INTRODUCTION

Laparoscopic cholecystectomy (LC) is the gold standard in the removal of the diseased gallbladder. Bile duct injury is rare with an incidence of 0.3–0.7%, but it can lead to serious consequences. Surgery for gallbladder disease tends to be difficult for even experienced doctors and has a high risk of complications.

Intraoperative fluorescent imaging with indocyanine green (ICG) has been employed for confirming the potency of vascular reconstruction surgery, liver transplantation, anastomosis of the gastrointestinal tract (GIT), brain aneurysms, identification of sentinel lymph node, and hepatocellular carcinoma detection. Recently, an intraoperative cholangiography technique in LC involving the excretion of fluorescent ICG in the bile after intravenous injection has been used to determine the bile duct anatomy.

Currently, some detailed reports have been published on LC using intraoperative ICG cholangiography and suggested its safety and feasibility. In this study, we evaluated the process of intraoperative ICG cholangiography including LC for gallbladder disease.

Indocyanine green is a medical dye that subserves wide application especially in its use in biliary surgery. Its fluorescent properties under near-infrared light have been used in the intraoperative characterization of the biliary tree to ensure safe surgery during LC. It is a tricarbocyanine dye having a molecular weight of 751 Da.

MATERIALS AND METHODS

Based on the procedures of ICG, LC was performed at the World Laparoscopy Hospital, India.

RESULTS

Results show that there was positive and successful intraoperative identification of the extrahepatic bile ducts. This reduced the likelihood of causing an injury to the bile ducts. This is, however, unlike the conventional imaging, whose results are usually not very successful. It has been noted that the intraoperative misidentification of the bile ducts anatomy is usually the main cause of bile duct injury.

DISCUSSION

Indocyanine green is also known as the florescent dye. This dye has been used since 1956. Aurogreen trade mark is injected intravenously 45 minutes before surgery. It is actually the one that helps light the path for better and real-time identification of the biliary anatomy during LC. There is a florescent imaging system that is usually used together with a laparoscope. The system must have a lightning system that provides light for both infrared and xenon rays. Figure 1 shows the package of ICG. Figure 2 demonstrated...
Role of Indocyanine Green in Laparoscopic Cholecystectomy

Indocyanine green acts as an imaging agent, which is sterile, water soluble, and has a peak spectral absorption averaging at 805 nm in blood pressure or simply the blood.

It does not undergo enterohepatic recirculation. It only stays in the bile for about 8 minutes after injection. The removal of ICG depends on several factors, including the blood flow of the liver, biliary excretion, and parenchymal cellular function. It is contraindicated in those having iodine toxicity. Sometimes, fluorescence may not be detected 45 minutes after the injection of ICG. Therefore, when this happens, the second dose of 2.5 μg of ICG can be administered. Also a second injection of ICG can be given if there is anything regarding perfusion that cannot be clearly understood during the surgery. Apart from its role to analyze the extrahepatic biliary anatomy better, thus reducing the incidence of bile duct injury, it also plays a role in identifying the anatomic structure in a quick manner, thereby reducing the time used in performing the procedure of cholangiography and hence also shortening the entire duration of surgery.

There is also no need to bring onboard additional equipment and manpower, especially the radiological personnel for an X-ray.

The technique of ICG also plays a role as a teaching tool for practitioners who are able to identify the relevant extrahepatic structures in almost every patient. This makes them experienced with the procedure that makes it easier for them to perform future procedure.

It does not require X-ray, thus no one is exposed to radiation. The ICG that is used is usually safe and does not cause any adverse reaction in patients. It is also cost-effective.

**CONCLUSION**

Real-time near-infrared fluorescence cholangiography offers better technology that can help with the identification of the vital biliary anatomy.

It helps to reduce the risk of bile duct injury by providing clear vision of the vital extrahepatic structure. The reduced risk helps to avoid complications that can arise from the injury of the bile duct, which sometimes can be fatal to a patient.

**REFERENCES**


