Endoscopic Accessory for Indocyanine Green (ICG)-Based Biliary Imaging during ERCP

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Technology description

Unmet Need

The Endoscopic Retrograde Cholangiopancreatography (ERCP) procedure is used to perform therapies such as retrieving obstructing gallstones, expanding tissue strictures, or placing a stent to relieve obstruction from malignancies. The procedure requires precision and a high degree of technical skill. For physicians to perform the procedure with an 80% success rate, they must perform up to 400 cases first. During ERCP, selective cannulation is the process of gaining access to either the biliary duct or pancreatic duct through the duodenal papilla. One of the main problems with cannulation is that the orientation of the ducts behind the entrypoint cannot be visualized. This lack of visualization makes it difficult to correctly position and orient the accessories used to enter the ducts. If the endoscopist fails within a certain time limit or after a certain number of unsuccessful attempts to access the bile duct for further therapeutic interventions using their regular cannulation technique, the procedure is called a difficult cannulation. The most dangerous complication of the ERCP procedure is pancreatitis, a life-threatening condition that occurs in 5% of cases often because of multiple failed cannulation attempts resulting in tissue irritation. Patients can also develop pancreatitis from this procedure when doctors use contrast to visualize the pancreatic and biliary ducts under fluoroscopy. Although the contrast chemicals are a current method of visualization, their use irritates the pancreatic duct further.

Technology Overview

This invention provides the physician with information about the location and orientation of the bile ducts without requiring the use of contrast. Instead, Indocyanine Green (ICG) us used to fluoresce the bile duct. The ICG binds to plasma proteins and the bound ICG emits light when illuminated with near-infared light. Intravenously injected ICG is excreted by the liver into the bile and can be detected approximately 15 minutes after the injection and continues to be detected for a couple of hours. Fluorescent imaging has been used to visualize the bile duct and gallbladder through a laparoscopic camera, but has never before been applied for use in ERCP or with duodenoscopes.

The invention involves two main elements, a fluorescence imaging system for visualization of the bile duct after ICG injection and a fluorophore or phosphorescence-coated guidewire to enable physicians to visualize the guidewire during insertion into the bile duct. This invention has the potential to make an impact on therapeutic endoscopy by making the ERCP procedure safer and easier for physicians to

be trained on and perform.

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