Contrast Does Not Affect Cholangioscope Image Quality

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Background/Aims: Peroral cholangioscopy is a rapidly evolving technique that allows direct examination of the bile duct. We sought to determine if there was a difference in image quality with the cholangioscope immersed in normal saline compared with radiologic contrast or a mixture of contrast and normal saline. **Methods:** Images were captured using the SpyGlass® cholangioscope system (Boston Scientific Corp.) immersed in solutions ranging from 0 to 100% contrast. The images were then reviewed in a blinded fashion by a panel of 9 endoscopists with experience using the SpyGlass® system. The reviewers scored the quality of each image based on a scale of 0 (extremely poor) to 10 (excellent).

Results: With the cholangioscope immersed in saline and 100% contrast, the mean image quality scores were 7.6 (95% confidence interval [CI], 6.7-8.5) and 6.9 (95% CI, 5.8-8.0), respectively. The highest mean image quality score was 7.8 (95% CI, 6.7-8.9), obtained in 70% contrast. No significant difference was noted in mean image quality scores using a one way analysis of variance technique ($p=0.414$). **Conclusions:** Although there are limitations to ex vivo studies, we encourage endoscopists to use intraductal contrast prior to peroral cholangioscopy, if needed for lesion localization. (*Gut Liver* 2011;5:115-116)

Key Words: Bile ducts; Endoscopes; Cholangiopancreatography; Endoscopic retrograde

Peroral cholangioscopy is a rapidly evolving technique that allows direct examination of the bile duct. Most cholangioscopy performed in the United States currently uses a fiberoptic system with a limited number of pixels, making image quality a major concern. There is no published data regarding the effect of radiologic contrast on cholangioscope image quality.^{1,2} We sought to determine if there was a difference in image quality with the cholangioscope immersed in normal saline compared with radiologic contrast or a mixture of contrast and normal

saline.

The contrast agent, iothalamate meglumine, was combined with normal saline to create solutions ranging from 0 to 100% contrast. Images were captured using the SpyGlass® cholangioscope system (Boston Scientific Corp., Natick, MA, USA). Images were obtained in each solution at a fixed distance from a standardized target. The images were then reviewed in a blinded fashion by a panel of 9 endoscopists with experience using the SpyGlass® system. The reviewers scored the quality of each image based on a scale of 0 (extremely poor) to 10 (excellent). Results were analyzed using a one-way analysis of variance technique.

With the cholangioscope immersed in saline and 100% contrast, the mean image quality scores were 7.6 (95% confidence interval [CI], 6.7-8.5) and 6.9 (95% CI, 5.8-8.0), respectively. Figs. 1 and 2, respectively, show images captured with the cholangioscope immersed in normal saline (0% contrast) and 100% contrast. The highest mean image quality score was 7.8 (95% CI, 6.7-8.9) in 70% contrast. The lowest mean image quality score was 6.5 (95% CI, 5.6-7.4), in both 50% and 60% contrast. Table

Table 1. Percent Contrast vs Mean Image Quality Score

Percent contrast, %	Mean image quality score
0	7.6
10	7.6
20	7.6
30	6.6
40	6.9
50	6.5
60	6.5
70	7.8
80	6.8
90	7.1
100	6.9

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Fig. 1. Cholangioscopic image in normal saline (0% contrast).

1 lists the image quality score for each solution studied. A one way analysis of variance revealed no significant difference in mean image quality scores ($p=0.414$).

The *ex vivo* design of this study does not account for some factors that complicate *in vivo* cholangioscopy (i.e., the dynamic flow of saline/contrast, bile, sludge, stone fragments, or touch bleeding). However, this study suggests that contrast or a contrast/saline mixture does not significantly affect cholangioscope image quality compared with normal saline. Based on these findings, we encourage endoscopists to use intraductal contrast prior to cholangioscopy if needed for lesion localization.

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Fig. 2. Cholangioscopic image in 100% contrast.

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