common in immunocompromised individuals.<sup>7-9</sup>

Although fungal infections of the eye are uncommon in immunocompetent healthy adults, epidemiologic studies have shown that the number of cases of sepsis caused by fungal organisms has increased by 207% between 1979 and 2000.<sup>10</sup> The most common exogenous sources of fungal eye disease include surface and penetrating eye injuries (especially when organic foreign body is involved), contact lens use and topical steroids use. An exogenous fungal eye infection may cause fungal keratitis and/or anterior uveitis/endophthalmitis. Endogenous fungal eye infections, on the other hand, are more prevalent in patients with defective immune system

(due to Acquired Immunodeficiency Syndrome 'AIDS', post-organ transplant or diabetes mellitus for instance), drug addicts and those on chronic intravenous alimentation, and very young neonates with fungaemia. Endogenous eye disease spectrum involves two distinct entities – chorioretinitis (when vitritis is absent) and endophthalmitis (when vitritis and/or anterior uveitis are present). *Candida albicans* is the most common organism encountered in both exogenous and endogenous fungal eye disease.<sup>11</sup>

Ocular complications following dental procedures are well reported in the literature.<sup>3</sup> A variety of clinical procedures such as tooth extraction, periodontal and endodontic treatment may cause local spread to the sinuses and the ipsilateral orbit, as well as translocation of microorganisms from the oral cavity to the bloodstream.<sup>3</sup> Microorganisms that gain entrance to the blood circulate throughout the body, but are usually eliminated by the host defences with no consequences. However, in rare cases, morbid dissemination of the organism had been reported.<sup>12</sup> Embong *et al.*<sup>13</sup> reported a patient with right maxillary molar dental abscess who developed ipsilateral oropharyngeal abscess and contralateral orbital cellulitis. They postulated that spread to the contralateral orbit might have happened haematogenously through the inter-cavernous sinusoidal septum. In our patients, the source of infection was a contralateral mandibular molar tooth extraction site suggesting transient candidemia as the most likely pathophysiologic mechanism.

In a healthy, immunocompetent patient, fungaemia as the possible cause of chorioretinitis is very uncommon.<sup>14</sup> Our patient

represented a diagnostic challenge as he gave no history remarks sufficient to raise a suspicion of infectious cause for his condition. As his initial investigation did not show any evidence of infection, he was treated as non-infectious chorioretinitis and treated with systemic steroids under antibiotic coverage. Worsening of his condition led to the eventual diagnosis of candidaemia. Many patients do not consider dental management as 'surgical' intervention and in such cases, patient should specifically be asked about dental treatment before symptoms onset.

Involvement of the right eye has been reported to be twice as common as involvement of the left eye in haematogenously spread infections. This has been attributed to the more proximal and direct blood flow to the right carotid artery.<sup>15</sup> In our case, the left eye was involved despite the location of the dental procedure being on the right side. The same pattern of spread was reported by Embong *et al.*<sup>13</sup> Thus, a haemodynamic spread of infections to the eye may not be simply be interpreted by anatomical configuration blood supply to the eye. More complex haemodynamic aspects, which need further study, may be involved.

This patient grew *Candida albicans* on cultures from swabs from the site of dental extraction, but blood cultures were negative. Positive cultures for *Candida* from the oral cavity are not, by their own, sufficient evidence of disseminated candidiasis. Rasool *et al.* reported positive *Candida* cultures from the oral mucosa of 34% of healthy Malaysian adults.<sup>16</sup> Positive blood cultures, on the other hand, are only found in 50–60% of cases with disseminated infection.<sup>17</sup> Therefore, the sig-

nificance of these findings should be interpreted within the context of each patient's clinical background. A positive fungal culture anywhere in the body should always raise the suspicion of a fungal cause for the clinical illness. A therapeutic trial of anti-fungal treatment, as in our patient, may be needed to avoid any delay until the result of culture becomes available.

Patients with isolated *Candida* chorioretinitis should be treated with systemic antifungal agents. Augmentation with intravitreal antifungal injections should be considered in those with vitritis or endophthalmitis, particularly if worsening on systemic therapy alone.<sup>14</sup> This patient had chorioretinitis with vasculitis and optic disc involvement, but with no evidence of vitritis. Hence, he was treated with systemic antifungal and steroid therapy. No intravitreal injections were given. Satisfactory response was observed on this protocol.

