Endophthalmitis with Klebsiella Pneumoniae Liver Abscess

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Endophthalmitis with *Klebsiella Pneumoniae* Liver Abscess

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**Abstract** Endogenous endophthalmitis is a rare, but devastating complication of septicemia. The prognosis of maintaining visual acuity in patients with septic endophthalmitis is poor in spite of an early diagnosis and the timely start of conventional therapeutic procedures because the intravitreous drug concentration remains low after the systemic administration of antibiotics due to the blood-ocular barrier. We treated an elderly female patient with endogenous endophthalmitis complicated with disseminated intravascular coagulation associated with a *Klebsiella pneumoniae* liver abscess. Endophthalmitis developed rapidly and we thus had to perform an enucleation of both eyeballs even though we made an early diagnosis and performed liver abscess drainage as well as the prompt systemic and subconjunctival administration of antibiotics. Our experience in treating this case emphasizes the need to perform the timely intravitreous infusion of antibiotics with a support therapy consisting of the systemic and subconjunctival administration of antibiotics for endogenous endophthalmitis associated with a *Klebsiella pneumoniae* liver abscess.

**Key words**: Endophthalmitis, Liver abscess, *Klebsiella pneumoniae*

**Introduction**

Endophthalmitis is an inflammatory process involving the ocular tissue confined inside the globes. Today endogenous endophthalmitis is a rare complication of septicemia thanks to the advent of antibiotics which has now made the effective control of sepsis possible. However, septic metastatic endophthalmitis associated with endocarditis, pneumoniae, meningitis, pyelonephritis, urinary tract infection, prostatic and abdominal surgery or a liver abscess, has recently been recognized in immunocompromized patients or drug abusers. Bilateral endophthalmitis occurs in one quarter of all such reported cases. Several reports have claimed that endogenous endophthalmitis associated with a *Klebsiella pneumoniae* liver abscess tended to result in either a loss of vision or left patients with only limited vision. The outcome is believed to be dependent on how early the treatment is initiated in addition to the nature of the infecting organism. However, an extremely poor visual outcome is generally unavoidable in spite of aggressive treatment with the appropriate systemic and subconjunctivally administration of antibiotics. We treated an elderly female with septic endophthalmitis and a *Klebsiella pneumoniae* liver abscess who demonstrated an enucleation of both eyeballs in spite of the prompt administration of systemic anti-
biotic therapy and liver abscess drainage.

**Case report**

An acutely ill 91-year-old Japanese female patient was admitted with a 5-day history of a high fever and anorexia. She had no significant medical history and had been apparently healthy without medication until this episode. On emergent admission her temperature was 36.1 °C and blood pressure was 94/56 mmHg. Her face and extremities looked pale. Her conjunctiva were neither anemic nor icteric. A physical examination of the abdomen revealed an enlarged tender liver, but no signs of peritoneal irritation. The hemoglobin concentration was 13.7 g/dl, the white blood cell counts were 25,600/µl with a differential of bands 4 %, segmented 86 %, monocytes 6 % and lymphocyte 4 %, and platelet counts 56 x 10^3/µl. The erythrocyte sedimentation rate was 21 mm/hr and C-reactive protein (CRP) 37.5 mg/dl. The blood sugar and hemoglobin A1C levels were normal at 115 mg/dl and 4.7 %, respectively. The hepatic function profiles showed the total bilirubin to be 1.6 mg/dl, aspartate aminotransferase 259 IU/l, alanine aminotransferase 310 IU/l, lactate dehydrogenase 759 IU/l, and alkaline phosphatase 189 IU/l. The blood urea nitrogen and creatinine levels were 53.4 mg/dl and 3.0 mg/dl, respectively. The prothrombin activity was 83.0 %, fibrinogen 454 mg/dl and fibrinogen degradation product 10 µg/ml. Abdominal ultrasonography (US) revealed a hypoechoic mass with a central high echogeneity and an irregular margin, measuring approximately 5 cm in the greatest dimension in the antero-inferior to posterior segment of the liver (Figure 1). Computed tomography (CT) revealed a mass with an inhomogenously decreased attenuation in the same area. These findings showed the patient to be in a state of disseminated intravascular coagulation (DIC) associated with a pyogenic liver abscess.

On day 1 Cefozopran (CZOP 2 g/day), Clindamycin (CLDM 600 mg/day) and Gabexate mesilate (100 mg/day) were administered intravenously. On day 2 US-guided percutaneous abscess drainage was performed. Approximately 30 ml of mucinous exudate including pus and blood was drained. The cultures of fluid thus obtained and the blood grew *Klebsiella pneumoniae*. On day 3 bilateral exophthalmos developed and the patient complained of orbital pain. A CT examination, however, showed no remarkably abnormal findings in either the cranial region or eyeballs (Figure 2). On day 4 a purulent exudate was recognized in both orbita. Levofloxacin ointment was administered and eye cooling was started. *Klebsiella pneumoniae* was isolated from the exudate of the orbita. Based on these findings, *Klebsiella*
*pneumoniae*-caused endophthalmitis was diagnosed. However, the patient’s visual acuity thereafter deteriorated rapidly even though the fever went down and both the liver function and DIC improved. The visual acuity of both eyes was eventually completely lost several days after the onset of orbital pain. During ophthalmologic examinations, the cornea and anterior chamber of both eyes were found to be extremely opaque, therefore a thorough ophthalmologic examination could not been performed. A visceral enucleation of the both eyeballs ultimately had to be performed because of a possible infectious focus to the surrounding tissues or organs and also for cosmetic reasons (Figure 2).

