

· · · · 2

: (Magnetic resonance cholangiopancreatography; MRCP)  
가 .  
: , CT  
15 (0.04 mg/kg) MRCP  
. 3 가 ,  
:  
,  
( $p < 0.05$ ). 12 (80.0%)  
, 2 (13.3%) , 1 (6.6%)  
3 , 1  
:  
MRCP

(Magnetic resonance cholangi- (5), (6, 7) 가  
opancreatography: MRCP) 가 (1). 가 . MRCP  
MRCP MRCP가 Silva (8) 가  
(Endoscopic retrograde cholangio- (2). MRCP 가  
pancreatography: ERCP) MRCP  
MRCP  
(3).  
4). (3, 2004 10 2005 10  
MRCP 15  
(Computed  
tomography: CT)  
MRCP . 15  
가 10 , 가 5 , 51.4

(17-76 ) . 3 0: , 1: ,  
 4 , 3 , 2: , 3:  
 3 , 2 , 2 , 1 .  
 1.5T (General 가  
 Electric Medical Systems, U.S.A.) 가 가 ,  
 가  
 (single shot fast spin echo: SSFSE) 가  
 T2 가 1.50  
 (source image), (3-D projection image) . 1.50  
 가 가  
 3-5 mm 40 .  
 5 cm ,  
 15 9 MRCP 가  
 TR/TE 4,000/900  
 msec, (fields of view, FOV) 250 mm, 가  
 (matrix) 256 × 256, (slice thickness) 40  
 mm 4 mm 1 2 가 3  
 3-4  
 MRCP 3 가 가  
 1kg 0.04 mg 1-2 ,  
 15 MRCP  
 2 MRCP  
 MRCP  
 가  
 paired t - test  
<sup>2</sup> test

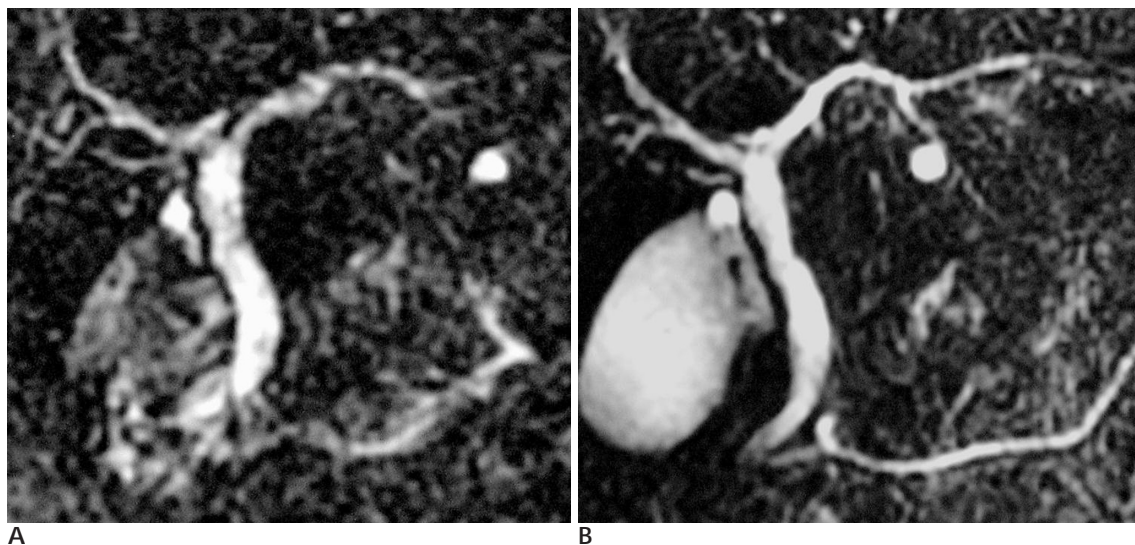


Fig. 1. MRCP image before (A) and after (B) morphine injection in a 71-year-old woman with acute pancreatitis. The image after morphine administration provides better qualites than the image before morphine administration for the visualization of the seg-mental intrahepatic bile duct, intrahepatic bile duct, common bile duct, cystic duct, and pancreatic duct.

