



Revolution of Novel Direct Peroral Cholangioscopy: Another Step Beyond Limitations

Tanyaporn Chantarojanasiri

Division of Gastroenterology, Department of Internal Medicine, Rajavithi Hospital, Rangsit University, Bangkok, Thailand

Corresponding Author

Tanyaporn Chantarojanasiri

ORCID <https://orcid.org/0000-0001-5781-8696>

E-mail chtunya@gmail.com

See “Utility of Direct Peroral Cholangioscopy Using a Multibending Ultraslim Endoscope for Difficult Common Bile Duct Stones” by Won Myung Lee, et al. on page 599, Vol. 16, No. 4, 2022

Since the first endoscopic retrograde cholangiopancreatography (ERCP) was initiated in 1968, the diagnosis and treatment for pancreatic and biliary diseases have been made based on the fluoroscopic images. With increasing diagnostic and therapeutic indications, interventions that has been guided by the “shadow” on the cholangiogram has become insufficient for some particular interventions such as targeted intraductal biopsy or lithotripsy for stones. By the introduction of cholangioscopy in the 1970s,¹ these intraductal modalities changed from the fluoroscopically guided to the direct visualization which enable more accurate diagnostic and therapeutic measures.

The development of peroral cholangioscopy has experienced many challenges. Firstly, the scope diameter is limited by the bile duct size or the size of the therapeutic ERCP working channel in case of single-operator cholangioscopy. This subsequently limited the diameter of the working channel of the cholangioscope and the diameter of the instruments especially for the biopsy forceps. Moreover, water irrigation and suction might not be sufficient especially in the presence of bleeding. Secondly, the bending property of the cholangioscope limits the scope movement, which usually start with an acute angulation from duodenum to the papilla and from the papilla to the desired segment of the bile duct. Thirdly, the resolution of endoscopic image is inferior to that of the luminal endoscope which hamper it use especially in the evaluation of the indeterminate biliary strictures. Early reports using mother-baby scope showed promising data but had several drawbacks since the technique need two endoscopists to perform and the scope was extremely fragile. This was soon replaced

by single-use, single-operator cholangioscopy which is much more widely used but still carry the same limitation as mentioned above. With the development of ultraslim upper endoscope, 'direct cholangioscopy was possible to perform by a single endoscopist. Compared with single-operator cholangioscopy, direct cholangioscopy provide a better endoscopic image, a larger cholangioscopic working channel, and a better ability to clear the endoscopic view through separated water irrigation and suction channel. This system also requires only single operator and carry a better scope durability when compared with the mother-baby scope. However, bile duct intubation using direct cholangioscope is still a big challenge since loop formation inside the stomach and duodenum occurs and acute angulation between the bile duct and the duodenum makes deep bile duct insertion difficult with poor stability.

There have been several techniques to assist bile duct intubation for direct cholangioscopy, including the wire-guided method,² duodenal overtube insertion,³ duodenal balloon insertion together with guidewire-assisted duodenal intubation,⁴ or using the specialized intraductal balloon as an anchor.⁵ These techniques improve the desired bile duct intubation significantly compared with free-hand cannulation⁶ but still have some limitations. Almost all accessories require duodenoscope or other endoscope insertion to place the instrument prior to the insertion of direct cholangioscope. Among these techniques, intraductal balloon anchor seems to provide a promising success rate which can be used along with other techniques (Table 1). Also, these ultraslim endoscope is durable since none of these reported scope damage during endoscopic interven-



Table 1. Feasibility of Direct Cholangioscopy Using Various Assistant Method

Author (year)	Method	No. of cases	Cholangioscope model	Successfulness	
				Free hand	With assistance
Larghi and Waxman (2006) ²	Wire-guided	3	GIF-XP 160	Not attempt	100% (3/3)
Choi <i>et al.</i> (2009) ³	Overtube-balloon	12	GIF-N230 or GIF-N260	Not attempt	83.3% (10/12)
Moon <i>et al.</i> (2009) ⁵	Intraductal balloon	29	GIF-XP260N, GIF-N260, and GIF-N230	Not attempt	Wire-guided 45.5% (5/11) Intraductal balloon-guided 95.2% (20/21)
Mori <i>et al.</i> (2012) ⁴	Duodenal balloon with guidewire-assisted	40	EG530N2, EG530NP, and EG530NW	Not attempt	92.5% (37/40)
Itoi <i>et al.</i> (2014) ⁶	Free-hand technique, a guidewire alone, or intraductal anchoring balloon	41	Prototype multibending direct peroral cholangioscope	0% (0/7)	Wire-guided 66.6% (4/6) Anchoring balloon 92.9% (26/28)
Lee <i>et al.</i> (2022) ⁷	Free-hand technique and intraductal anchoring balloon	20	CHF-Y0010	95% (19/20)	Intraductal balloon 100% (1/1)

tions such as lithotripsy.

In this issue of *Gut and Liver*, Lee *et al.*⁷ introduce a newly developed cholangioscope. This multibending model allows easier free-hand insertion into the bile duct with better stability. Apart from having two bending sections to overcome the angulation, this model is longer than conventional ultraslim scope, with two working channels and stiffer shaft to reduce loop formation and facilitate free-hand insertion. These improvement changed remarkably from the previous version, in which free-hand insertion was not successful in all seven patients that free-hand insertion was attempted.⁶ The study was performed on 20 patients with difficult common bile duct stones in which cholangioscopy and lithotripsy were successfully performed in all patients with one case of mild complication. Although this study reported a small number of patients in which the procedures were performed under expert hands, it showed a promising future for the development of the direct peroral cholangioscopy.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ORCID

Tanyaporn Chantarojanasiri

<https://orcid.org/0000-0001-5781-8696>

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