Cholangioscopic appearance of circular folds in immune-related adverse event cholangitis

Immune checkpoint inhibitors (ICIs) are increasingly being used for various indications in cancer. However, because they affect the immune system, their use may lead to immune-related adverse events (IRAEs). The use of nivolumab is associated with the IRAE cholangitis, which has no established countermeasures [1]. The cholangioscopic findings of cholangitis are nonspecific and include erosion, ulceration, and hemorrhage [2, 3]. We report a case of cholangitis showing circular folds on cholangioscopy.

A 68-year-old woman developed fever and elevated hepatobiliary enzymes 2 months after starting pembrolizumab treatment for lung cancer. Computed tomography and endoscopic ultrasonography showed dilation and diffuse thickening of the common bile duct (CBD) (▶ Fig. 1). Magnetic resonance cholangiography showed CBD dilation without intrahepatic bile duct dilatation (▶ Fig. 2). Cholangiography showed dilation and shaggy appearance of the CBD (▶ Fig. 3). Cholangioscopy revealed red, edematous circular folds with hemispherical protuberances in the CBD (▶ Video 1). The pathological analysis of the CBD indicated lymphocytic and eosinophilic infiltration below the bile duct epithelium. CD4+ and CD8+ lymphocytes were seen in similar frequencies (▶ Fig. 4). She was diagnosed with cholangitis and treated with 0.8 mg/kg/day prednisolone on day 15 after symptom onset. Thereafter, the fever and elevated hepatobiliary enzymes rapidly improved.

Notably, cholangitis may be confused with ICI-related liver injury, making diagnosis difficult based on imaging findings alone. In our patient, cholangioscopy indicated edematous circular folds of the CBD mucous membrane, and cholangiography revealed a shaggy CBD wall. Bile duct wall thickening suggests abnormal lymphocytic infiltration. In patients who develop bile duct dilation with thickness on computed tomography and/or endoscopic ultrasonography after ICI treatment, cholangioscopy with biopsy and...
CD4/8 staining may be helpful for the early diagnosis of cholangitis.

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**Competing interests**

The authors declare that they have no conflict of interest.

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