Short Term Outcomes of Intersphincteric Resection with Total Mesorectal Excision for Low Rectal Carcinoma

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Abstract

Background: The study assessed the short term surgical, oncological and functional outcomes of intersphincteric resection.

Methods: During the period between December 2012 and October 2015 (a total of 35 months), 70 patients presented with low rectal carcinoma were operated by ISR with TME in a joint supervision study between Oncology Center of Mansoura University, Egypt and Sapienza University, Rome, Italy.

Results: Intraoperative morbidity occurred in 5 cases; a hemorrhage from the presacral plexus, posterior wall vaginal tear which repaired from intra-vaginal suturing and a splenic capsule tear treated conservatively, ureteric injury and respiratory distress. The median ISR operative time was 240 ± 97.3 hours. The time needed for narcotic analgesia was 54 ± 18.7 hours. The complications occurred in 28.6% of patients are as following; Colonic necrosis in 4 patients (5.7%), anastomotic fistulas in 6 cases (8.5%), pelvic abscess in 5 cases (7.1%), Pelvic hematoma in 1 case (1.4%), prolonged ileus in 1 case (1.4%), wound infection in 4 cases (5.7%), and non-surgical complications in the form of pneumonia and pulmonary edema in 2 cases. One mortality after 25 days due to pulmonary and cardiogenic edema in the open group. The late postoperative complications occurred in 5 cases (7.1%) which include; 4 anal stenosis (5.7%) and 1 Anovaginal fistula due to recurrent adenocarcinoma. The overall recurrence after ISR was 7 cases (10%) after a mean follow period of 24 months. Local recurrence occurred in 3 cases (4.3%) while distant recurrence occurred in 4 cases (5.7%). Two years disease-free survival was 89.9%. Two years survival was 97% after ISR for low rectal cancer. Clinical assessment using Kirwan grading score after 9 months showed that 60 patients (87.6%) had good functional outcome (grade I/II).

Conclusion: ISR with TME help avoiding permanent stoma and provides a reasonable short term surgical, functional and oncological outcomes.

Key Words: Short term – Intersphincteric resection – Low rectal carcinoma.

Introduction

The management of rectal cancer has changed substantially during the recent decades. The introduction of total mesorectal excision [1], improved accuracy of preoperative staging with magnetic resonance imaging [2], and more precise indications for neoadjuvant radiotherapy or chemoradiotherapy represent significant progress [3].

Ideal surgery for rectal cancer should not only obtain adequate radial and circumferential margins, but also preserve normal sphincter function [4]. In 1982, Heald et al., [5] introduced a surgical technique-Total Mesorectal Excision (TME), which became the gold standard procedure for rectal cancer [6]. In 1990, the results of a ‘close shave’ at anterior resection were reported, suggesting that a resection margin of 1cm or less produced an oncological outcome similar to that of a resection margin greater than 1cm [7]. Abdominoperineal Resection (APR) with permanent colostomy and Sphincter-Sparing Procedures (SSP) are the two primary surgical options for rectal cancer. Nevertheless, the abdominoperineal resection has profound drawbacks, including loss of anorectal function with a permanent colostomy and a high incidence of sexual and genitourinary dysfunction. The risk of dying was increased by 30% among patients with low rectal cancer who underwent APR compared with those having an anterior resection. The reasons of the worse prognosis of APR patients are due to the fact that APR is not a well standardized procedure. The technical limit is the non-anatomical perineal dissection, managed through the ischiorectal fat and the pelvic floor muscles without anatomical landmarks [8]. To overcome these limitations, a
number of surgical procedures have been developed, ranging from simple excision to complex resections with reconstruction [9]. Preoperative chemoradiation therapy is widely used to treat locally advanced rectal cancer to increase resectability, and to enhance sphincter preservation, local control and possibly, survival rates. Surgery was performed six to eight weeks after radiotherapy. The study aims to assess the short term outcomes of intersphincteric resection.

Patients and Methods

During the period between December 2012 and October 2015 (a total of 35 months), 70 patients with low rectal carcinoma were operated by ISR with TME procedure in a cooperation between Oncology Center of Mansoura University and Sapienza University of Rome, Italy. All patients were investigated by colonoscopy and biopsy, MRI pelvis and/or endrectal ultrasound and CT abdomen and chest. Neoadjuvant treatment was given to all patients with Tumor staging of T3 or more or node positive tumors. Inclusion criteria included a very low rectal cancer below 5cm from the anal verge or less than 3 cm from the dentate line with normally continent and tumor-free external anal sphincter. Exclusion criteria were T4, metastatic tumors, fecal incontinence.

