

CASE REPORT

Endogenous endophthalmitis with a visual acuity of 6/6

Gillian Denise Ji-Yee Siu, Ernie Chi-Fung Lo, Alvin Young

The Chinese University of Hong Kong, Shatin, Hong Kong

Correspondence to
Dr Ernie Chi-Fung Lo,
lcf091@ha.org.hk

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SUMMARY

A 43-year-old man suffering from *Klebsiella* liver abscess and bacteraemia presented with left eye visual disturbance a few days after admission. His visual acuity was 6/6. There was a whitish subretinal mass located at the temporal periphery without vitritis. His visual acuity dropped to 6/120 with marked vitritis 1 day later and a diagnosis of a subretinal abscess was made. The vitreous cultures were negative. Response was suboptimal with intravitreal antibiotics, and retinotomy, vitrectomy, antibiotic irrigation and silicone oil tamponade were required. His vision gradually improved to 6/60 with silicone oil in situ. This case illustrates the rare presentation of a subretinal abscess in endogenous endophthalmitis with no initial associated vitritis, and the importance of maintaining a high level of suspicion despite good visual acuity on presentation in cases with relevant history. Early detection and intervention, and close monitoring may salvage the patient's vision in such cases.

BACKGROUND

Endogenous endophthalmitis is the haematogenous spread of organism to the eye by crossing the blood-retina barrier. Gram-negative bacterial endophthalmitis is more common in Asia and *Klebsiella pneumoniae* is emerging as a popular culprit.^{1 2} Diabetes mellitus, intravenous drug addiction, indwelling catheters and malignancy are common risk factors.^{3 4} Liver abscess is a common cause of systemic infection.⁵ The presenting visual acuity is usually poor, such as hand movement or worse, especially if the disease is bacterial in origin.³ Endogenous endophthalmitis patients tend to have a poor visual prognosis despite early and aggressive treatment, and there is no formal guideline for screening or treatment specific to endogenous endophthalmitis, though guidelines on postoperative endophthalmitis may shed some light on its management.^{6 7} The Endophthalmitis Vitrectomy Study and the recent European Society of Cataract & Refractive Surgeons guidelines focused on postoperative endophthalmitis.^{6 7} Their results may not be totally applicable, as the spectrum of causative organism and pathogenesis differs significantly.⁸ Subretinal abscesses were more commonly related to *Nocardia* systemic infection.⁹ *K. pneumoniae*-related endogenous endophthalmitis presenting with a subretinal abscess is rare and none of the reported cases have described good visual acuity on presentation.^{9 10}

CASE PRESENTATION

A 43-year-old man with diabetes mellitus presented with fever, right lower quadrant abdominal pain and night sweats for 1 week. He was admitted to our medical ward for work up and started on intravenous piperacillin and tazobactam. Blood results showed raised white cell count $10.9 \times 10^9/L$, alkaline phosphatase 190 IU/L, alanine transaminase 103/L and bilirubin 40 $\mu\text{mol/L}$. Bedside ultrasound of the abdomen on the same day showed a heterogeneous liver lesion suspected to be a liver abscess. There was also fatty liver but no biliary tract dilation. CT of the abdomen carried out the next day confirmed the diagnosis of a liver abscess of $6 \times 7.3 \times 5.7$ cm in the posterior segment, so ultrasound-guided drainage was performed. C reactive protein and white cell count dropped. The patient was switched to intravenous amoxicillin and clavulanate, after 3 days of piperacillin and tazobactam, as the blood culture results came back positive for *K. pneumoniae* sensitive to amoxicillin and clavulanate. However, on the same day, the patient began to have intermittent fever again and presented with a left eye visual disturbance, which he described as a veil over his eye with a mild foreign body sensation. There was no subjective drop in visual acuity.

