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Research Article

# A Novel Method of Creation of Pneumoperitoneum for Re-Look Surgery

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## Abstract

### Objectives

The aim of this article is to describe a novel technique of safely establishing a pneumoperitoneum for laparoscopic revision surgery.

### Background

Attempting diagnostic laparoscopy and peritoneal lavage for abdominal sepsis following primary laparoscopic surgery is associated with risk of visceral injury during the creation of pneumoperitoneum and port insertion.

### Methods

A disposable 5 millimeters port, scissors, an intravenous giving set and a single three-way cannula are required to assemble the unit for induction of a pneumoperitoneum. After the first laparoscopy, the unit is applied and can be used for the subsequent laparoscopies.

### Results

The unit was successfully used in 4 patients. There were no complications caused by the unit and the pneumoperitoneum was established efficiently and safely.

### Conclusions

The technique is easy, safe and effective for achieving subsequent pneumoperitoneum in morbidly obese patients who need diagnostic laparoscopy and /or peritoneal lavage for sepsis following bariatric surgery. The unit has the potential to enable minimal access management for leak and sepsis following complex gastro-intestinal surgery in morbidly obese patients.

**Keywords:** Pneumoperitoneum; Laparotomy; Laparoscopy; Bariatric Surgery; Hassan's Technique; Veress's Needle Technique

## Introduction

Laparoscopy has an established role in the management of critically ill patients and especially those with sepsis or systemic inflammatory response syndrome (SIRS) because of gastrointestinal anastomotic leaks [1-3]. High Body Mass Index (BMI) patients who develop leaks frequently require repeat laparoscopy for assessing progression of the abdominal pathology and sepsis and for peritoneal lavage. Pneumoperitoneum induction in these patients is challenging and surgeons are either using open Hasson's technique or blind Veress's needle. Hasson's technique may take longer time and result in a relatively large wound in obese patients (compared to Veress's needle technique), while Veress's needle is a blind technique with a risk of visceral injury. Sometimes it is difficult to use either technique safely or just not possible after repeating attempts which lead to conversion to laparotomy with its known extra morbidity compared to laparoscopy. The aim of this paper is to describe a simple unit for induction of safe pneumoperitoneum in patients with abdominal sepsis following major laparoscopic bariatric surgery without using Veress's or Hasson's technique.

## Methods

We need the following materials for unit formation: Scissors, intravenous giving set, three ways cannula and 5 millimeters (mm) disposable port are needed. The giving set is cut to obtain 60-70 cms length, which is introduced into the abdominal cavity through the chosen 5 mms port. The cannula end of the given set tube is attached to the three ways cannula (see figure 1). The port is then removed from the abdominal wall and cut at a point to have a remaining length of 4-5 centimeters (to keep the port in the abdominal wall and outside peritoneal cavity as in figure 2 to avoid visceral injury after deflation), making sure not to break the inside tube.