1- Abdominal step: The patient was positioned supine, with both arms padded and protected at the sides, in a modified lithotomy position. The surgical team consists of two surgeons, two assistants, two nurses and one anesthetist. The main surgeon starts on the patient's right side with one nurse and two assistants. The abdomen was entered through a lower vertical midline incision. Careful inspection of the pelvis, peritoneal surface and intraoperative ultrasound were routinely done to accurately assess the liver. The procedure was initiated by incising the peritoneum immediately medial to the inferior mesenteric vessels. The inferior mesenteric vessels were highly ligated to increase the length of the colon segment and the number of the lymph nodes harvest Fig. (1). A full mobilization of the left colon and splenic flexure was done to facilitate a tension-free anastomosis. The plane for total mesorectal excision was followed down in the pelvis starting from the sacral promontory superficial to the hypogastric fascia with preservation of the hypogastric plexus and nerves as low as possible to facilitate the perineal step. The rectosacral ligament was opened to enter into the supralever plane, the sheet of the pelvic floor (levator ani) was incised distally to enter into the posterior intersphincteric plane.

2- Perineal step: A lone star retractor was used to expose the anal canal Fig. (2). A gauze was introduced into the rectum to avoid rectal and tumor spillage. A circular incision of the anal canal is performed 1 cm below the tumor. Both the mucosa and the muscular layer were incised to transect the internal anal sphincter. The rectum was then closed by purse string sutures. The dissection between the internal and the external sphincters was performed by using scissors in a bloodless plane. The dissection continued along the levator ani. Transanal division of the superior sheath of the pelvic floor then of the presacral Waldeyer's fascia allowed reaching the abdominal dissection. Coloanal anastomosis was done in two layers. The rectal specimen was examined by frozen section to assess the distal resection margin and completeness of mesorectal excision.

Results

In our study, diverting temporary ileostomy was done in 61 patient (87%). The rate of ileostomies closure, in our study, reached up to 95.1% (58/61). The mean distance of the anastomosis from the anal verge was (17.64 ± 9.39). The postoperative TNM-staging groups in our study after ISR were as following: stage 0 (12.9%), stage 1 (21.4%), stage 2 (30%) and stage 3 (35.7%). As regards Dukes' staging, 12 cases (17.2%) were stage A, 33 cases (47.1%) were stage B, and 25 cases (35.7%) were stage C. Twenty five cases (35.7%) had nodal metastasis. The overall mean (±SD) number of harvested lymph nodes was 15.7 (±9.2) lymph nodes and ranged between (2-57) lymph nodes. Fifty four tumors (77.1%) had a favorable histology (well and moderately differentiated) while 16 (22.6%) tumors had unfavorable pathological differentiation. Mucinous adenocarcinoma represented 14.3% (10 cases) of overall histological types which is higher than the reported incidence. Venous invasion was positive in 6 (8.6%) (2.9%). Cases while the perineural invasion was positive in 2 cases. In our study, the distal margins were free in 66 cases (94.3%) and the infiltrated distal margins occurred in 4 cases (5.3%). Also, the circumferential margins were free in 65 cases (92.6%) and positive in 5 cases (7.4%). There were five intraoperative morbidities; a hemorrhage from the presacral plexus, posterior wall vaginal tear which repaired from intra-vaginal suturing and a splenic capsule tear treated conservatively, ureteric injury and respiratory distress. In our study, one case (1.4%) of non-surgical early postoperative mortality occurred due to pulmonary and cardiogenic edema. Early postoperative mortality rate was reported between 0
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and 6 percent of patients who underwent ISR in the different studies. The overall blood loss after ISR was 323 (±198). The mean time till bowel motility (the number of hours required after surgery to notice intestinal sounds) was 50 (±19) hours. The overall complications in our study was 28.6%. Anastomotic leak is the most mind-occupying complication after rectal surgery. Anastomotic dehiscence are higher following ultra-low than after low anterior resection, and the incidence of subclinical leak from colorectal anastomosis is 17%. The rate of the anastomotic leak was (8.5%). Colonic necrosis occurred in 4 patients (5.7%). Pelvic abscess occurred in 5 cases (7.1%). Pelvic hematoma occurred in 1 case (1.4%) and required re-exploration to control the bleeding source from the presacral plexus. A prolonged ileus has been reported in 1 case (1.4%) of our study. Wound infection occurred in 4 cases (5.7%). Wound infections were treated successfully by open wound care. Non-surgical complications occurred in the form of pneumonia and pulmonary edema in 2 cases. There was one case of mortality (1.4%) after 25 days due to pulmonary and cardiogenic edema. The late postoperative complications occurred in 5 cases (7.1%). Anal stenosis occurred in 4 cases (5.7%) and is greatly associated with conservatively-treated colonic necrosis. 3 cases were treated conservatively by dilation and one case by diamond island flap. One case of anovaginal fistula occurred after 16 months. The overall incidence of reoperation after ISR was 12 reoperation (17.1 %) in 11 cases (15.7%). Nine reoperation were due to postoperative complications and 2 reoperations due completely atonic external sphincter and 1 reoperation for local recurrence. In our study, overall local (4.3%) and distant recurrence (5.7%) after ISR occurred was an adverse event in 7 cases (10%) after a mean follow period of 24 months. Local recurrence occurred in 3 cases (4.3%) after a mean period of 24 months. The most common site of distant recurrence was the liver (4.3%).

