

The Forearm Balloon Invention for Hand-assisted Laparoscopic Surgery

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The groups of laparoscopic procedures that may benefit from a hand-assisted technique are laparoscopically assisted procedures. The necessitated conditions for conversion in laparoscopic surgery are also benefit from this technique. Application of the surgeon's hand allows continued efficient retraction, blunt dissection, and tactile feedback throughout the case. It is also easier to learn and performed in laparoscopic surgery. The forearm balloon, an alternative hand access port, may allow the surgeons to perform advanced laparoscopic surgery more economically and efficiently.

Key words : Hand-assisted laparoscopic surgery, Hand access port

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Introduction

Interventional laparoscopy can be an excellent surgical therapeutic modality in treatment of gastrointestinal diseases. It should be stressed that those procedures are advanced laparoscopic techniques, requiring previous training to minimize complications. The surgical experience in hand-assisted laparoscopic surgery may shorten the learning period associated with laparoscopic procedures. This method may be more economical than totally laparoscopic approach. The forearm balloon is a hand access port that easy to invent form medical devices in general hospitals.

Materials and Method

Laparoscopic surgery requires expensive import instruments that increase the total hospital costs. Invention of some laparoscopic equipment can save an expense in the procedure. Hand access port is an essential instrument in the hand-assisted laparoscopic surgery. My suggestion is the forearm balloon that the surgeons can make it from simple

devices in the operating rooms or the medical supplied departments of general hospitals.¹ The equipment composes of four devices in the following issues.

1. Two transfusion bags
2. One elastic bandage
3. One long surgical glove
4. One 50 ml. syringe

The method requires two transfusion bags to be tied together around both edges of them with simple ligation. The surgeon wears this device on the forearm before wrapping around with an elastic bandage. The purpose of bandaging is to squeeze the balloon to enlarge at the distal forearm next to the wrist. The long surgical glove is then covered around the whole devices on the forearm. The last device, a 50ml.-syringe, is applied for air pumping action to enlarge the balloon. Adjusting the balloon pressure by the surgeon provides a reliable sealing mechanism and efficiently preserving pneumoperitoneum during the operation. (Figure 1)

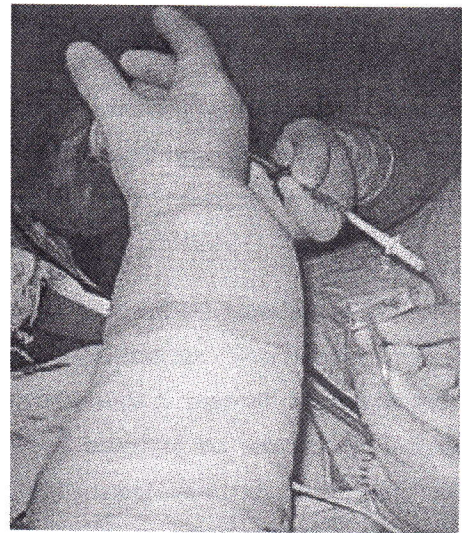
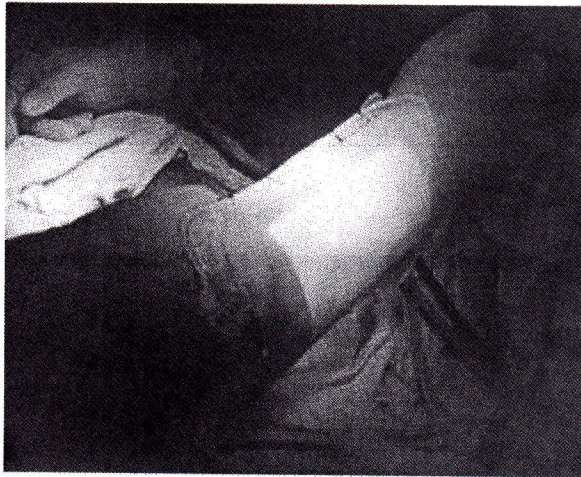
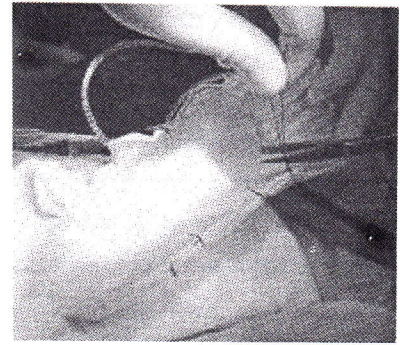
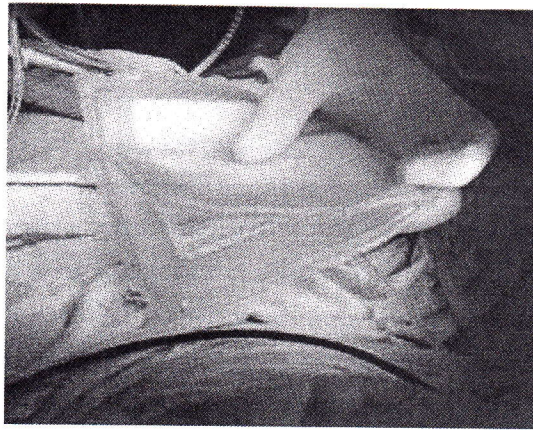


