

## Persistent Air Bubbles in the Gallbladder After Endoscopic Retrograde Cholangio-Pancreatography\*

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〈국문초록〉

역행성 담관 췌장 조영술 후의 담낭내 지속성 기포\*

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직접 담관조영술시 기포가 담낭내에 주입될 수가 있다. 저자들은 역행성 담관 췌장 조영술후 담낭내 지속성 기포를 나타내었던 한 예를 경험하여, 담석과의 감별점과 지연 방사선점사의 필요성을 문헌고찰과 함께 보고하는 바이다.

Multiple small air bubbles were introduced into the gallbladder (GB) during the endoscopic retrograde cholangio-pancreatography (ERCP). Prolonged appearance of movable small round filling defects in the GB were detected for more than 18 hours in the GB. The importance of delayed GB films after ERCP and the differentiation between the stones and air bubbles are discussed.

**Key words:** Bile duct radiography — Bile duct gas — Gallbladder air

Gas can be introduced into the biliary tract during the direct cholangiography.<sup>1</sup> Then the differential diagnosis between the gas and true lesion such as stone is mandatory for further evaluation of the patient. The gas shadows usually change in position and disappear later in the delayed film. This paper concerns a patient with persistent multiple small rounded filling defects in the GB due to air bubbles introduced during the ERCP.

### Case Report

This 26-year-old woman presented with 7-days

history of jaundice and fatigability. She was admitted to neurosurgical department of this hospital under the diagnosis of cerebral infarction for 10 days about 1 month ago. She was given some medication by the neurosurgeon after discharge. She was relatively well until 7 days ago when she experienced easy fatigability and progressive jaundice.

On examination her skin and sclerae were very icteric. Liver was not palpable. Laboratory studies disclosed that she had abnormal liver function. The serum bilirubin was 8.7 mg per 100 ml (direct bilirubin 3.9 mg and the indirect bilirubin 4.8 mg), the SGOT 148 U per liter, the SGPT 136 U per liter, and Alkaline phosphatase 27.3 KA per deciliter. X-ray films of the chest and abdomen were normal. Ultrasound examination of abdomen revealed small contracted GB. Intra-

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and extra-hepatic bile ducts were not dilated. About 1 week later ERCP was performed for the differential diagnosis of drug induced hepatitis and sclerosing cholangitis. Although the caliber of intrahepatic bile ducts were slightly smaller than usual, no filling defects or irregular contour were detected both in the intra- and extra-hepatic bile ducts. Multiple very small air bubbles were introduced into distal CBD during the procedure. In the erect film there were multiple closely impacted very small rounded radiolucencies measuring about 2 mm in diameter in the top of the GB which is densely opacified (Fig. 1). The small rounded radiolucencies were arranged in a transverse single layer in the erect film.



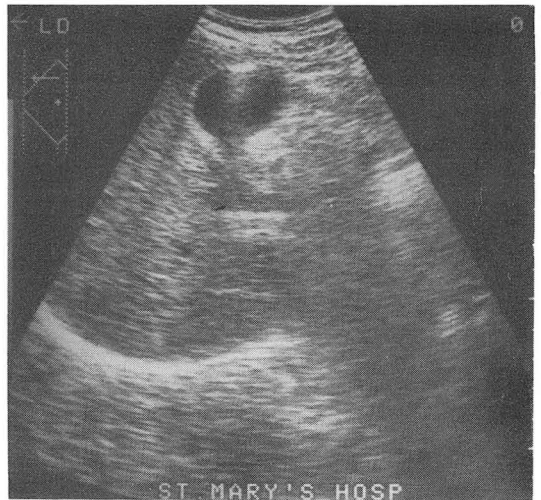
**Fig. 1.** Initial erect film reveals multiple small rounded radiolucencies in the top of the GB in a single layer.