MRCP가 (Fig. 1) (80.0%) , 2 (13.3%) , 1 (6.6%) (Table 1). MRCP가 (Fig. 2). 1.50 (p < 0.05). MRCP가 3 (20.0%) , 2 (6.6%) (p < 0.05) (Fig. 3). 66.6 - 93.3% , 80.0%, 93.3% 가 , , , 가 , , , 가

**Table 1.** Comparison of Image Qualities by the Scores Using the Before and after Intravenous Morphine Administration (*n* = 15)

	Before morphine	After morphine	<i>p</i> -value*
Segmental intrahepatic bile duct	1.24 ± 0.96	1.73 ± 0.82	0.012**
Intrahepatic bile duct	1.52 ± 0.91	1.76 ± 0.72	0.024**
Cystic duct	0.97 ± 1.06	1.19 ± 0.81	0.325
Common bile duct	2.28 ± 0.73	2.51 ± 0.71	0.043**
Pancreatic duct	1.40 ± 0.84	1.92 ± 0.83	0.00081**

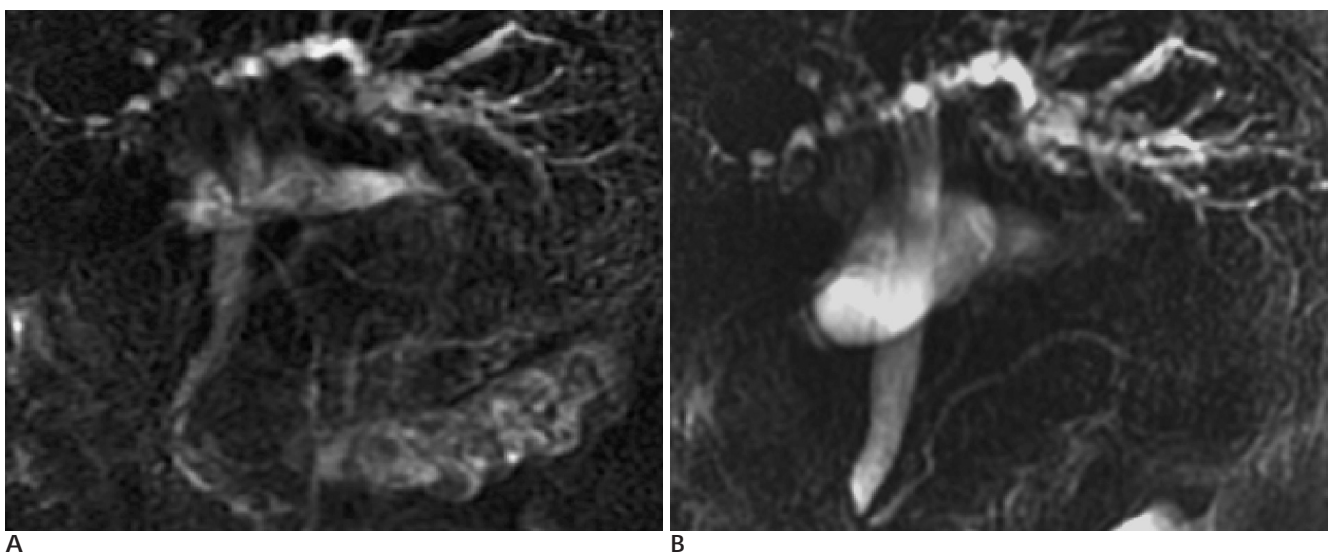
Numbers: Average ± standard deviation

\**p*-value: paired t-test, \*\*statistically significant, *p* < 0.05

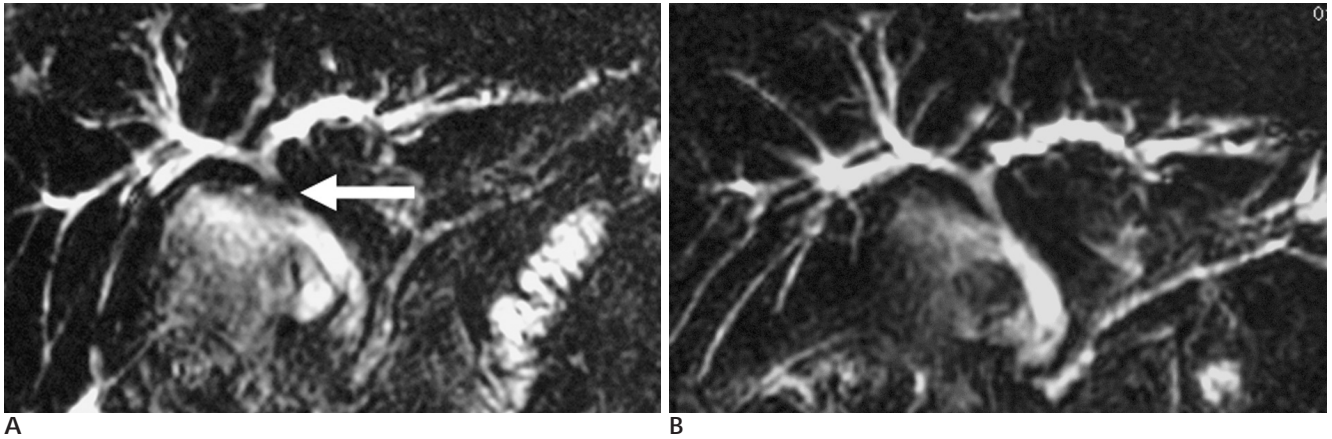
**Table 2.** Number of Cases for Optimal Image Quality Using the Before and After Intravenous Morphine Administration (*n* = 15)

	Before morphine (%)	After morphine (%)
Segmental intrahepatic bile duct	5/15 (33.3%)	10/15 (66.6%)
Intrahepatic bile duct	7/15 (46.6%)	11/15 (73.3%)
Cystic duct*	3/12 (25.0%)	4/12 (33.3%)
Common bile duct	12/15 (80.0%)	14/15 (93.3%)
Pancreatic duct	6/15 (40.0%)	11/15 (73.3%)

\*Cholecystectomy (*n* = 3)



**Fig. 2.** MRCP image before (A) and after (B) morphine injection in a 51-year-old man with liver cirrhosis. Pancreatic duct is clearly visualized only in the (B). For visualization of the cystic duct, the both images provide poor image quality.

[illegible]

## MRCP가

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## Usefulness of MR Cholangiopancreatography after Intravenous Morphine Administration<sup>1</sup>