Figure 1 The Forearm Balloon Invention.

Discussion

Hand-assisted laparoscopic surgery is the newly developed technique in laparoscopic surgery. It involves intraabdominal placement of the hand or forearm through the minilaparotomy Incision while pneumoperitoneal condition is maintained. In this procedure allows the surgeon to use his hand in the insufflated abdomen under the direct vision offered by the video visualization. The hand can be used as in an open conventional surgical procedure to palpate organs or tumors, reflect organs atraumatically, retract structures, identify vessels, dissect bluntly along tissue plane and provide finger pressure to bleeding points while proximal control is

achieved. It is also easier to learn and performed than totally laparoscopic surgery. The intraabdominal hand assists the surgeon by allowing him to more accurately judge depth perception in the two dimensional view offers by the video scope. The surgeon has additional information concerning the depth form the proprioceptive feedback form the inserted hand. This experience may shorten the learning period associated with laparoscopic procedures. (Table 1) This method may be more economical than totally laparoscopic approach by reducing both number of laparoscopic ports and number of instruments requires.^{2,5}

Table 1 Advantages of Hand-Assisted Laparoscopic Surgery.

Hand-Assisted Laparoscopic Surgery (described by A.Darzi, M.D. FRCS, FRCSI)
Palpate organs or tumors
Reflect organs atraumatically
Retract structures
Identify vessels
Dissect bluntly along a tissue plane
Proximal control of bleeding points
Knot tying
Reducing both number of ports and instruments
Accurately judge depth perception
Easier to learn and perform
Shorten the learning curve

What procedures are suitable for hand-assisted laparoscopic technique?

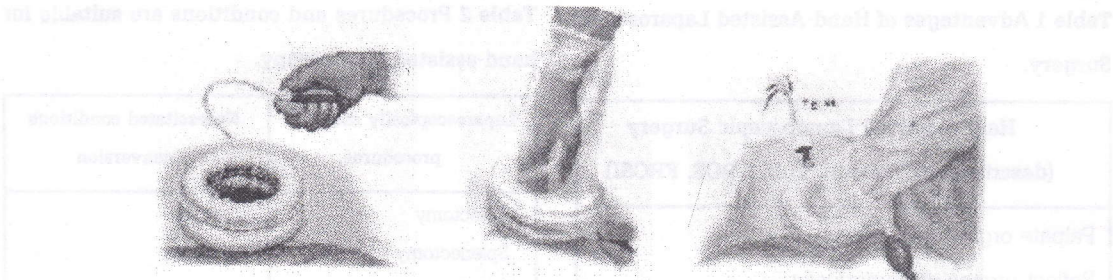
Hand-assisted laparoscopic technique is an alternative method for many laparoscopic procedures. The most obvious group of procedures that may benefit from a hand-assisted technique are those procedures that already require the fashioning of laparoscopic entry and a minilaparotomy for their completion. These procedures include those that are presently termed "laparoscopically assisted." These operations avoid the major morbidity associated with a laparotomy by utilizing the advantages of the video laparoscope during the initial dissection stage and completion of the procedure through a minilaparotomy. The examples of those procedures are colectomy, splenectomy, gastectomy, pancreatectomy, hepatectomy nephrectomy, hysterectomy and tumor removal procedures. Another group of procedures that may benefit from a hand-assisted technique are various types of conversional procedures. The laparoscopic management of necessitated conditions for conversion, bleeding, adhesion, organ injury, CBD exploration, biliary by pass procedures, prolong operative time, benefit the surgeons from the adoption of a hand-assisted technique. (Table 2)

Table 2 Procedures and conditions are suitable for hand-assisted laparoscopy.