**Figure1:** Complete unit.

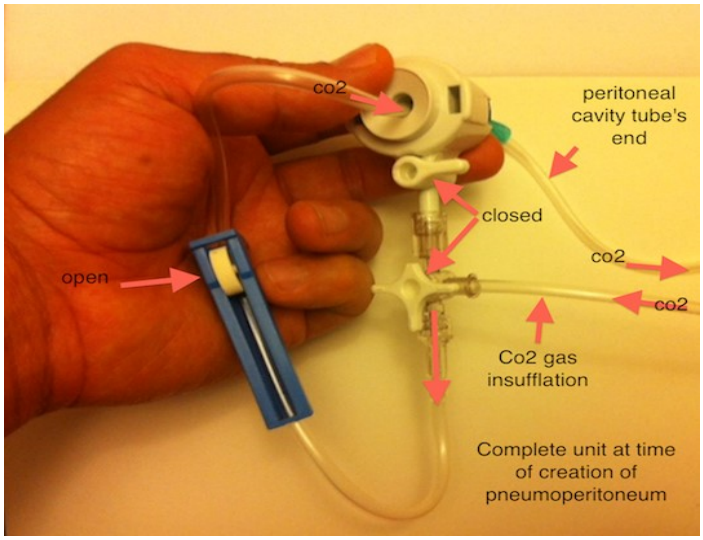
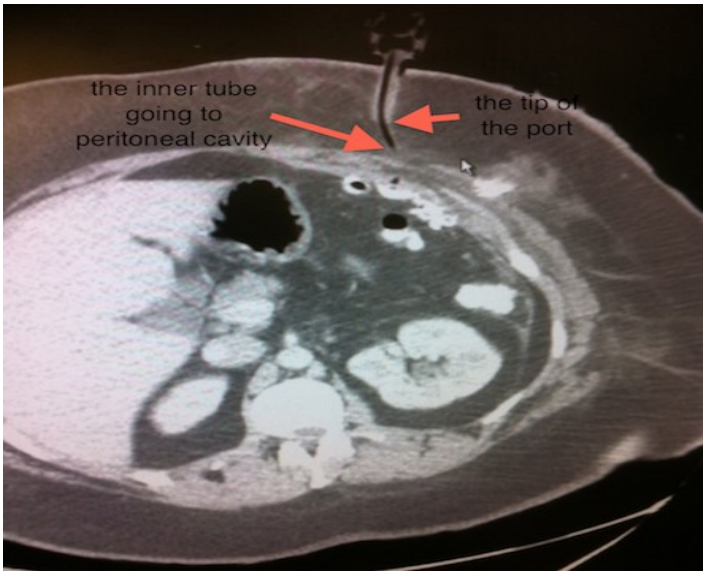
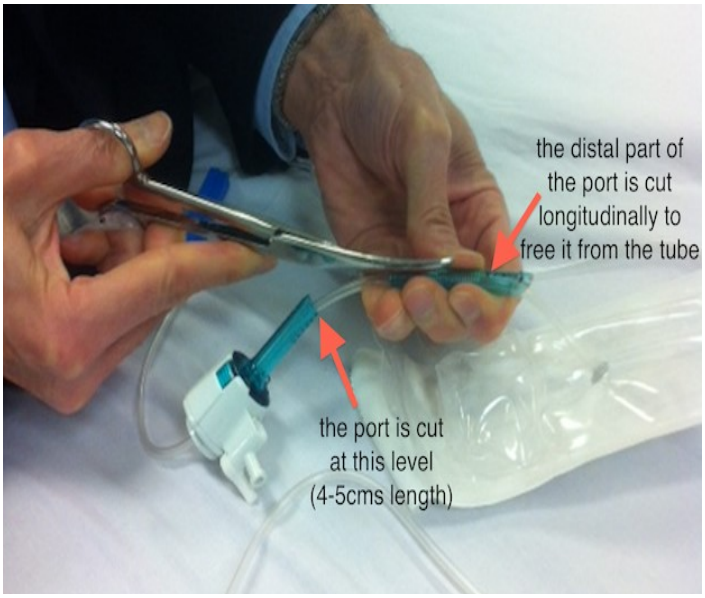



**Figure 2:** Computerized Tomography showing the port in the abdominal wall and outside the peritoneal cavity to avoid possible trauma to the viscera.




The remaining distal part of the port is cut longitudinally to free it off the tube (see figure 3). Then, the port is introduced again over the tube and is fixed to the abdominal wall by two stitches as in figure 3(three ways cannula can be applied prior to Co2 insufflation). The excluded parts are shown in section 2 of figure 5. In the second session of laparoscopy, the gas tube is attached to the three ways cannula and the gas is insufflated easily through the unit as in Figure 1(completed unit).

**Figure 3:** The port is cut at 4-5 cms point and the distal part of the port is cut and removed off the tube.




## Results

This method was used in two patients who developed leaks following gastric bypass and plicated gastric band procedures.

They needed several re-laparoscopies and peritoneal lavages. It was also used in another two patients who needed re-look after initial laparotomies for ischemic bowel. There were no complications from this method of pneumoperitoneum induction particularly organ injuries and surgical emphysema.

**Figure 4:** The unit is fixed to the abdominal wall using two non-absorbable sutures. The three ways canula is attached prior to the Co2 gas insufflations (optional).

