

Double single-port pan-proctocolectomy with transanal total mesorectal excision [TaTME] and ileal pouch-anal anastomosis [IPAA]: improvisation under limited resources

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Abstract

Introduction

Novel surgical techniques fail to reach all parts of the world equally due to financial constraints. Non-availability of high-cost equipment in the developing world hinders progress. Transanal total mesorectal incision [TaTME] is a novel technique becoming popular world over due to many perceived benefits. Some of the equipment requirements prevent surgeons in resource-limited environments from taking up this technique. We describe the performance of a double single port panproctocolectomy with TaTME and ileal pouch-anal anastomosis for a patient with colitis-associated rectal cancer under improvised conditions at a tertiary care centre in Sri Lanka. Standard practice requires two laparoscopic stacks and an integrated air insufflator both of which are not available in the local setting. A flexible endoscope was used to replace the need for a second laparoscopic stack and a simple drainage bag connection to the standard insufflator to provide a stable pneumoperitoneum. The patient had a rapid uneventful recovery.

Introduction

Transanal mesorectal excision [TaTME] is a technique that has been well accepted by colorectal surgeons due to the improved access it provides to the deep pelvis [1]. Apart from better access, this technique is associated with other perceived benefits such as a well-controlled rectotomy and a double purse-string stapled anastomosis, which theoretically lowers the risk of leakage in low rectal anastomoses [2]. The double single port technique uses a single port device at the proposed ileostomy site in the right iliac fossa [RIF] for the abdominal dissection and a transanal port device for the 'bottom-up' dissection in the mesorectal plane. The reduced access trauma in this procedure is associated with better outcome [3].

The double single port technique requires the use of two

separate laparoscopic stacks for either side for two surgeons to operate in tandem and to carry out the procedure. Additionally, an integrated CO2 insufflation device with special tubing is required to provide a stable pneumoperitoneum without bellowing of the rectum [3]. These requirements limit the use of this technique in resource-scarce environments. Here we describe a double single-port restorative proctocolectomy with TaTME performed using a flexible endoscope and an improvised insufflation system to counter the resource limitation.

Methodology

A 70-year-old female was referred by the gastroenterologist with colitis-associated cancer of the upper rectum. She had pancolitis and the cancer was localised to the rectum. Following a multi-disciplinary team discussion, it was decided to proceed with a restorative panproctocolectomy. The patient was placed in Lloyd-Davies position and a GelPoint port [Applied Medical, Rancho Santo Margarita, California] was placed at the proposed ileostomy site in the RIF [Figure 1], and a GelPoint Path [Applied Medical, Rancho Santo Margarita, California] transanally.

A flexible endoscope [Fuji EC-760ZP, Fujifilm, Japan] was used in place of a second laparoscopic stack and a 30-degree



Figure 1. GelPoint single port at the proposed ileostomy site for trans abdominal dissection.

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telescope for the 'bottom-up' dissection. The endoscope was inserted directly through the gelport to increase the maneuverability while two 10mm plastic working ports were used for the laparoscopic instruments [Figure 2]. An improvisation was made to the standard CO2 insufflator by connecting a drainage bag between the device and the port [Figure 3]. This acted as a reservoir and maintained a stable air supply into the pneumopelvis maintained at 15 mmHg. This simple 'hack' eliminated the need for an integrated insufflator.

A purse-string was inserted just proximal to the proposed rectotomy site. Using a hook diathermy and a laparoscopic



Figure 2. Setup for the transanal dissection with the flexible endoscope inserted through the GelPoint path.

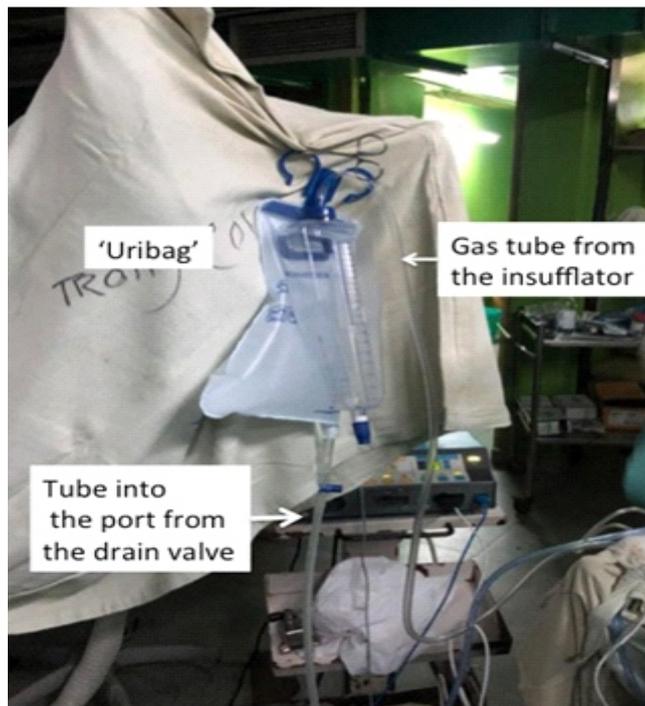


Figure 3. The 'uribag hack' - a sterile urine drainage bag connected between the insufflator and the port.