Laparoscopically assisted procedures	Necessitated conditions for conversion
Colectomy	Bleeding
Splenectomy	Adhesion
Gastectomy	Organ injury
Pancreatectomy	CBD exploration
Hepatectomy	Biliary by pass procedures
Nephrectomy	Prolong operative time
Hysterectomy	
Tumor removal	

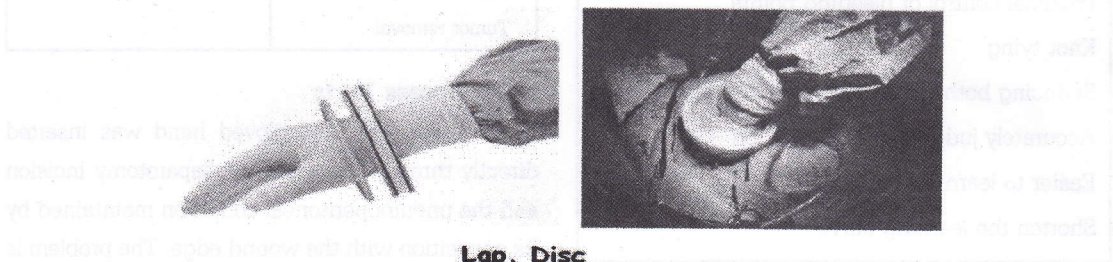
Hand Access Ports

Formerly, the gloved hand was inserted directly through the small minilaparotomy Incision and the pneumoperitoneal condition maintained by its apposition with the wound edge. The problem is the pneumoperitoneum could not be maintained from unrestoring the gastight seal. The development of hand access ports could be solved this problem. Many types of hand access ports, Hand Port System and Lap Disc for examples, were created for assisting this laparoscopic procedure. (Figure 2, 3) My invention, the forearm balloon, consists of four simple medical devices. Those devices can be found in the operating rooms or the medical supplied departments of general hospitals. The two transfusion bags must be tied together around both edges of them with silk ligations. An elastic bandage is applied to wrap around this device proximally after wearing on the distal forearm and wrist. The long surgical glove is then covered around the whole devices on the forearm for unity and easy to work. A 50ml. syringe is applied for air pumping action to enlarge the transfusion bags and ballooning. The pneumoperitoneum could be maintained by adjusting that balloon pressures. This pneumoperitoneal condition is better than apposition of the pure hand with the wound edge. The laparoscopic surgeons may be not familiar with this suggested method and air leakage from inadequate balloon pressures adjustment is a possible occurrence. However, it is more economical and easier to supply than other commercial hand access port applications. (Figure 4)



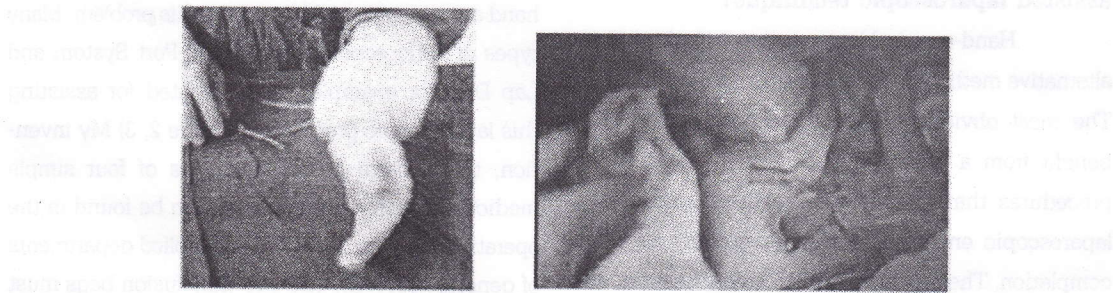
Hand Port System

Figure 2 The Hand Port System.



Lap. Disc

Figure 3 The Lap Disc.



Forearm Balloon

Figure 4 The Forearm Balloon.

References

1. Poschong Suesat. The Forearm Balloon Invention, Laparoscopic Tips, Video clip. Available from URL <http://www.youtube.com/poschong>
2. Monson JR, Darzi A, Carey PD, Guillou PJ. Prospective evaluation of laparoscopic-assisted colectomy in an unselected group of patients. *Lancet* 1992;340:831-3.
3. O'Reilly M, Saye WB, Mullins SG, Pinto SE, Falkner FT. Technique of Hand-assisted laparoscopic surgery. *J Laparoendoscopic Surg* 1996;6(4):239-44.
4. Bemelman WA, Ringers J, Meijer DW, de Wit CW, Bannenberg JJ. Laparoscopic-assisted colectomy with the Dexterity Pneumo Sleeve. *Dis Colon and Rectum* 1996;39(10 Suppl):s59-s61.
5. Scott HJ, Darzi A. Tactile feedback in laparoscopic colonic surgery. *Br J Surg* 1997;84:1006-8.