

Intra-operative identification of ureters using indocyanine green for gynecological oncology procedures

María Cabanes , Felix Boria, Alicia Hernández Gutiérrez, Ignacio Zapardiel

Gynecologic Oncology, La Paz University Hospital, Madrid, Spain

Correspondence to

Dr María Cabanes, Gynecology, Hospital Universitario La Paz, Madrid 28046, Spain; mariacabanes@gmail.com

Accepted 18 October 2019

SUMMARY

It is well known that ureteral injury is a possible complication of gynecological surgery. The literature reports rates for ureteral injuries for pelvic surgery ranging from 1% to 10%^{1,2} as the complexity of the procedure increases. Many of these injuries remain unrecognized during the surgery.³

Patients with prior surgical procedures, endometriosis, inflammatory bowel disease, or gynecological cancers are more likely to present this complication.^{2,3}

Different identification techniques have been described, such as regular ureteral stent placement, methylene blue injection, or illuminated ureteral catheter positioning. However, all of them are moderately expensive, time consuming, or with a lack of high-quality ureteral visualization.^{3,4}

We present a new ureteral visualization technique in order to avoid complications related to ureteral injury during gynecological oncologic surgeries (video 1). By using indocyanine green (ICG) injection in the ureters by cystoscopy, the fluorescent ureters can be easily identified to assess their location or facilitate their dissection. Ureteral visualization by ICG has been previously used experimentally in different medical areas such as colorectal surgery.²

Our simplification of the technique includes the following steps: (1) cystoscopy to place in the ureter 10 cm of a 6 Fr catheter; (2) ureteral injection of 8 mL ICG solution (concentration 1.25 mg/mL); (3) removal of ureteral catheters (full ureteral catheterization is not needed); (4) intra-operative identification using near infrared light at the locations needed (transperitoneally, infundibulopelvic area, lateral parametria, or ventral parametria). This technique may be used both in laparoscopic and open surgery by using a laparoscopic endoscope or a specific near infrared camera, respectively.

The main advantage is a lower risk of ureteral injury due to real-time identification during the surgical procedure. Moreover, our technique is a cheaper option than others with high-quality visualization, is much less time-consuming (15 additional minutes to the procedure), and has a low adverse event profile.

We have carried out this technique in 16 patients to date with 100% success in ureteral identification.



video 1.

The equipment used was Olympus endoscopy tower Visera Elite II S200 with 0° infrared scope (OLYMPUS IBERIA S.A.U, Barcelona, Spain).

We conclude that ureteral identification using ICG injection is a feasible option to facilitate ureteral dissection and assessment of its location during gynecological oncologic surgery, with a low cost and good safety profile that could prevent ureteral injury.

Contributors MC, FB and IZ conceived the presented idea. MC and FB developed the video and wrote the manuscript with support from IZ and AHG. IZ supervised the project.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

ORCID iD

María Cabanes <http://orcid.org/0000-0002-6213-7374>

REFERENCES

- Delacroix SE, Winters JC. Urinary tract injuries: recognition and management. *Clin Colon Rectal Surg* 2010;23:104–12.
- Nam YS, Wexner SD. Clinical value of prophylactic ureteral stent indwelling during laparoscopic colorectal surgery. *J Korean Med Sci* 2002;17:633–5.
- Mandovra P, Kalikar V, Patankar RV. Real-time visualization of ureters using indocyanine green during laparoscopic surgeries: can we make surgery safer? *Surg Innov* 2019;8:1553350619827152.
- Siddighi S, Yune JJ, Hardesty J. Indocyanine green for intraoperative localization of ureter. *Am J Obstet Gynecol* 2014;211:436.e1–436.e2.



© IGCS and ESGO 2019. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Cabanes M, Boria F, Hernández Gutiérrez A, et al. *Int J Gynecol Cancer* Published Online First: [please include Day Month Year]. doi:10.1136/ijgc-2019-000895