**Discussion**

A pyogenic liver abscess is an emergent disease frequently associated with a compromised host in such diseases as diabetes mellitus and acquired immunodeficiency syndrome etc. *Klebsiella pneumoniae*, a highly virulent intraocular pathogen, is most frequently isolated from the aspirate of liver abscesses and blood in such patients. Endophthalmitis is an inflammation of the ocular tissue which is confined inside the ocular globes. Therefore, the patient’s visual acuity rapidly worsens. Endogenous endophthalmitis is much less frequent than exogenous endophthalmitis. The association of endogenous endophthalmitis with a *Klebsiella pneumoniae* liver abscess has been reported by several authors (14-17). In our case *Klebsiella pneumoniae* was cultured from blood, the exudates of liver abscess and vitreous exudates. Though only a small amount of vitreous aspirate is generally obtained in cases of endophthalmitis, a culture of vitreous aspirate is an important examination for establishing the diagnosis and initiating prompt therapy because en-

![Computed tomography showed no remarkably abnormal findings in the cranial region, eyeballs or muscles in the orbitas (left). An enucleatio bulbi of both eyes was performed (right).](Fig. 2)
dogenous endophthalmitis frequently takes a poor clinical course. Cheng et al mentioned that of the 14 reported patients with endophthalmitis associated with a pyogenic liver abscess, 11 patients ended up with a total loss of vision while two patients had severely limited vision.

The intravitreous injection of antibiotics without delay seems to be an effective treatment for endogenous endophthalmitis. On the other hand, even patients who promptly receive the intravenous administration of antibiotics and antibiotics ointment for eyes still tend to demonstrate poor results. This is because an inadequate amount of the antibiotic is able to penetrate into the vitreous humor after either subconjunctival or systemic administration. The parenteral administration of most antibiotics does not consistently achieve adequate intraocular bacterial inhibitory levels because of the blood-retinal barrier. As a result, the intravitreal injection of antibiotics with or without a vitrectomy has been recommended. Regarding treatment with corticosteroids, the efficacy of corticosteroids in the treatment of endogenous endophthalmitis remains unknown, however, animal experiments have shown good results with either corticosteroids or the combined use of antibiotics and corticosteroids. In addition, the time interval between the infection and the initiation of intravitreous treatment is considered to be an important factor. The treatment in such cases should be initiated by the time the vitreous becomes filled with the abscess and the retina becomes inflamed. Two articles noted that therapy for the treatment of endophthalmitis initiated 12 hours after infection of the microorganism was not as effective as such therapy which was started four to six hours after infection.

Clinically, Chou et al demonstrated that a delayed initiation of the treatment of more than two days for endogenous endophthalmitis resulted in blindness either in one or both eye balls. They thus emphasized that prompt therapy with intravitreous injections within 24 hours following the diagnosis could possibly avoid blindness and they also suggested that either cefamezin plus gentamicin, vancomycin plus amikacin or vancomycin plus amikacin should obtain a good response to *Klebsiella pneumoniae* endogenous endophthalmitis.

The risk factors for septic metastatic lesions associated with pyogenic liver abscess have been reported to be a *Klebsiella pneumoniae* abscess, bacteremia and the underlying diabetes mellitus by comparison of patients with a pyogenic liver abscess who developed septic metastatic lesions with those who did not. Furthermore, as for the important factors for complicated endophthalmitis in cases of *Klebsiella pneumoniae* liver abscess, Fung et al demonstrated them to be serotype K1 of *Klebsiella pneumoniae* serotypes and diabetes mellitus as the underlying disease. Among the 14 patients complicated with endophthalmitis of the 134 patients with *Klebsiella pneumoniae* liver abscess ranging from 34 to 78 years of age in their report, 85.7 % (12 of 14) of the isolates belonged to serotype K1 and 92.3 % (13 of 14) were diabetic. There has so far been no paper reporting advanced age to be an independent risk factor for endophthalmitis, however, physicians now often encounter elderly patients with diabetes mellitus due to the overall increase in the average lifespan. Therefore, as shown in our case, physicians should be aware of the possible development of septic endophthalmitis and should thus perform prompt and aggressive treatment.
using a combined medical-ophthalmological approach when even non-diabetic patients develop *Klebsiella pneumoniae* liver abscess and start to complain of ocular symptoms.

There is no clear evidence in the literature that the use of intravitreous injections will improve the visual outcome in patients with endophthalmitis. As a result, further investigations regarding the optimal treatment protocol are needed based on a large population of endogenous endophthalmitis patients in order to improve the prognosis of this devastating infection.

References


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クロプシエラ肝臓炎を合併した転移性眼内炎症例

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細菌性眼内炎は稀な疾患であるが、発症した際には高頻度に敗血症を伴う。抗生剤の静脈投与にも拘わらず、血液眼関門のために眼窩内への抗生剤の移行の抵抗性が認められ、眼科的予後は不良とされている。われわれは肝臓炎ならびに血管内播種性凝固症候群（DIC）を有した 91 歳女性の細菌性眼内炎例を経験した。肝臓炎穿刺液培養、血液培養のいずれかに Klebsiella pneumoniae が検出され、DIC に対する治療と共に肝臓炎ドレナージ、抗生剤の静脈投与が開始された。治療開始後 3 日目より両眼発赤が出現し、4 日目には眼球から膿瘍排出を認め、膿瘍より Klebsiella pneumoniae が検出され、Klebsiella pneumoniae を起炎菌とした転移性細菌性眼内炎を診断した。眼内炎は急速に進行し、眼窩内容摘出術を施行した。本症例から細菌性眼内炎の早期発見の重要性と同時に細菌性眼内炎に対する抗生剤の静脈投与・点眼投与による治療抵抗性があらたため示され、本疾患に対する硝子体内への抗生剤注入をはじめとした積極的かつ適切な治療法の再考が必要である。

（和文抄録）