Haematogenous spread of *Candida* to the eye usually involves both eyes. Vianna *et al.* reported involvement of the second eye three years after the onset in the first eye.<sup>18</sup> Prolonged follow-up and sufficient antifungal therapy to eliminate the organism is crucial in patient presenting with unilateral involvement to avoid involvement of the other eye.

In conclusion, *Candida albicans* should be considered as a possible cause in the differential diagnosis of chorioretinitis and retinal vasculitis in a healthy, immunocompetent, patient. Diagnosis is challenging and requires high index of suspicion. Detailed dental history is mandatory in such cases to raise the suspicion of a fungal cause.

## REFERENCES

- 1:** Oude Lashof AM, Rothova A, Sobel JD, et al. Ocular manifestations of candidemia. *Clin Infect Dis.* 2011; 53:262-8.
- 2:** Rodriguez-Adrián LJ, King RT, Tamayo-Derat LG, Miller JW, Garcia CA, Rex JH. Retinal lesions as clues to disseminated bacterial and candidal infections: Frequency, natural history, and etiology. *Medicine (Baltimore)* 2003; 82:187-202.
- 3:** Kiderman A, Tair JA. An eye for a tooth. *Gerodontology.* 2013; 30:83-4.
- 4:** van der Woerd A. Management of intraocular inflammatory disease. *Clin Tech Small Anim Pract.* 2001;16:58-61.
- 5:** Tabbara KF. Ocular toxoplasmosis: toxoplasmic retinochoroiditis. *Int Ophthalmol Clin.* 1995;35:15-29.
- 6:** Ament CS, Young LH. Ocular manifestations of helminthic infections: onchocerciasis, cysticercosis, toxocariasis, and diffuse unilateral subacute neuroretinitis. *Int Ophthalmol Clin.* 2006; 46:1-10.
- 7:** Shah CP, McKey J, Spirn MJ, Maguire J. Ocular candidiasis: a review. *Br J Ophthalmol.* 2008; 92:466-8.
- 8:** Egli A, Bergamin O, Müllhaupt B, Seebach JD, Mueller NJ, Hirsch HH. Cytomegalovirus-associated chorioretinitis after liver transplantation: case report and review of the literature. *Transpl Infect Dis.* 2008; 10:27-43.
- 9:** Babu RB, Sudharshan S, Kumarasamy N, Therese L, Biswas J. Ocular tuberculosis in acquired immunodeficiency syndrome. *Am J Ophthalmol.* 2006; 142:413-8.
- 10:** Pfaller MA, Diekema DJ. Epidemiology of invasive candidiasis: a persistent public health problem. *Clin Microbiol Rev.* 2007; 20:133-63.
- 11:** Donahue SP, Greven CM, Zuravleff JJ, et al. Intraocular candidiasis in patients with candidemia. Clinical implications derived from a prospective multicenter study. *Ophthalmology.* 1994; 101:1302-9.
- 12:** Gautam H, Kaur R, Goyal R, Bhalla P, Dewan R. Oral thrush to candidemia: a morbid outcome. *J Int Assoc Physicians AIDS Care (Chic).* 2010; 9:325-7.
- 13:** Embong Z, Ismail S, Thanaraj A, Hussein A. Dental infection presenting with ipsilateral parapharyngeal abscess and contralateral orbital cellulitis.

tis - a case report. Malays J Med Sci. 2007; 14:62-6.

**14:** Feman SS, Nichols JC, Chung SM, Theobald TA. Endophthalmitis in patients with disseminated fungal disease. Trans Am Ophthalmol Soc. 2002; 100:67-70.

**15:** Romero CF, Rai MK, Lowder CY, Adal KA. Endogenous endophthalmitis: case report and brief review. Am Fam Physician. 1999; 60:510-4.

**16:** Rasool S, Siar CH, Ng KP. Oral candidal species

among smokers and non-smokers. J Coll Physicians Surg Pak. 2005; 15:679-82.

**17:** Alexander BD, Pfaller MA. Contemporary tools for the diagnosis and management of invasive mycoses. Clin Infect Dis. 2006; 43:S15-27.

**18:** Vianna RN, Souza Filho JP, Deschênes J, Burnier MN Jr. Bilateral Candida chorioretinitis: involvement of the second eye after 3 years. Can J Ophthalmol. 2005; 40:75-8.

