

resolved. The dorsum of his right foot had only small, red macules, and erythema in the pretibial region had resolved.

BCG vaccine has been used for decades for the prevention of tuberculosis. More recently, BCG has been used as immunotherapy for various tumors. Importantly, the dosing of BCG is much higher when given as cancer immunotherapy [5]. As a result, BCG immunotherapy is often complicated by systemic side effects. Although BCG has been recovered from blood immediately after subcutaneous injection [6], attempts at isolating the organism from skin specimens from patients with chronic cutaneous changes have been futile [7]. Therefore, the cause of the cutaneous granulomatous lesions has remained controversial. Even though some investigators have postulated a hypersensitivity reaction to BCG as the underlying etiology, others have pointed to the rapid response of patients to anti-tuberculosis treatment as evidence for direct invasion [5].

To our knowledge, we report the first case of culture-proven BCG infection of a chronic cutaneous lesion. When combined with the granulomatous changes seen during pathological evaluation and an excellent clinical response to antituberculosis therapy, it appears that direct BCG infection is the etiology of at least some of the postimmunization cutaneous abnormalities in our patient.

***Klebsiella pneumoniae* Liver Abscess, Endophthalmitis, and Meningitis in a Man with Newly Recognized Diabetes Mellitus**

In the United States, culture of material from pyogenic liver abscesses most often yields polymicrobial bowel flora [1]. In Taiwan, however, monomicrobial *Klebsiella pneumoniae* infection causes most pyogenic liver abscesses, particularly among diabetics [2]. Endogenous (hematogenous) endophthalmitis is a recognized complication in this population [3–5]. To my knowledge, this is the first report from the United States to describe a patient with *K. pneumoniae* liver abscess, endophthalmitis, and meningitis.

A 38-year-old black man with no known medical problems was well until 4 days before admission, when he developed a headache and fever. Photophobia, neck stiffness, anorexia, and abdominal pain followed. On examination, the patient appeared uncomfortable, and his temperature was 40°C. Ophthalmologic examination findings were normal. Nuchal rigidity and right-upper-quadrant tenderness were present.

Lumbar puncture yielded cloudy CSF with the following

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References

1. Mastrangelo MJ, Sulit HL, Prehn L, Bornstein RS, Yarbrow JW, Prehn RT. Intralesional BCG in the treatment of metastatic malignant melanoma. *Cancer* **1976**;37:684–92.
2. Talbot EA, Perkins MD, Silva SFM, Frothingham R. Disseminated bacille Calmette-Guérin disease after vaccination: case report and review. *Clin Infect Dis* **1997**;24:1139–46.
3. Magnon D, DeVillez RL. Disseminated cutaneous granulomas from BCG therapy. *Arch Dermatol* **1980**;116:355.
4. de la Monte SM, Hutchins GM. Fatal disseminated bacillus Calmette-Guérin infection and arrested growth of cutaneous malignant melanoma following intralesional immunotherapy. *Am J Dermatopathol* **1986**;8:331–5.
5. Sparks FC, Highton A, Hunt JS, Scholnick PL. Generalized cutaneous reaction associated with the intratumor injection of BCG. *Chest* **1975**;68:725–7.
6. Pinsky CM, Hirshaut Y, Oettgen HF. Treatment of malignant melanomas by intratumoral injection of BCG. *Natl Cancer Inst Monogr* **1973**;39:225–8.
7. Shea CR, Imber MJ, Crompton TG, Cosimi AB, Sober AJ. Granulomatous eruption after BCG vaccine immunotherapy for malignant melanoma. *J Am Acad Dermatol* **1989**;21:1119–22.

characteristics: WBC count, $372 \times 10^6/L$, with a predominance of polymorphonuclear leukocytes; total protein, 2.78 g/L; and glucose, 7.8 mmol/L (140 mg/dL). Gram staining revealed large, encapsulated gram-negative bacilli. The serum glucose concentration was 18.7 mmol/L (337 mg/dL). Hepatic aminotransferase and γ -glutamyltransferase levels were each elevated to ~5 times the upper limit of normal.

Ceftriaxone and metronidazole were given intravenously. *K. pneumoniae* grew in a culture of the CSF. A CT scan of the abdomen showed a 5 × 6-cm multicystic mass in the right hepatic lobe. Percutaneous aspiration provided green pus that yielded, in pure culture, *K. pneumoniae* with an antibiogram identical to that of the CSF isolate. A drainage catheter was left in place until output ceased.

On hospital day 3, the patient reported left-eye pain and blurry vision. Periorbital edema, chemosis, and conjunctival hyperemia were present (figure 1). Further ophthalmologic findings included visual acuity of 20/400 in the left eye, hypopyon, and vitreal haziness suggestive of endophthalmitis. Vitreous humor was aspirated, and ceftazidime and vancomycin were injected intravitreally. Vitreous cultures were negative.