On examination with a hand-held Snellen chart, both eyes had a visual acuity of 6/6. There was mild injection of the left eye and the pupil took longer to dilate compared with the right eye. With a portable slit lamp, anterior chamber cells could not be seen and there was no hypopyon. On fundus examination of the left eye, there was a three-disc diameter subretinal whitish mass with clear margin, overlying retinal haemorrhage and surrounding ghost vessels at the 9 o'clock region, not involving the macula. The vitreous was clear and the right eye was unremarkable. In view of good visual acuity and no vitritis, vitreous tap was not performed (figure 1).

TREATMENT

On the next day the patient's left eye vision had dropped to 6/120 with significant vitritis noticed. Vitreous tap and intravitreal amikacin 0.4 mg and ceftazidime 2 mg were injected in view of his *Klebsiella* infection. His general condition was suboptimal as well, with increased collection at the paracolic gutter and right-sided basal pleural effusion, requiring 4 L O₂/min. He was switched to intravenous ceftriazone with oral ciprofloxacin in view of his eye condition. The vitreous (0.1 mL aspirated) culture was negative for bacteria and fungus.



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Figure 1 B-scan of the subretinal mass on day 2. Retina was flat and vitritis was not dense. Day 1 fundus photos are not available as the patient was bedbound.

The patient's visual acuity dropped to hand movement with increasing vitritis 5 days after the intravitreal antibiotics, so pars plana vitrectomy, retinotomy of the abscess for biopsy with silicone oil tamponade and endolaser was carried out. Intravitreal vancomycin 1 mg and ceftazidime 2 mg was given (figure 2). Intraoperatively, a chalky white powder-like substance was drained from the mass (figure 3), which confirmed that the mass was subretinal and not in the choroid. There was, however, insufficient tissue for histology and the vitreous tap yielded a negative culture once again. Owing to his septic condition, the patient could not lie prone and subretinal fluid extended inferiorly from the retinotomised abscess. On post-operative day 4 he was finally well enough for posturing and the retina was reattached.

OUTCOME AND FOLLOW-UP

The patient's visual acuity gradually improved to 6/24 at 3 months. The subretinal abscess and vitritis resolved gradually, leaving an atrophic area of the chorioretina (figure 4). However, inferior retinal detachment was noted and the patient was reoperated with encircling band, pars plana vitrectomy, retinotomy, endolaser, cryotherapy, silicone oil tamponade as well as phacoemulsification and intraocular lens insertion. The retina



Figure 2 Intraoperative view of the whitish subretinal mass with overlying dilated retinal vessels. Macula was spared.

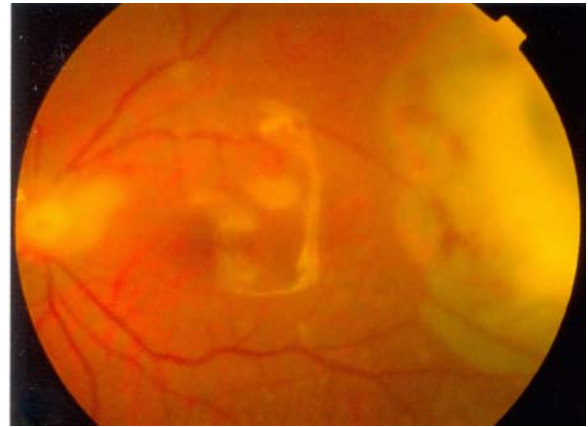


Figure 3 Fundus photo at 10 days after first pars plana vitrectomy. Retina was flat with silicone oil. The subretinal abscess remained.

reattached successfully with a visual acuity of 6/60 at 3 months after the second surgery.

DISCUSSION

Endogenous endophthalmitis usually presents late with poor visual acuity and prognosis. Bacterial endogenous endophthalmitis presenting with a visual acuity of 6/6 has not been reported so far.⁹⁻¹⁸

Since most endophthalmitis cases present late, there may already be florid signs of corneal oedema, conjunctival chemosis, hypopyon, fibrin and anterior chamber cells. The fundal view is often obscured in these cases and ultrasound B-scan is needed to assess the posterior pole. It is not surprising to see dense vitreous echogenicity and multiple loculations in the B-scan. One would not anticipate a subretinal abscess with vitritis at the early stage of the disease, as the infection usually spreads haematogenously to the choroid first. Looking back at the progress of our case, the sole presentation with a subretinal abscess is rare but may be a mid-stage sign before full blown endophthalmitis with vitritis. Our case illustrates the fast progression of the endophthalmitis from a simple subretinal mass on presentation to severe vitritis within 24 h. This subretinal abscess stage may therefore be often missed, especially when the

