

# ID P042: Single operator cholangioscopy reduces patient radiation exposure in the management of difficult bile duct stones and indeterminate bile duct structures: a single center comparison study

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## Abstract

**Purpose:** Endoscopic Retrograde Cholangio-Pancreatography (ERCP) is a well-established endoscopic procedure for treatment or palliation of a great variety of hepatobiliary and pancreatic diseases, routinely performed using X-ray fluoroscopy. Due to extended fluoroscopy times and increased number of images, patient radiation doses can be high, especially in complex cases. A new digital single-operator cholangioscopy (D-SOC) system (SpyGlass Digital System, Boston Scientific), allows direct visualization of the ducts, targeted biopsies, visual wire manipulation and difficult stone lithotripsy in a radiation-free manner. We investigated whether the SpyGlass platform used adjunctively to ERCP may actually reduce patient radiation exposure.

**Methods:** We retrospectively analyzed a database of consecutive patients undergoing D-SOC following failure of ERCP either for difficult-to-treat biliary stones or indeterminate strictures. The overall patient radiation exposure outcomes in terms of Kerma Area Product (KAP), Fluoroscopy time (T) and the total number of films (F) were compared to a historical cohort of patients with difficult stones or indeterminate strictures exclusively managed by conventional ERCP before the era of D-SOC. All procedures were performed by a single, experienced operator.

**Results:** Between 2016 and 2017, a total of 16 patients underwent successful D-SOC management of difficult biliary stones (n=11) or indeterminate strictures (n=5). The historical cohort comprised 20 patients with difficult-to-treat stones (n=12) or indeterminate strictures (n=8) who were successfully managed by repeat conventional ERCP between 2012 and 2015.

Median KAP, T and F in patients undergoing D-SOC were 11.8 Gy<sub>cm</sub><sup>2</sup>, 4.2 min and 1.6 films respectively, compared with 17 Gy<sub>cm</sub><sup>2</sup>, 5.8 min, and 2.6 films respectively in the historical ERCP cohort. Statistically significant differences (P<0.05) were found for KAP and T.

**Conclusions:** Adjunct use of the new SpyGlass cholangioscopy platform significantly reduces radiation exposure in patients with difficult stones or indeterminate strictures in whom conventional ERCP has failed.

## INTRODUCTION

The endoscopic retrograde cholangiopancreatography (ERCP) is a standard procedure to diagnose diseases and treat conditions of the biliary ducts and pancreas. It is documented that over 1 million number of patients undergo very year ERCP for various clinical conditions.

In some cases, such as indeterminate strictures or large, impacted (difficult) stones, cholangioscopy or pancreatoscopy could be performed to the patient. In this way direct visualization and treatment in the pancreaticobiliary anatomies. It is well-documented that direct visualization of the bile and pancreatic ducts during ERCP can be of significant value in helping to obtain better biopsy specimens and more effectively guide stone therapy. Due to extended fluoroscopy times used during ERCP, patient radiation doses can be high, especially in complex cases.

Recently a new system was introduced in the market; a fully digital single-operator cholangioscopy (D-SOC) machine (SpyGlass Digital System, Boston Scientific). The method allows direct visualization of the ducts, targeted biopsies, visual wire manipulation and difficult stone lithotripsy in a radiation-free manner.

## RESULTS

Between 2016 and 2017, a total of 16 patients underwent successful D-SOC management of difficult biliary stones (n=11) or indeterminate strictures (n=5). Set up of the procedure can be seen in the image below.

The historical cohort comprised 20 patients with difficult-to-treat stones (n=12) or indeterminate strictures (n=8) who were successfully managed by repeat conventional ERCP between 2012 and 2015.

Median KAP, T and F in patients undergoing D-SOC are seen in the histogram graph below.

Statistically significant differences (P<0.05) were found for KAP and T with the spyglass procedure lower than conventional ERCP.

Approximate reduction of radiation dose and fluoroscopy time is 30%.

## PURPOSE

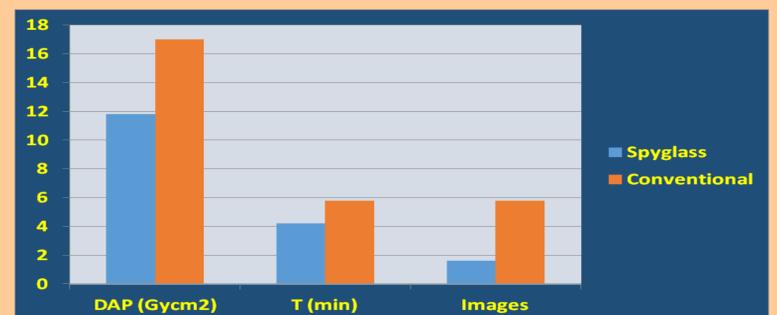
The aim of the study was to compare patient radiation doses during ERCP procedures performed either conventionally or using the SpyGlass cholangioscopy platform (D-SOC system).

## METHODS

We retrospectively analyzed a database of consecutive patients undergoing D-SOC following failure of ERCP either for difficult-to-treat biliary stones or indeterminate strictures.

The overall patient radiation exposure outcomes in terms of Kerma Area Product (KAP), Fluoroscopy time (T) and the total number of films (F) were compared to a historical cohort of patients with difficult stones or indeterminate strictures exclusively managed by conventional ERCP before the era of D-SOC.

All procedures were performed by a single, experienced operator. The image of this system is shown below.



## CONCLUSIONS

Preliminary results show that the Spyglass method provides important clinical, and operational benefits for managing patients with difficult stones and indeterminate biliary strictures.

Although there are few studies so far, we are positive that use of this system reduces radiation exposure in patients with stones which can be removed with great difficulty.