

## The white banner test. A simple intra-operative leak test during laparoscopic sleeve gastrectomy

Professor Nashwan Mahgoob

Department of Surgery College of Medicine University of Mosul , Mosul , Iraq  
Correspondence: nashwanmahgoob@yahoo.com

(Ann Coll Med Mosul 2020; 42 (2):195-198).

Received: 3<sup>rd</sup> August 2020; Accepted: 11<sup>th</sup> Nove. 2020.

### ABSTRACT

**Objective:** To evaluate the efficacy of a simple intra-operative test (white banner test) for the detection of a leak during laparoscopic sleeve gastrectomy.

**Design:** A prospective case series study. Setting: Obesity center at Soran private hospital, Erbil, Iraq, during the period from January 2017 to June 2019.

**Participants:** eighty patients underwent the white banner test during laparoscopic sleeve gastrectomy. The records of intraoperative findings and post-operative follow up were analyzed.

**Patients and methods:** After completing the sleeve process and hemostasis, a gauze of 4\*12 cm was introduced through the 12mm trocar and displayed along the course of remaining sleeved stomach, nasogastric tube inserted to the upper portion of the stomach, compression of the pylorus by grasper against the vertebrae, 100 milliliters of saline stained by methylene blue dye were injected slowly by the anesthetist through the nasogastric tube, waiting for 30 seconds, any discoloration of the gauze was recorded and the site of leak (if any) was identified and managed. If the gauze appeared white, gauze withdrawn and the procedure finished.

**Results:** In 80 patients, only two patients showed a blue spot at the gauze, which were fixed by suture. In all other patients, the gauzes were completely clean and (white). Postoperatively no early leak was detected.

**Conclusion:** This is a simple and not time-consuming intraoperative procedure that can be used to detect intra-operative leaks during laparoscopic sleeve gastrectomy.

**Keywords:** obesity. Sleeve gastrectomy. Leak. Intraoperative test.

**Acknowledgment:** The author thanks all the staff who works at the obesity center at Soran Private Hospital for their unlimited support for this study.

The study received no outside funding and no relevant financial disclosures.

The researcher declares that there is no conflict of interest regarding the publication of this research

### اختبار الراية البيضاء للكشف عن التسرب أثناء تكميم المعدة بالمنظار

الاستاذ نشوان قحطان محجوب

فرع الجراحة / كلية الطب / جامعة الموصل / الموصل / العراق

#### الخلاصة

**الهدف:** تقييم فعالية إجراء بسيط داخل العملية (اختبار الراية البيضاء) للكشف عن التسرب أثناء تكميم المعدة بالمنظار.  
**تصميم:** دراسة حالات تسلسلية..

**الإعداد:** مركز السمنة في مستشفى سوران الخاص ، أربيل ، العراق ، خلال الفترة من يناير ٢٠١٧ إلى يونيو ٢٠١٩  
**المشاركون:** ثمانون مريضاً خضعوا لاختبار الراية البيضاء أثناء عملية تكميم المعدة بالمنظار. تم تسجيل النتائج أثناء العملية ومتابعة ما بعد التداخل الجراحي لمدة ٦ اشهر.

**طريقة العمل:** بعد الانتهاء من عملية التكميم والإرقاء ، تم إدخال شاش بحجم ٤ \* ١٢ سم من خلال الفسحة التي يبلغ قطرها ١٢ ملم وفرشها على طول المعدة المتبقية ، تم ادخال أنبوب أنفى معدى الى الجزء العلوى من المعدة ، وضغط بوابة المعدة السفلى عن طريق الماسكة ، تم حقن ١٠٠ مليلتر من المياه المالحة الملونة بصبغة الميثيلين الزرقاء ببطء بواسطة أخصائى التخدير من خلال الأنبوب الأنفى المعدى ، بعد انتظار لمدة ٣٠ ثانية ، تم ملاحظة وجود أى تلون للشاش وتم تحديد موقع التسرب (إن وجد) ، إذا لم يتم العثور على تلون يتم اخراج الشاش والانتهاء من الفحص.

**النتائج:** في ٨٠ مريضاً ، أظهر مريضان فقط بقعة زرقاء على الشاش ، تم إصلاحها عن طريق الخياطة. في جميع المرضى الآخرين ، كانت الشاشة نظيفة بالكامل (بيضاء). بعد العمل الجراحي لم يتم الكشف عن أي تسرب.