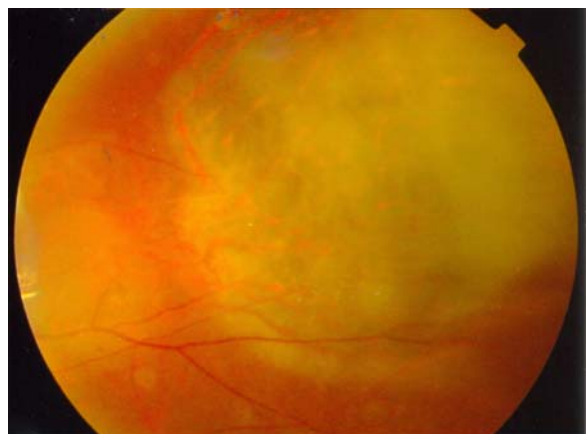


Figure 4 Fundus photo at 2 months after endophthalmitis. Area of chorioretinal atrophy seen where the subretinal abscess had been.

subretinal abscess spares the macula and vision is maintained, as in our patient. Examination was made difficult as our patient was too ill and bedbound. In retrospect, low-grade vitritis might have already been present on the first day, given the patient's symptom of feeling a veil over his eye, and a pupil that was slow to dilate, which might have prompted our ophthalmologist for treatment on day 1. Therefore, physicians or ophthalmologists should maintain a high level of suspicion of endophthalmitis in patients with poorly controlled sepsis, subjective visual blurring, ocular signs such as conjunctival injection, sluggish pupil dilation and anterior chamber or anterior vitreous inflammation.

Subretinal abscess is difficult to manage. Since these patients may already be on systemic antibiotics and, in addition, the bacterial load may still be contained in the subretinal abscess, a negative vitreous tap is not surprising^{9 12–14 16–18} and should not be the reason to delay treatment. In other words, penetration of intravitreal antibiotics to the subretinal layer may also be limited as most systemic antibiotics do not cross the blood-retinal barrier. As a result, most reported subretinal abscess cases eventually required surgical intervention due to poorly controlled ocular infection.^{9–12 14–16} Yet, the risk of retinal detachment after drainage of a subretinal abscess is high,^{9 14 15 18} especially when the effect of silicone oil tamponade is reduced while the abscess resolves and the vitreous cavity volume expands. The dose of intravitreal antibiotics may also have to be adjusted postoperatively. The ESCRS guidelines suggested reducing the dose of intravitreal antibiotics up to 50% for a vitrectomised eye.^{7 19} For eyes with silicone oil or gas, a reduction of 1/4–1/10 of the standard dose may be considered.^{7 19}

As illustrated by this case, despite good vision and the concern about antibiotics toxicity, the fast progression of endophthalmitis calls for early intervention. Early pars plana vitrectomy and drainage should be considered. Abscess fluid can be sent for culture as well as pathology, which may aid the diagnosis.¹⁶ Posturing with tamponade agent immediately postoperatively is essential if the patient is physically fit. In our literature review, after the initial operation, none of the cases required further intravitreal antibiotics, so the postulated dosage issue after injection of tamponade agent may not be as intimidating. Instead, if intravitreal antibiotics is to be administered

intraoperatively, standard concentration should be used prior to air-fluid exchange and subsequent oil or gas tamponade. In view of the high risk of retinal detachment, the use of encircling band or scleral buckle can be considered to aid the reattachment of the necrotic retina.

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Learning points

- ▶ Normal visual acuity does not exclude endogenous endophthalmitis.
- ▶ Vitreous tap culture result may be negative as the bacterial load may not be in the vitreous.
- ▶ Retinal detachment is a common complication after drainage of a subretinal abscess.

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