



SCIENTIFIC LETTER

The endoscopic-White Test: Detection of a Whipple anastomotic leakage using linoleic ac. as an endoscopic dye



Test endoscópico blanco para fístulas: detección de una fístula anastomótica poscirugía Whipple con ácido linoleico como colorante endoscópico

The “White-Test (WT)” is a lipid emulsion dye (e.g. linoleic acid content parenteral nutrition supplement) used for the intraoperative detection of biliary leakages in liver surgeries.^{1–4} The utility of dyes has been reported in some interventional endoscopy techniques, but this one in particular has not been described until now.⁵

The identification of intestinal leakages can be challenging despite radiological or endoscopic studies. We describe a case of a 57-year-old man who underwent a right hepatectomy for cholangiocarcinoma and subsequently a cephalic duodenopancreatectomy for affected margin, presented in the post-operative a low-output leakage in the gastro-jejunal anastomosis with symptoms and peri-anastomotic collection. This was confirmed with a positive fistulography, but without detection by computed tomography (CT) or esophago-gastro-duodenal transit.

After 5 weeks without resolution despite parenteral nutrition and percutaneous drainage, endoscopy was performed. The internal orifice of the fistula was not identified endoscopically, therefore the Endoscopic-WT (EWT) was performed by injection with gentle pressure of 10 mL of lipid emulsion (20% linoleic acid) through the 10Fr pig-tail percutaneous drainage. Hereby the orifice was detected at the level of the gastro-enteric anastomosis thanks to the “jet” leak of the white dye. The Endoscopic-WT was repeated without messing up the endoscopic vision or staining the mucosa, since this dye allows a quick and easy washing. Thus the orifice was successfully sealed using a 8.5–11 mm over-the-scope clip (OTSC) and two hemoclips (Fig. 1), without more evidence of white dye leakage. The procedure was performed with deep sedation, without technical incidents or adverse events. Intake oral started 3 days after this procedure without incidents.

Four weeks later, on CT control with oral contrast no leaks or collections were detected, allowing the removal of percutaneous drainage. At 1 year’ endoscopy control, the anastomosis was easily bypassed without defects.

This case describes the potential use of Endoscopic-WT at interventional techniques as the leakage management. Feasibility, simple use, not staining and safety of this fatty emulsion are properties to highlight (Appendix A. Supplementary data).

All authors have read and agreed on the content of this manuscript.

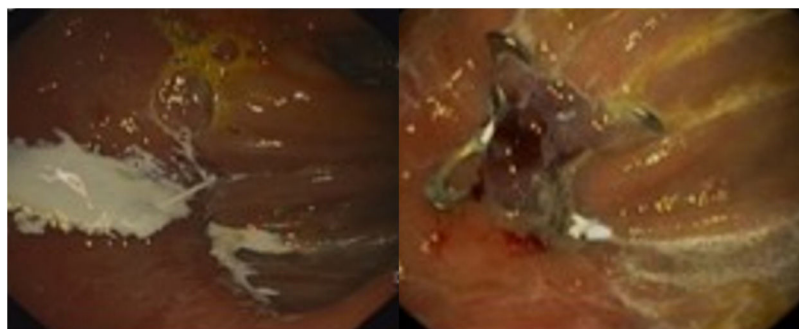


Figure 1 Gastrojejunal anastomotic leakage treated by endoscopic-White-Test and over-the-scope clip. Detection of the orifice at the level of the gastro-enteric anastomosis due to a “jet” leak of the white dye, and sealed with an over-the-scope clip.

Authors' contribution

Claudia F. Consiglieri, Emilio Ramos, Joan B. Gornals: study concept and design, acquisition of data, analysis and interpretation of the data, drafting of the article, editing figures, critical revision of the article, and final approval.

Conflict of interest

The authors declare that they have no conflict of interest or financial ties to disclose.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.gastrohep.2022.01.001](https://doi.org/10.1016/j.gastrohep.2022.01.001).

References

1. Nadalin S, Li J, Lang H, Sotiropoulos GC, Schaffer R, Radtke A, et al. The White test: a new dye test for intraoperative detection of bile leakage during major liver resection. *Arch Surg*. 2008;143.
2. Leelawat K, Chaiyabutr K, Subwongcharoen S, Treepongkaruna SA. Evaluation of the white test for the intraoperative detection of bile leakage. *HPB Surg*. 2012;2012.
3. Wang HQ, Yang J, Yang JY, Yan LN. Bile leakage test in liver resection: a systematic review and meta-analysis. *World J Gastroenterol*. 2013;19.
4. Linke R, Ulrich F, Bechstein WO, Schnitzbauer AA. The White-Test helps to reduce biliary leakage in liver resection: a systematic review and meta-analysis. *Ann Hepatol*. 2015;14:161–7.
5. Consiglieri CF, Gornals JB, Albines G, De-la-Hera M, Secanella LL, Pelaez N, et al. EUS-guided methylene blue cholangiopancreatography for benign biliopancreatic diseases after failed ERCP. *Gastrointest Endosc*. 2016;84:152–7.

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