**الخلاصة:** هذا إجراء جراحي بسيط لا يستغرق وقتاً طويلاً ويمكن استخدامه للكشف عن التسريبات أثناء العمليات الجراحية خلال عملية تكميم المعدة بالمنظار

**الكلمات المفتاحية:** السمنة. تكميم المعدة. تسرب. اختبار أثناء العملية

**شكر وتقدير:** المؤلف يشكر جميع الموظفين الذين يعملون في مركز السمنة في مستشفى سوران الخاص لدعمهم غير المحدود لهذه الدراسة

## INTRODUCTION

Obesity is a medical condition in which excess body fat accumulates in the body causes a negative impact on health<sup>1</sup>. Various methods have been tried to manage obesity including diet, lifestyle changes, pharmacological and surgical intervention in which sleeve gastrectomy is the most popular one<sup>2-4</sup>. Sleeve gastrectomy (SG) is a vertically oriented gastrectomy that removes approximately 70 to 80 percent of the greater curvature of the stomach creating a banana like gastric tube with a volume of approximately 150 to 200 mL based on the less distensible lesser curvature. SG can be associated with significant complications, which include bleeding, leaks and gastric strictures of these; a gastric leak which have a variance of 0 - 4.3%<sup>5-8</sup>, is associated with significant and prolonged morbidity, remaining one of the most feared complications. Based on the fact that operative detection of a technically induced staple line defect can be treated with prompt closure, a wide number of surgeons adopt the routine use of intra operative leak test during surgery for detection of leaks including methylene blue test, air test or esophago-gastro-duodenoscopy (OGD)<sup>9,10</sup>. In this study, we did use the methylene blue dye in a new simple way called the white banner test in order to detect an intraoperative leak.

## PATIENTS AND METHODS

The study was conducted from January 2017 to June 2019 at the Obesity center at Soran private hospital, Erbil/Iraq, by the author. It included 80 patients in whom sleeve gastrectomy was decided to them for treatment of their obesity. Their BMI range between 36 to 40, there was no previous bariatric surgery done to any of them, neither any comorbid disease. All patients signed the informed consent regarding the procedure and accompanied test.

The procedure done as follows: After completing the stapling and ensure adequate hemostasis, a

series of gauzes (2 or 3) measured 4\*12 cm were introduced through the 12mm trocar and displayed throughout the sleeved portion of remaining stomach from the gastro-esophageal junction down to antrum, the nasogastric tube of 18 F inserted and pointed at the upper portion of stomach, flow was transiently blocked with bowel clamp compressing at the pyloric channel, 50 to 100 ml of normal saline containing 5 mL of methylene blue dye (final concentration of 0.01%) is injected slowly by the anesthetist through the nasogastric tube, the distension of the stomach is noticed and maintained for 30 seconds, the gauze examined for any spot discoloration. If no discoloration detected the compression released, gauze withdrawn and the procedure finished. Figure 1, 2. No drains were lifted apart from the 2 patients with positive test.

## RESULTS

From 80 patients, two patients showed positive discoloration of the gauze at the antral portion of the first stapler line of the stomach and mid portion of remained stomach respectively (2.5%). In other patients, the gauze remained clean from any stain (97.5%).

Postoperatively, all patients were followed by the standard regimen adopted by our center. No leak was detected clinically in any patients for 6 months of postoperative follow-up.

## DISCUSSION

Staple line leak is the most feared complication after sleeve gastrectomy. Intraoperative methylene blue and air leak tests are routinely used to evaluate for a leak in many centers, however, the utility of these tests is controversial. The 2012 International Sleeve Gastrectomy Expert Panel failed to reach a consensus about whether routine intraoperative leak tests should be performed. Negative leakage tests, either intraoperative or early postoperative, do not necessarily mean that a leak will not occur<sup>11,12</sup>. Intraoperative leak

assessment using endoscopy and/or distention of the anastomosis with dye, air, or other gas may be useful to detect leaks that can be repaired during the procedure, but these techniques have not been reported to decrease the risk of leak after surgery. Identification of a "positive" intraoperative leak, however, regardless of the type of test used, should warrant appropriate repair and retest before completion of the operation<sup>13,14</sup>. We can say that the evidence supporting our common practices does not meet the highest standards of evidence since till now there is no standard guideline for sleeve gastrectomy operation. Until we have that evidence, we should do what seems logical and whenever possible. This means that even if leak test of whatever its way is not going to tell us that leak will not occur but it can detect an intraoperative mechanical defect which can be managed easily before leaving the operative field preventing the patient from a disastrous complication that would have occurred in case of the missed condition<sup>15</sup>.

The technique that we used it (white banner test) is simple, needs no instrumentation and takes only 3 minutes to be accomplished. No previous research about using gauze to detect the spots of leak has been reported.

In conclusion, we recommend the use of intraoperative leak test as a routine, at least it will detect mechanical leak intra-operatively that can be managed before the disaster happened. We need to compare our new way of leak test with other ways for further assessment of its accuracy.

