The image shows two surgeons from behind, wearing blue scrubs and blue bouffant caps. They are standing in an operating room, looking at two large monitors. The left monitor displays a close-up endoscopic view of internal organs, while the right monitor shows a fluoroscopic (X-ray) image of a catheter or stent. The room is dimly lit, with the primary light source being the monitors. A GE OEC logo is visible on a piece of equipment on the left.

## Advanced fluoroscopy- endoscopy hybrid room for pancreaticobiliary treatment: an innovative experience

Experience of Dr. Fredrick Swahn at  
Skane University Hospital - Lund



With the expansion of surgeons training in endoscopy imaging and the broadening of the endoscopist's skills to endoscopic ultrasound (EUS), Endoscopic Retrograde Cholangio Pancreatography (ERCP) procedures are increasing and transitioning from diagnostic to therapeutic indications.<sup>1</sup> Modern guidewire procedures including biliary cannulation, pancreatic stenting, and, Endoscopic Papillary Large Balloon Dilatation (EPLBD), require the capacity of a hybrid room, integrating advanced endoscopy with high image quality fluoroscopy.

### Efficiency and progress of ERCP

In 2018, the 50<sup>th</sup> anniversary of the first ERCP procedure performed by Dr. William S. McCune in Washington DC, was celebrated in Malmö (Sweden).

The role of ERCP in the management of pancreaticobiliary diseases has been increasing and strengthened by other techniques such as Endoscopic Ultrasound (EUS) and more recently direct visualization systems allowing intraductal endoscopy. The positioning of these very thin instruments is performed under fluoroscopy with contrast media injection to visualize the biliary and pancreatic ducts. The final control, performed taking a fluoroscopic image, is stored in the patient file for follow up.

The Surgery department of Lund University Hospital chose the OEC Elite CFD C-arm for its advanced hybrid room equipped with intraductal ERCP procedure capability.

High image quality fluoroscopy from the CMOS flat panel detector was the determining criteria for Dr. Swahn for selecting the OEC Elite CFD C-arm system. Guidance of devices and stents of a couple of millimeters in diameter into the biliary and pancreatic ducts

requires high image resolution and contrast in soft tissues.

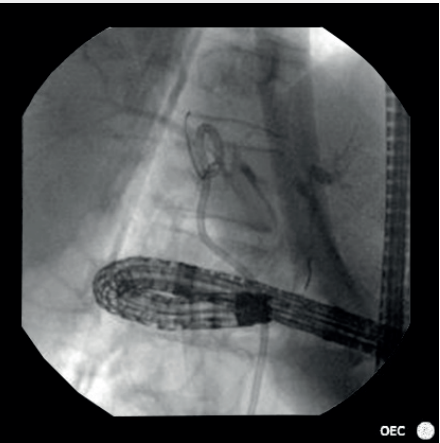
**“For this room, we needed a C-arm with excellent X-ray image quality at low dose imaging. It is one of the essential things you need to have when performing advanced endoscopy and ERCP procedures.”**  
**Dr. F.Swahn**

### High-resolution fluoroscopic guidance

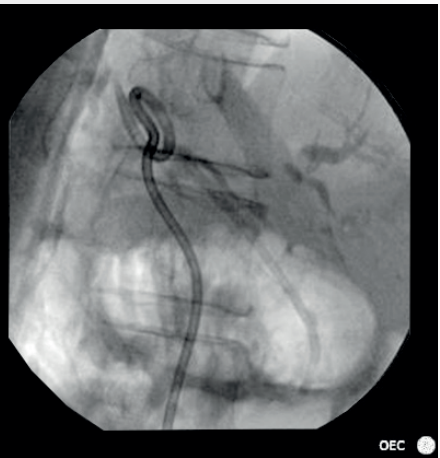
Complex pancreaticobiliary system treatment is permitted by the use of a direct visualization system (SpyGlass® Boston Scientific). This instrument is introduced into the pancreaticobiliary tracts through the duodenoscope positioned at the level of the major duodenal papilla. A catheter is then slowly inched into the duct and through which either electrohydraulic lithotripsy (EHL) or laser lithotripsy (LL) devices can be introduced. Intraductal biopsies can also be performed with forceps or brushes through this catheter.

If the duodenoscope guidance to the major duodenal papilla can be performed with traditional fluoroscopic

**Dr. Frederik Swahn:**  
**“The OEC Elite CFD C-arm is a very good work horse. It provides the best X-ray images I have seen in mobile C-arm flat panels.”**



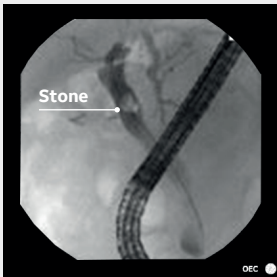
Biopsy brush



Stent implantation into biliary duct for drainage soft tissue resolution

imaging, the introduction and motion of the direct visualization system and its tools require high-resolution fluoroscopy with high contrast sensitivity given the small size of the tool.

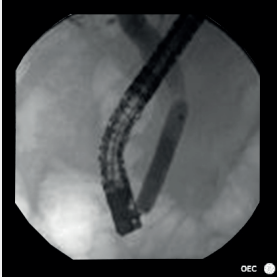
Initial cholangiogram showing the stone



Cholangiogram displaying stone progression toward papilla



Large balloon inflated in duodenal papilla



Control cholangiogram after bile duct drainage with small balloon



### High soft-tissue contrast fluoroscopy

Complex ERCP in the pancreaticobiliary system often involves interventions such as ballooning, brush biopsies or drainage stenting. At this point of the procedure, fluoroscopy is the usual method to guide and control the placement of these devices. In the abdominal belt of the patient, which consists of diverse densities such as bone, muscles, air, and fat, the challenge is then to identify thin or low-density devices.

As the handling of the duodenoscope and its tools is complex, fluoroscopy with high spatial resolution in diverse soft tissue densities, without manual adjustment, is a clinical added value that contributes to achieving a positive patient outcome. Today, endoscopic devices and tools do not always address the procedure's needs.

Many developments are ongoing to increase access to the targeted anatomy in a simpler and faster way.

For further improvement of the procedure, the fluoroscopy-endoscopy hybrid room would benefit from an even higher level of integration of the different minimally-invasive navigation techniques and a more integrated workflow across the equipment. □



Dr. Fredrik Swahn is a gastroenterology surgeon, specializing in advanced ERCP endoscopy techniques. After fourteen years of practice in Karolinska University Hospital, Stockholm, he joined Lund University Hospital in 2015, to develop advanced endoscopy surgery.



1. Kozarek 2016 | R Kozarek et al. The future of ERCP. Endoscopy International Open 2017; 05: E272–E274

The statements by GE's customers described here are based on their own opinions and on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc., there can be no guarantee that other customers will achieve the same results.