grasper the dissection along the TME plane was carried out up to the peritoneal reflection. The abdominal dissection was carried out using the single port at the RIF and one 5mm additional port in the left iliac fossa to complete the total colectomy using a 30° laparoscopic telescope. The two dissection planes of the rectum were met at the peritoneal reflection to complete the rendezvous procedure. The specimen was delivered through the port in the right iliac fossa and divided at the terminal ileum. An ileal pouch was fashioned extra-corporeally and a double purse-string stapled pouch-anal anastomosis was carried out. The port site at the RIF was used for the diverting loop ileostomy. The total operating time was 320 minutes with a blood loss of less than 100 ml. Both surgeons have been formally trained in TaTME at several centres in Europe through mentoring and cadaveric dissection courses.

Postoperative pain control was excellent as the patient only had the ileostomy site and a 5mm drain site [Figure 4]. The patient had an uneventful recovery and was discharged on postoperative day five.

Discussion

Scarcity of resources hindering progress in surgical innovation has been a long-discussed topic [4]. The general non-availability of high-cost surgical instruments has limited surgical innovation to certain parts of the world. This could be countered through innovation and improvisations that allow safe surgery at a low cost. TaTME has proven the comparable outcome in both benign and malignant proctectomies. Use of this technique for restorative surgery in UC has been well



Figure 4. At the end of the procedure, the patient had the ileostomy site and the drain that was inserted through the 5mm working port site at the left iliac fossa.

documented with safety, short-term and long-term outcome [5, 6]. Performing the division of the rectum transversely at the correct height is a difficult task in pan proctocolectomy, especially in a narrow pelvis. Rectotomy done under direct vision alleviates this difficulty in TaTME reducing the future risk of 'cuffitis' [inflammation of the rectal cuff] in a residual long rectal stump in a patient with ulcerative colitis.

Dedicating two laparoscopic stacks with 30-degree telescopes for a single procedure is not feasible in a resource-limited setting. The use of a flexible endoscope instead of a laparoscopic telescope has not been described previously. While we were compelled to improvise with the endoscope due to scarcity, we identified several advantages over the 30-degree telescope. The flexibility of the scope allowed easy access in the limited space within the deep pelvis. The rigid telescope with laparoscopic instruments tends to cause clashing during the dissection.

Also, the operating surgeon and the camera operator both having to be seated close in-between the legs of the patient reduces the freedom of movements. The endoscope with controls located distally allows the camera operator to stand away from the surgeon allowing greater mobility for the surgeon. Having a suction channel at the tip of the endoscope allows the suction of smoke and fluid created within the operating space without interruption to the procedure.

In standard practice, the integrated insufflation system [eg: Airseal devise] evacuates the smoke or a suction apparatus has to be introduced through a working port disrupting the workflow. Besides, the water channel of the endoscope allows the cleaning of the camera lens of mist without withdrawing it. The picture quality of the endoscope with high definition



Figure 5. The view of the transanal dissection plane through the flexible endoscope. The thin 'white hair like' connective tissue of the TME plane is clearly visible.

camera allowed excellent visualization not secondary to the laparoscopic view [Figure 5].

The insertion of the scope directly through the gelpport instead of a working port gave us high maneuverability and was inspired by similar use during the TASER procedure [7]. Using a single port for abdominal dissection and utilizing the same for specimen extraction helped to prevent an abdominal incision.

The pulsatile movements of the rectum, known as 'bellowing' when using the standard insufflator, is due to the intermittent flow of gas. Countering this effect by connecting a commercially designed reservoir bag to a standard system has been described previously [8]. Connecting an easily accessible sterile drainage bag ['uribag'] between the insufflator and the port provides the same effect and is being used by many colorectal units as an alternative. The integrated insufflation system and the single-use tubing system is beyond affordability in an already challenged-free healthcare system as Sri Lanka. This simple improvisation provided a cost-effective alternative. The suction mechanism on the endoscope replaced the requirement for a smoke evacuation system. A disadvantage of using the endoscope is the loss of orientation in the lumen of the rectum. We found that making mucosal markings with the diathermy at 12 'o clock position helped in orientation during the luminal phase of the dissection.

We believe this is the first reported case in the literature of a double single- port TaTME with panproctocolectomy and IPAA in Sri Lanka. We believe these improvisations will help popularize TaTME procedures amongst surgeons in the resource-limited setting. The innovative practice of surgery encourages safe practice delivered to patients at a lesser cost.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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