Annals of Medicine Research and Public Health
Review Article (ISSN: 2995-5955)

# Indocyanine Green Fluorescence in Laparoscopic Repair Completely Extraperitoneal (TEP) of Inguinal Hernia: A Case Report and Literature Review

**Luciano Ramírez[1*], Daniel Toapanta[2], Luis Cazaban[3]**
[1]Assistant Clinic Surgical TO, Hospital of Clinics, University of the Republic, Uruguay
[2]Resident Surgery General, Clinic Surgical TO, Hospital of Clinics, University of the Republic, Uruguay
[3]Teacher Holder Clinic Surgical TO, Hospital of Clinics, University of The Republic, Uruguay

**Citation:** *Luciano Ramírez, Daniel Toapanta, Luis Cazaban. Indocyanine Green Fluorescence in Laparoscopic Repair Completely Extraperitoneal (TEP) of Inguinal Hernia: A Case Report and Literature Review. Ann Med Res Pub Health. 2026;5(2):1-6.*

**Received Date:** 07 August, 2026**; Accepted Date:** 13 August, 2026**; Published Date:** 15 August, 2026

[*]**Corresponding author:** Luciano Ramírez, Resident Surgery General, Clinic Surgical TO, Hospital of Clinics, University of the Republic, Uruguay



## ABSTRACT

**Introduction:** Totally extraperitoneal (TEP) laparoscopic repair is a widely used technique for treating inguinal hernias. However, identifying vascular structures during preperitoneal dissection can be challenging, especially in large, recurrent, or anatomically variable hernias. Fluorescence angiography with green of indocyanine (ICG) has emerged as a tool Intraoperative imaging allows visualization of vascularization in real time and could increase the safety of the procedure.

**Aim:** Describe the utility of the green of indocyanine during the Laparoscopic TEP repair and review the available scientific evidence.

**Clinical case:** A 63–year–old male patient with a reducible right inguinoscrotal hernia underwent laparoscopic repair. Following intravenous administration of ICG, the inferior epigastric vessels and regional vascularization were clearly identified using fluorescence visualization. facilitating the dissection of the space preperitoneal and avoiding vascular lesions. The procedure was completed without complications, with adequate mesh placement and a favorable postoperative course.

**Conclusion:** Indocyanine green fluorescence is a promising tool for improving anatomical identification during repair. laparoscopic of the hernia inguinal. His employment could increase surgical safety and reduced hemorrhagic complications, although prospective studies are needed to confirm these benefits.

**Keywords:** Green of indocyanine; Fluorescence; Hernia inguinal; TEP; Laparoscopy

## INTRODUCTION

The hernia inguinal represents a of the pathologies surgical further frequent in clinical practice, with millions of procedures performed annually worldwide, totally extraperitoneal (TEP) laparoscopic repair has become established as an effective and safe alternative in recent decades, offering minor pain postoperative, recovery functional further quick and lower incidence of chronic pain compared to some open approaches.[1]

Despite these advantages, dissection of the preperitoneal space remains a passed technically demanding. The presence of variations anatomical, fibrosis or hernias of great size can hinder the ID of structures vascular, particularly the inferior epigastric vessels, increasing the risk of intraoperative bleeding.

The surgery guided by fluorescence with green of indocyanine has experienced a remarkable development in different specialties surgical. After his When administered intravenously, ICG binds to plasma proteins and fluoresces when excited by near–infrared light, allowing real–time visualization of tissue perfusion and vascular anatomy.[2]

Its usefulness has been widely demonstrated in hepatobiliary, colorectal, oncological, and robotic surgery. However, experience in abdominal wall surgery is still limited. In 2024, Zhang and collaborators published one of the first clinical studies that evaluated the application of ICG during laparoscopic TEP repair demonstrated better identification of the inferior epigastric vessels and a reduction in intraoperative bleeding compared to the conventional technique.[3]

In this context, we present a case of the use of indocyanine green during laparoscopic repair of an inguinal hernia and review the evidence available about their potential benefits, limitations and future perspectives.[4]

## AIM

Describe the experience initial with the employment of green of indocyanine during the laparoscopic TEP repair of inguinal hernia and to analyze the available scientific evidence regarding its usefulness in optimizing anatomical identification and the safety of the procedure.

## MATERIAL AND METHODS

A narrative literature review was conducted on the use of indocyanine green fluorescence angiography (ICG) in laparoscopic inguinal hernia repair. The PubMed, Scopus, and Google Scholar databases were consulted. including publications in English and Spanish until 2025. HE they used Search terms: Indocyanine Green, Fluorescence Imaging, Inguinal Hernia, Totally Extraperitoneal Repair, TEP, Laparoscopic Hernia Repair and Near–Infrared Fluorescence.

HE included studies originals, series of cases, reports of case and reviews that they will evaluate the employment of ICG in surgery of the hernia inguinal. In parallel, a clinical case performed at our center is described to illustrate the practical application of this technology.

## CASE CLINICAL

Male patient, 63 years old, diagnosed with inguinoscrotal hernia right of several years of evolution, symptomatic and completely reducible. Her personal history included hypertension.

properly controlled with treatment pharmacological. No had no history of previous inguinal surgery or known allergy to iodine or indocyanine green.