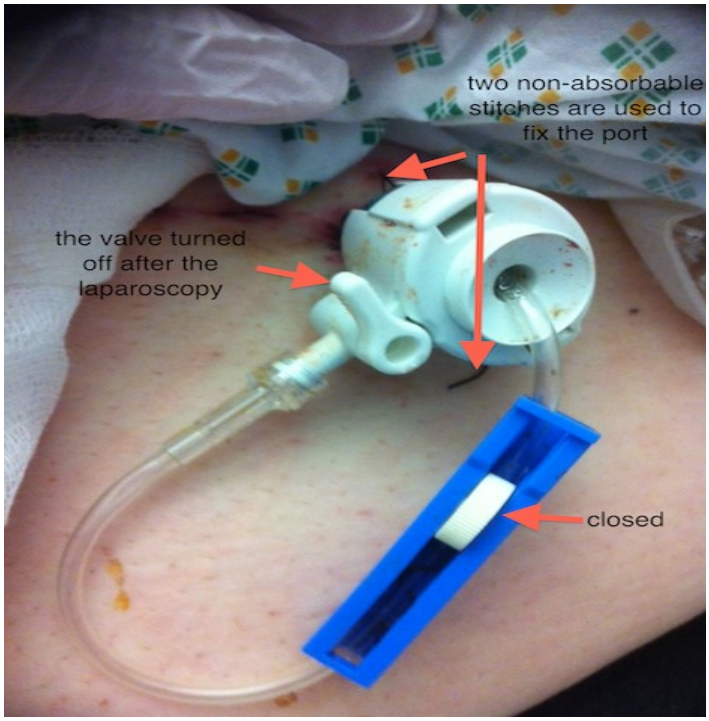
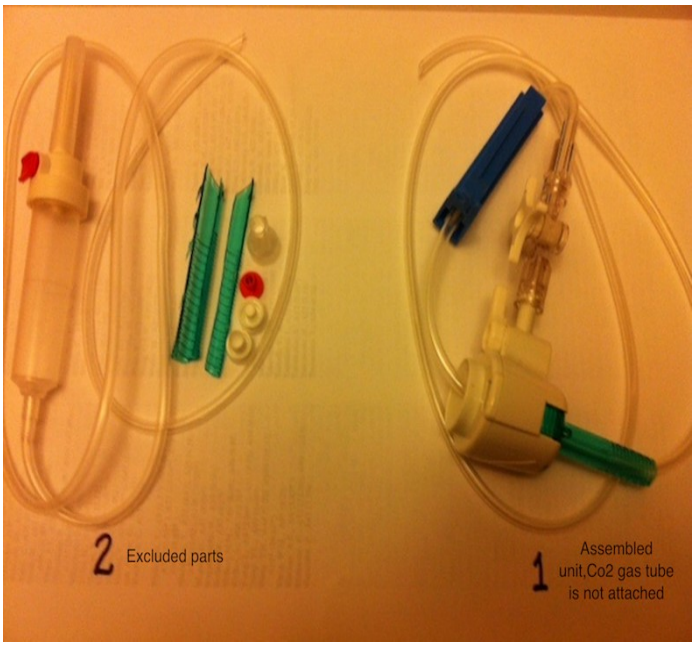



**Figure 5:** 1. The unit before attaching the Co2 gas insufflation tube 2. The excluded parts.




## Discussion

In abdominal sepsis following laparoscopic bariatric surgery, pneumo-peritoneum induction using Hasson's or Veress's needle techniques may be challenging. The initial safe access in these cases is performed using Veress needle at Palmer's point and Visiport (ENDOPATH XCEL, USA) or using Hasson's approach. If the patient needs re-look surgery, then this novel technique is applied. The unit is especially designed for use in complicated and critically ill patients after bariatric surgery, where a decision to repeat laparoscopy and /or further laparoscopic intervention and for cases such as exploration for bowel ischemia. The unit is easy to assemble, cheap (using the same port) and safe. In bariatric patients early laparoscopic diagnosis and treatment of sepsis is the gold standard. Once the diagnosis is established and a decision I taken for re-look, then this technique of pneumoperitoneum is feasible. Management of post bariatric surgery leaks/sepsis is associated with high mortality and morbidity. Mortality rate could reach 4.5 % after sleeve gastrectomy and 1.4 % after gastric bypass [4,5]. The overall mortality of leaks following bariatric surgery may reach 3.3% [6]. It is difficult to ascertain the precise rate of secondary injuries on this category of patients, as there is paucity in the literature. Secondary injuries or complications have been previously described because of ports, Veress's needle and pneumo-peritoneum induction on patients who had primary laparoscopic procedures [7,8]. Our pneumo-peritoneum induction technique can be used in any case of sepsis or complications following laparoscopic surgery in obese or morbidly obese patients with the added advantages of reducing the time of the procedure and making the first port introduction easier and safer. There is a body of opinion that abdominal sepsis in the critically ill may benefit from a decompressive laparotomy/laparostomy rather than multiple laparoscopic explorations. While this is true to a certain extent, not all cases of post-operative sepsis need laparostomy. Furthermore, laparostomy would prolong patients' recovery and leave patients with the defects that require further complex reconstruction and of uncertain outcome to reduce mortality in average cases [9]. This situation may be applied for advanced and delayed presentation and commonly with sepsis following colorectal perforation and leaks rather than gastric or small bowel leaks. In bariatric surgery, vast majority of patients are operated upon early to avoid severe morbidity and mortality [10]. It is a fact that for extra safety, bariatric surgeons have a very low threshold to take patients for laparoscopic exploration if they show signs of abdominal catastrophe following bariatric procedures [11,12]. In many situations of acute abdomen because of sepsis following bariatric surgery, the surgeon may consider laparotomy rather than laparoscopy just because of difficulty in pneumo-peritoneum induction or failure of attempted creation of pneumo-peritoneum. Laparotomy will carry an additional risk of wound complications, exacerbate the surgical trauma and result in a longer stay and a pos-