Three hours delayed erect film revealed similar multiple small rounded radiolucencies in the top of the GB and several small rounded radiolucencies in the neck of the GB and cystic duct portion (Fig. 2). Ultrasonogram of the GB was obtained. There was changing strongly echogenic shadow in the highest portion of the distended GB (Fig. 3). Weak indistinct lower level echoes are seen posterior to the strong echo.

Eighteen hours delayed roentgenogram revealed diminished number of multiple small radiolucencies without significant contraction of the GB (Fig. 4). About 27 hours delayed spot film revealed disap-



**Fig. 2.** Three hours delayed erect film reveals again multiple small rounded radiolucencies in the top of the GB. There are also several small rounded radiolucencies in the neck portion of the GB.

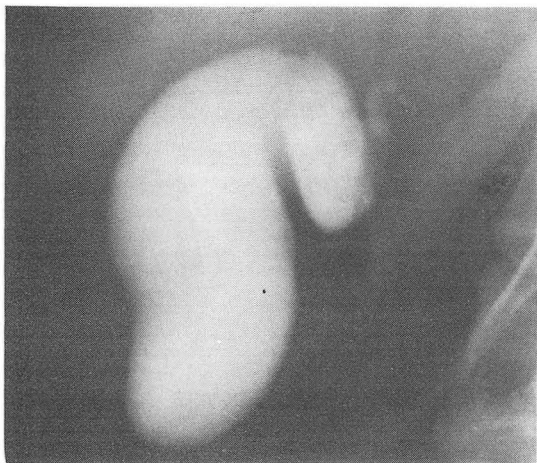


**Fig. 3.** Ultrasonogram of the GB reveals strongly echogenic shadow in the highest portion of the distended GB. Weak indistinct lower level echoes are seen posterior to the strong echo.

pearance of all of the small rounded radiolucencies in the persistently opacified and moderately contracted GB.

## Discussion

The multiple small rounded radiolucencies in the



**Fig. 4.** Eighteen hours delayed erect film reveals only several small rounded radiolucencies in the top of the GB.

top of the GB after ERCP in our patient were proven to be air introduced during the ERCP. Introduction of air bubbles are common to all methods of direct cholangiography<sup>1</sup> and then air bubbles can be sources of interpretive error.<sup>2</sup> The air bubbles can be distinguished from stones by the rounded appearance of the former and often angular shape of the latter.<sup>3</sup> Another more useful method is to use positional change. With change of the patient from supine to erect position, air bubbles float toward higher level in contrast to the downward migration of stones. But floating stones can occur after intake of oral cholecystographic contrast medium or after a long fast.<sup>4,5</sup> It was suggested that high level of specific gravity of bile in those cases caused the floating phenomenon.

Although the prolonged appearance of multiple small rounded radiolucencies in a single layer in the densely opacified GB raised the possibility of tiny cholesterol stones, there are many reasons against the possibility of stones. (I) Multiple air bubbles were noticed in the distal CBD in the initial examination. (II) Second ultrasound examination revealed strongly echogenic shadow with posterior indistinct lower level echoes. According to the in vitro study performed by Sommer and Taylor, acoustic shadows distal to calculi contain significantly fewer echoes and are therefore more sharply defined than those distal to gas

collection.<sup>6</sup> (III) Although there were a number of reports of the spontaneous disappearance of GB calculi,<sup>7,8,9,10</sup> the complete disappearance of radiolucencies without pain usually suggest against the stones.

In our patient the air bubbles disappeared completely as delay as 27 hours after initial injection of CM. This result suggests the importance of delayed GB film after ERCP for confirmation or exclusion of stones and for exclusion of air bubbles. Mason et al already emphasized the importance of delayed GB film.<sup>11</sup> But their study lasted only 4 hours. In the special cases such as our patient, even 24 hours delayed radiography is recommended.

Prolonged opacification of the GB was noticed in our patient. The cause of the phenomenon was undetermined. There were contradictory reports about the significance of the phenomenon.<sup>12,13,14</sup>

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