HE Indian repair laparoscopic through technique completely extraperitoneal (TEP), under general anesthesia. We performed an infraumbilical incision, creating space behind the rectus abdominis muscle, preperitoneal, we placed barter of 10 mm and optics of $0^{EITHER}$, HE starts with at a pressure of 12 mmhg, blunt dissection is performed with an endoscopic instrument.[5]

Identifying first instances he bones pubic, the artery epigastric lower and the arcuate line. From the dissection of the 3 zones and the five triangles. TO level medial HE finds the area 2 (figure 5) that continues the symphysis of the pubis and the space of Retzius. The area 1st locates to level side (space of Bogros) and contains the psoas muscle and nerves, zone 3 is the most critical zone containing the most important structures and vascularization.

A time developed he space preperitoneal and previous to the start of the dissection of the inguinal region, were administered 1 cc of indocyanine green was administered intravenously, followed by a 10–cc bolus of physiological saline solution. Using near–infrared fluorescence imaging, the inferior epigastric vessels and the vascular network of the anterior abdominal wall were immediately visualized.

Fluorescence allowed for clear identification of the vascular pathway, facilitating the dissection of the hernial sac and avoiding maneuvers close to vascular structures. The anatomy it remained clearly delimited, favoring a precise and safe dissection.

Subsequently HE completes the reduction of the sack hernia and HE implanted A 15 x 10 cm polypropylene mesh was used, although the type and material are debatable, adequately covering the Fruchaud myopectineal orifice. Fixation was performed according to the service's standard technique.

No vascular injuries, significant bleeding, or vas deferens injury were recorded. neither of the glasses spermatics. The loss blood was minimum and No It was necessary to convert the procedure. The evolution postoperative was favorable. He patient start tolerance oral He experienced adequate analgesia, without hematoma, seroma or surgical site infection, and was discharged after 24 hours.