Ciprofloxacin, cefazolin, and corticosteroid eye drops were administered every 1–2 h. The patient was discharged after receiving ceftriaxone for 21 days and metronidazole for 17 days. Thereafter, he completed a 30-day regimen of oral levofloxacin and metronidazole. A subsequent CT scan showed no reaccumulation of fluid in the liver. At his most recent follow-up



Figure 1. Photograph of patient's left eye, taken on hospital day 4. Lid edema and chemosis made it impossible for the patient to open his eye without assistance. Conjunctival hyperemia is most apparent in the superior aspect of the eye. Intravitreal puncture caused the subconjunctival hemorrhage located inferiorly.

(about 10 weeks after discharge), there was no clinical evidence of recurrent liver abscess. Visual acuity in the left eye was 20/60.

This patient had meningitis and liver abscess due to *K. pneumoniae* and newly recognized diabetes mellitus. Ophthalmologic findings were diagnostic of endophthalmitis, and despite negative vitreous cultures, the causative microorganism of the ocular infection was most likely *K. pneumoniae* as well. This assumption is reasonable because only ~74% of vitreous cultures are positive in cases of endogenous bacterial endophthalmitis [6].

Staphylococcus aureus and streptococci are the most common causes of endogenous endophthalmitis, and *K. pneumoniae* was isolated from only one of 28 patients reported in 1994 [6]. In the United States, the vast majority of pyogenic liver abscesses not caused by *S. aureus* are polymicrobial; most commonly isolated are facultative gram-negative bacilli, anaerobic gram-negative bacilli, and microaerophilic streptococci [1].

However, in Taiwan, *K. pneumoniae* as a single pathogen is the most common etiology of pyogenic liver abscess, and an association between underlying diabetes and *K. pneumoniae* liver abscess is well recognized [2–5]. Septic metastatic lesions, particularly endophthalmitis, are much more common among

patients with *K. pneumoniae* liver abscess than among those with polymicrobial infection [2]. This association has been reported rarely outside of Taiwan [7, 8], and review of the literature failed to identify any previous report of this disease from the United States.

The ophthalmologic outcome of endogenous bacterial endophthalmitis is usually poor [6]. Of 21 patients with *K. pneumoniae* endophthalmitis described in 2 reports, 17 (81%) became blind; 3 of the remaining 4 patients had impaired vision [2, 4]. In another study, the outcome was no light perception, enucleation, or evisceration in 14 of 15 affected eyes [5]. Early diagnosis and the use of intravitreal antibiotics may have contributed to the relatively good outcome for my patient.

This is the first report of *K. pneumoniae* liver abscess, endophthalmitis, and meningitis from the United States. Physicians should consider the possibility of *K. pneumoniae* infection in their diabetic patients with liver abscess so that detection and appropriate management of complications are not delayed.

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References

- McDonald MI, Corey GR, Gallis HA, Durack DT. Single and multiple pyogenic liver abscesses: natural history, diagnosis and treatment, with emphasis on percutaneous drainage. *Medicine* **1984**;63:291-302.
- Wang JH, Liu YC, Lee SSJ, et al. Primary liver abscess due to *Klebsiella pneumoniae* in Taiwan. *Clin Infect Dis* **1998**;26:1434-8.
- Cheng DL, Liu YC, Yen MY, Liu CY, Wang RS. Septic metastatic lesions of pyogenic liver abscess: their association with *Klebsiella pneumoniae* bacteremia in diabetic patients. *Arch Intern Med* **1991**;151:1557-9.
- Liu YC, Cheng DL, Lin CL. *Klebsiella pneumoniae* liver abscess associated with septic endophthalmitis. *Arch Intern Med* **1986**;146:1913-6.
- Liao HR, Lee HW, Leu HS, Lin BJ, Juang CJ. Endogenous *Klebsiella pneumoniae* endophthalmitis in diabetic patients. *Can J Ophthalmol* **1992**;27:143-7.
- Okada AA, Johnson RP, Liles WC, D'Amico DJ, Baker AS. Endogenous bacterial endophthalmitis: report of a ten-year retrospective study. *Ophthalmology* **1994**;101:832-8.
- Lindstrom ST, Healey PR, Chen SCA. Metastatic septic endophthalmitis complicating pyogenic liver abscess caused by *Klebsiella pneumoniae*. *Aust N Z J Med* **1997**;27:77-8.
- Casanova C, Lorente JA, Carrillo F, Perez-Rodriguez E, Nunez N. *Klebsiella pneumoniae* liver abscess associated with septic endophthalmitis [letter]. *Arch Intern Med* **1989**;149:1467.