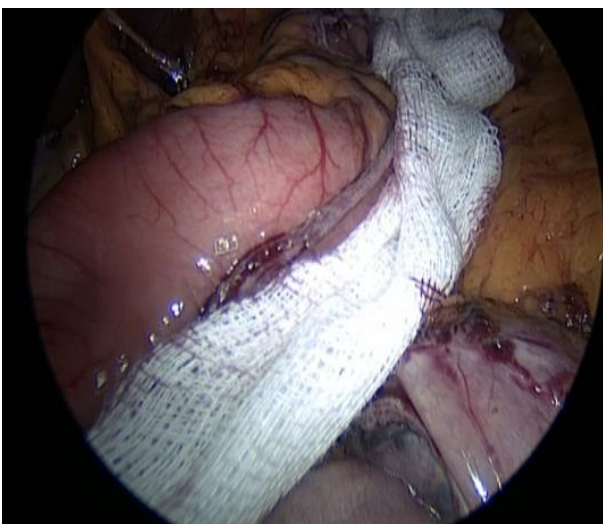


Figure 1: display the gauze along the sleeved stomach



Figure 2: comprising the pylorus and injection of the dye.

## REFERENCES

- 1.WHO. 2015.Obesity and overweight Fact sheet N°311". Retrieved 2 February 2016.
- 2.Yehoshua RT, Eidelman LA, Stein M,Fichman S, Mazor A, Chen J et al. 2008 . Laparoscopic sleeve gastrectomy-volume and pressure assessment. *Obes Surg*; 18:1083.
- 3.Lee CM, Cirangle PT, Jossart GH. Vertical gastrectomy for morbid obesity in 210 patients: report of two-year results. *Surg Endosc*. 2007; 21:1810–6.
- 4.Moon HS, Kim WW, Oh JH. Results of laparoscopic sleeve gastrectomy (LSG) et 1 year in morbidly obese Korean patients. *Obes Surg*. 2005; 15:1469–75.
- 5.Praveenraj P, Gomes RM, Ku2011. mar S, . Management of gastric leaks after laparoscopic sleeve gastrectomy for morbid obesity: A tertiary care experience and design of a management algorithm. *J Minim Access Surg*. 2016 Oct-Dec; 12(4): 342–349.doi: 10.4103/0972-9941.181285
- 6.Bellanger DE, Greenway FL. Laparoscopic sleeve gastrectomy, 529 cases without a leak: Short-term results and technical considerations. *Obes Surg*. 2011; 21:146–50 .
- 7.Daskalakis M, Berdan Y, Theodoridou S, Weigand G, Weiner RA. Impact of surgeon experience and buttress material on postoperative complications after laparoscopic sleeve gastrectomy. *Surg Endosc*. 2011 ;25:88–97.
- 8.Al-Sabah S, Ladouceur M, Christou N. Anastomotic leaks after bariatric surgery: it is the host response that matters. *Surg Obes Relat Dis*. 2008; 4(2):152-7.

9. de Aretxabala X, Leon J, Wiedmaier G, Turu I, Ovalle C, Maluenda F, Gonzalez C, Humphrey J, Hurtado M, Bena-vides C. Gastric leak after sleeve gastrectomy: analysis of its management. *Obes Surg.* 2011;21: 1232-1237 [PMID: 21416198 DOI: 10.1007/s11695-011-0382-5]
10. Wahby M, Salama AF, Elezaby AF, Belgrami F, Abd Ellatif ME, El-Kaffas HF, Al-Katary M. Is routine postoperative gastrografin study needed after laparoscopic sleeve gastrectomy? Experience of 712 cases. *Obes Surg.* 2013; 23: 1711-1717 [PMID: 23828033 DOI: 10.1007/s11695-013-1013-0]
11. Swinnen J, Eisendrath P, Rigaux J, Kahegeshe L, Lemmers A, Le Moine O, et al. Self-expandable metal stents for the treatment of benign upper GI leaks and perforations. *Gastrointest Endosc.* 2011 ; 73:890–899. <http://dx.doi.org/10.1016/j.gie.2010.12.019>.
12. Dakwar A, Assalia A, Khamaysi I, Kluger Y, Mahajna A. Late complication of laparoscopic sleeve gastrectomy. *Case Rep Gastrointest Med.* 2013; 2013: 136153 [PMID: 23662218 DOI: 10.1155/2013/136153]
13. Julie K, Dan A, Dan E. ASMBS position statement on prevention, detection, and treatment of gastrointestinal leak after gastric bypass and sleeve gastrectomy, including the roles of imaging, surgical exploration, and non-operative management. *Surgery for Obesity and Related Diseases.* 2015; 11 , 739–748.
14. Monica S, Jonathan Z, Karan P. Intraoperative leak testing has no correlation with leak after laparoscopic sleeve gastrectomy. *Surgical Endoscopy.* 2016 March; 30 ( 3): pp 883–891
15. Sandeep A, Hemanga B, Mahesh C. Practice of routine intraoperative leak test during laparoscopic sleeve gastrectomy should not be discarded. *Surgery for Obesity and Related Disease.* 2011 September–October; 7(5): e24–e25. DOI: <https://doi.org/10.1016/j.soard.2011.03.013>