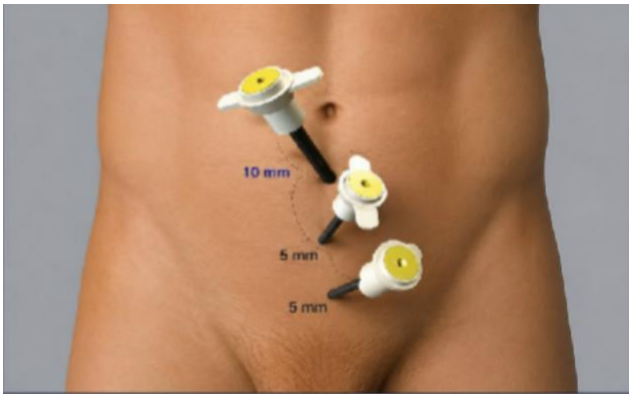


**Figure 1:** Provision of trocars in Extraperitoneal laparoscopic inguinal hernioplasty (TEP).

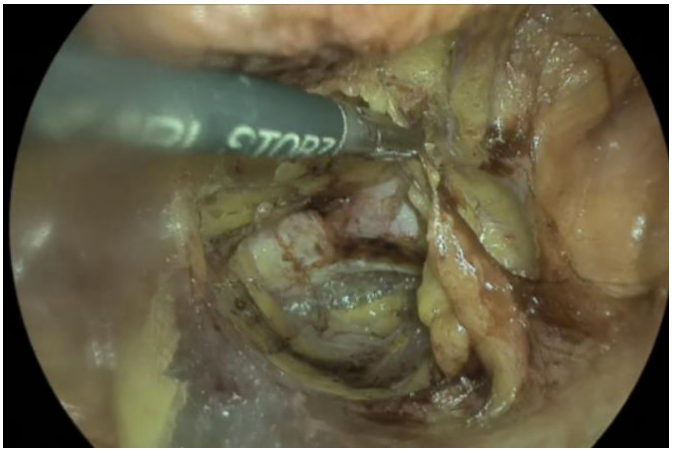

**Figure 2:** Dissection Rome space of Retzius.

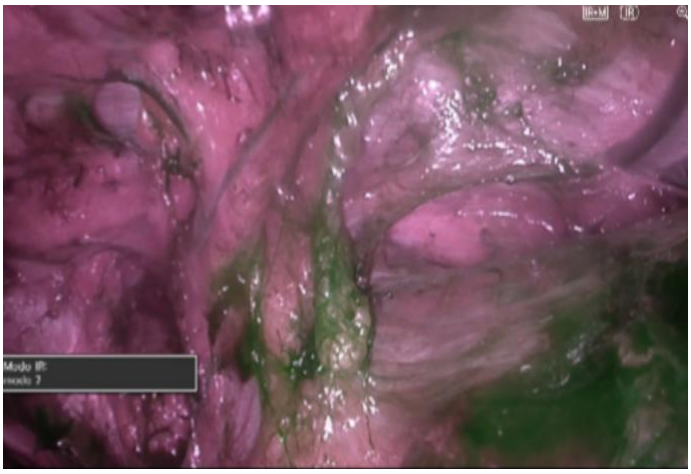

**Figure 3:** Utilization of green indocyanine Identification of vascular structures.


**Figure 4:** 3 Zones of dissection for the Laparoscopic hernia repair.

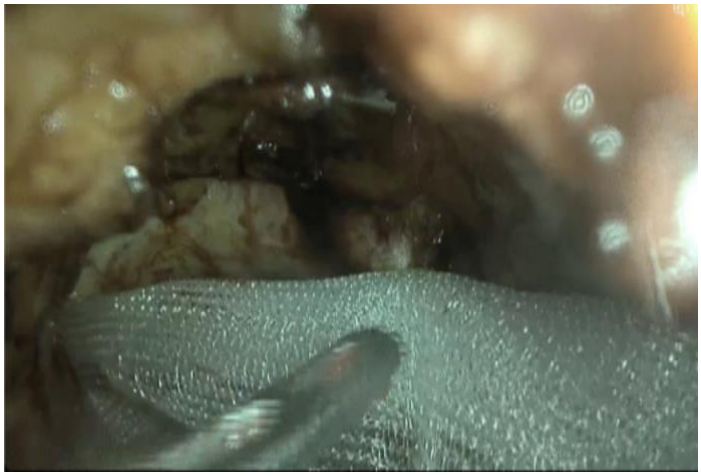

**Figure 5:** Collation of the mesh prolene.

## DISCUSSION

The incorporation of intraoperative imaging technologies represents one of the advances further important of the surgery minimally invasive in the last decade. Indocyanine green fluorescence has proven useful in multiple surgical procedures by allowing dynamic visualization of tissue perfusion and vascular anatomy in real time.

In surgery colorectal, hepatobiliary and reconstructive, he ICG has shown Benefits include perfusion assessment, identification of anatomical structures, and reduction of certain postoperative complications. However, its application in abdominal wall surgery remains a developing field.

During laparoscopic TEP repair, identifying the inferior epigastric vessels is a crucial step to avoid hemorrhagic injury and facilitate the creation of the preperitoneal space. Although the anatomy of the region inguinal is good known, there are variations anatomical that They can increase the technical difficulty, especially in obese patients, inguinoscrotal hernias, relapses, or a history of abdominal surgery.[6]

The study published by Zhang and colleagues in 2024 constitutes one of the first experiences clinics that evaluated systematically the utilization of the Indocyanine green fluorescence was used during laparoscopic TEP repair. The authors demonstrated that fluorescence allowed for more accurate identification of the inferior epigastric vessels, reducing the risk of vascular injury and facilitating anatomical orientation during dissection.

Our experience coincides with these results. In the case presented, Fluorescence visualization allowed for the early identification of vascular structures before critical dissection, providing greater safety. during the release of the sack hernia and the placement of the mesh.

In addition to vascular identification, fluorescence could have future applications in the assessment of the perfusion of the cord spermatic, of the sack hernia or even of compromised tissues in incarcerated or strangulated hernias are possible instructions still requiring validation through prospective studies.

Another important aspect is the educational value of this technology. The objective visualization of vascular anatomy can facilitate the learning of residents and surgeons. in training, shortening potentially the curve of learning of the TEP technique.

However, the routine use of ICG has limitations. These include: he cost additional, the need of equipment specific with infrared vision and the limited availability of high–quality comparative studies. Up to the moment, the guides international of the European Hernia Society They do not recommend its systematic use due to insufficient clinical evidence.

TO weigh of it, he growing development of platforms laparoscopic and Robots equipped with fluorescence systems suggest an expansion of their applications in abdominal wall surgery.

## CONCLUSION

The use of indocyanine green during laparoscopic TEP repair proved feasible and safe in the case presented. Fluorescence allowed for identification clear of the glasses epigastric lower and of the anatomy regional vascular system, facilitating a precise and uncomplicated dissection.

Although the available evidence remains limited, published results and our experience suggest that this technology could improve intraoperative safety, especially in complex procedures or during the learning curve. Prospective, comparative, multicenter studies are needed to define his impact about the results clinical and establish recommendations for incorporation into routine practice.

**Acknowledgments:** None.
**Conflicts of interest:** The authors declare that there are no conflicts of interest.

## REFERENCES

1. The Hernia Surge Group. International guidelines for groin hernia management. *Hernia*. 2018;22(1):1-165.
2. Bittner R, Arregui ME, Bisgaard T, et al. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal hernia (International Endohernia Society – IEHS). *Surg Endosc*. 2011.
3. Simons MP, Aufenacker T, Bay–Nielsen M, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia*. 2009;13(4):343–403.
4. Alander JT, Kaartinen I, Laakso A, et al. A review of indocyanine green fluorescent imaging in surgery. *Int J Biomed Imaging*. 2012;2012:940585.
5. Reinhart MB, Huntington CR, Blair LJ, et al. Indocyanine Green: Historical Context, Current Applications, and Future Considerations. *Surg Innov*. 2016;23(2):166–175.
6. Ishizawa T. Fluorescence navigation surgery with indocyanine green. *Ann Gastroenterol Surg*. 2020;4(2):158–166.