sible challenge of wound closure. The use of this new method to create pneumo-peritoneum is avoiding all above-mentioned problems. Laparoscopic technique is compensating the cost by lower morbidity and shorter hospitalization [13-15]. We also used this unit to induce pneumo-peritoneum for laparoscopy in patients who had laparotomy for bowel ischemia when re-look is decided (the unit is inserted at the end of first laparotomy). This had avoided re-opening the laparotomy wound and also shortened the procedure time. Knowing the scale of bariatric surgery and the associated septic complications, and the need for re-look after laparotomy for non-bariatric reasons, this technique is expected to provide a positive impact on the management of these critically ill patients when widely applied.

## Conclusions

This method of pneumo-peritoneum in morbidly obese patients who need re-look surgery is feasible and effective. This technique may be used in high BMI patients who require several re-laparoscopies for diagnosis, revisional procedures and /or peritoneal lavage because of complications following major laparoscopic surgery. The unit can also be used to create pneumo-peritoneum and laparoscopy for patients who need re-look procedure after laparotomy for non-bariatric conditions.

**Conflicts of interest:** They have no conflict of interest.

## References

1. O'Riordan JM, Larkin JO, Mehigan BJ, McCormick PH. Re-laparoscopy in the diagnosis and treatment of postoperative complications following laparoscopic colorectal surgery. Surgeon. 2013, 11(4): 183-186.

2. Caruso C, La Torre M, Benini B, Catani M, Crafa F et al. Is laparoscopy safe and effective in nontraumatic acute abdomen? J Laparoendosc Adv Surg Tech A. 2011, 21(7): 589-593.

3. Carlson GL1, Patrick H, Amin AI, McPherson G, MacLennan G et al. Management of the open abdomen: a national study of clinical outcome and safety of negative pressure wound therapy. Ann Surg. 2013, 257(6): 1154-1159.

4. Moszkowicz D, Arienzo R, Khettab I, Rahmi G, Zinzindohoué F et al. Sleeve Gastrectomy Severe Complications: Is It Always a Reasonable Surgical Option?. Obes Surg. 2013, 23(5): 676-665.

5. Edwards MA, Jones DB, Ellsmere J, Grinbaum R, Schneider BE. Anastomotic leak following antecolic versus retrocolic laparoscopic Roux-en-Y gastric bypass for morbid obesity. Obes Surg. 2007, 17(3): 292-297.

6. Spyropoulos C, Argentou MI, Pastas T, Thomopoulos K, Kehagias I et al. Management of gastrointestinal leaks after surgery for clinically severe obesity. Surg Obes Relate Dis. 2012, 8(5): 609-615.

7. Compeau C, McLeod NT, Ternamian A. Laparoscopic entry: a review of Canadian general surgical practice. Can J Surg. 2011, 54(5): 315-320.

8. Krishnakumar S, Tame P. Entry complications in laparoscopic surgery. J Gynecol Endosc Surg. 2009, 1(1): 4-11.

9. Anderson O, Putnis A, Bhardwaj R, Ho-Asjoe M, Carapeti E et al. Short- and long-term outcome of laparostomy following intra-abdominal sepsis. Colorectal Dis. 2011, 13(2): e20-32.

10. Hussain A, El-Hasani S. Bariatric emergencies: current evidence and strategies of management. World J Emerge Surg. 2013, 8(1): 58.

11. Thompson E, Ferrigno L, Grotts J, Knox J, Sobelman S et al. Causes and Timing of Nonelective Reoperations After Bariatric Surgery: A Review of 1304 Cases at a Single Institution. Am Surg. 2015, 81(10): 969-973.

12. Aminian A, Jamal MH, Andalib A, Batayyah E, Romero-Talamás H et al. Is Laparoscopic Bariatric Surgery a Safe Option in Extremely High-Risk Morbidly Obese Patients?. J Laparoendosc Adv Surg Tech A. 2015, 25(9): 707-711.

13. Sussenbach SP, Silva EN, Pufal MA, Casagrande DS, Padoin AV et al. Systematic review of economic evaluation of laparotomy versus laparoscopy for patients submitted to Roux-en-Y gastric bypass. PLoS One. 2014, 9(6): e99976.

14. Tiwari MM, Reynoso JF, High R Tsang AW, Oleynikov D. Safety, efficacy, and cost-effectiveness of common laparoscopic procedures. Surg Endosc. 2011, 25(4): 1127-1135.

15. Bradley JF 3rd, Ross SW, Christmas AB, Fischer PE, Sachdev G et al. Complications of bariatric surgery: the acute care surgeon's experience. Am J Surg. 2015, 210(3): 456-461.