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**Purpose:** We wanted to assess the usefulness of MRCP after intravenous morphine administration in the evaluation of the hepatopancreatic pancreato-biliary ductal system.

**Materials and Methods:** We studied 15 patients who were suspected of having disease of hepatopancreatic ductal system and they did not have any obstructive lesion on ultrasonography and/or CT. MRCP was acquired before and after morphine administration (0.04 mg/kg, intravenously). Three radiologists scored the quality of the images of the anatomic structures in the hepatopancreatic ductal system. We directly compared the quality of the images obtained with using the two methods and the improvement of the artifacts by pulsatile vascular compression.

**Results:** The MRCP images obtained after intravenous morphine administration were better than those obtained before morphine administration for visualizing the hepatopancreatic ductal system. On direct comparison, the MRCP images obtained after morphine administration were better in 12 cases, equivocal in two cases, and the images before morphine administration were better in only one case. In three patients, MRCP before morphine injection showed signal loss at the duct across the pulsatile hepatic artery. In two of three patients, MRCP after morphine injection showed no signal loss in this ductal area.

**Conclusion:** MRCP after intravenous morphine administration enables physicians to see the hepatopancreatic ductal system significantly better and the artifacts caused by pulsation of the hepatic artery can be avoided.

**Index words :** Bile ducts, anatomy

Magnetic resonance (MR), cholangiopancreatography

Magnetic resonance (MR), artifact

Bile ducts, radiography

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