Fig. (1): A-high ligation of the IMV B-lone star retractor was used to facilitate exposure during dissection in the Intersphincteric plane.

Fig. (2): Anastomosis between the colonic wall and the the remaining sphincter complex and anoderm.
Discussion

Despite the progress in the neoadjuvant therapy, radical resection of rectal carcinoma is the only hope for permanent cure of rectal cancer [10]. R0 resection, preservation of continence and avoidance of local recurrence are currently considered to be achievable goals in the treatment of ultra-low rectal carcinoma. Successful excision of a low rectal tumour while preserving the anal sphincter requires knowledge of the pattern of tumour spread and an understanding of the physiology of the sphincter mechanism. The move towards sphincter preserving surgery began with early anorectal physiology work that showed the distal 1-2cm of the rectum and internal anal sphincter not to be absolutely necessary for continence [6]. The goal of intersphincteric resection is to divide the rectum transanally and to remove part or the whole of the internal anal sphincter, in order to obtain adequate distal margin and preserve the natural function of defecation. ISR is used mainly in Europe [11] and more recently in Asia [13]. This technique modified the concept of sphincter preservation, because it permits theoretically to avoid APR in all rectal cancers due to possibility to obtain safe distal margin in all cases [16]. Sphincter preservation presents several advantages; the first is the threefold lower risk of intraoperative rectal perforation and positive circumferential margin than APR [13]. This is because TME with sphincter preservation is a more anatomical and standardized surgical procedure than APR. The second advantage is the better genital function observed after low anterior resection than after APR: 72-90% vs. 63-75% [14]. This is due to the lower risk of damaging the pelvic branches of the pelvic autonomic nerve, which are exposed during the perineal phase of an APR. The third advantage of conservative surgery is preservation of the body image that may increase quality of life [15].

The technique of ISR was first described by Schiessel et al. [15] who undertook the procedure to enable restorative resection and avoidance of a permanent stoma. In our study, straight colo-anal anastomoses were performed which is the same in all recent ISR studies [18-21]. In our study, diverting temporary ileostomy was done in 61 patient (87%) which is created with a usual closure of the ileostomy either after 1 month after the operation or after the completeness of the adjuvant therapy. In other studies, the rate of use of diverting ileostomy in ISR ranged between 77 and 90% [19,21]. Temporary stoma was used usually aiming to decrease the incidence perianastomatic infections and the occurrence of muscular fibrosis of the external anal sphincter. In our study, the mean distance of the anastomosis from the anal verge was (17.64 ± 9.39). Twenty five cases (35.7%) had nodal metastasis. The overall mean (±SD) number of harvested lymph nodes was 15.7 (±9.2) lymph nodes and ranged between (2-57) lymph nodes. Lim et al., [18] reported a mean number of harvested lymph nodes of 13.7 (±7.3) lymph nodes with a range between (5-35) lymph node.

Fifty four tumors (77.1%) had a favorable histology (well and moderately differentiated) while 16 (22.6%) tumors had unfavorable pathological differentiation. In our study, mucinous adenocarcinoma represented 14.3% (10 cases) of overall histological types which is higher than the reported incidence. This is evidently explained by the selection of the patient with early stage for transanal endoscopic microsurgical resection. In our study, venous invasion was positive in 6 (8.6%) (2.9%). Cases while the perineural invasion was positive in 2 cases. The distal margins were free in 66 cases (94.3%) and the infiltrated distal margins occurred in 4 cases (5.3%) which were less than the reported infiltrated distal margins (11%) [22]. Also, the circumferential margins were free in 65 cases (92.6%) and positive in 5 cases (7.4%) in our study which were also less than the reported infiltrated circumferential margins (10.3%) by Kuo et al. [23].

There were five intraoperative morbidities; a hemorrhage from the presacral plexus, posterior wall vaginal tear which repaired from infra-vaginal suturing and a splenic capsule tear treated conser-
vatively, ureteric injury and respiratory distress. In our study, one case (1.4%) of non-surgical early postoperative mortality occurred due to pulmonary and cardiogenic edema. Early postoperative mortality rate was reported between 0 and 6 percent of patients who underwent ISR in the different studies. The overall complications in our study was 28.6%. A similar cumulative morbidity rate was reported to be 28.9% after ISR [24].

Anastomotic leak is the most mind-occupying complication after rectal surgery. A reported rate between (9.1% and 11%) of anastomotic leak after intersphincteric resection is similar to the rate of the anastomotic leak in our study (8.5%) [25,26]. In our study, Colonic necrosis occurred in 4 patients (5.7%) which is lower than the same reported complication in a recent ISR study by Kuo et al., [23]. In our study, Pelvic abscess occurred in 5 cases (7.1%), a rate in the reported range between 2.7% and 25% after ISR [18,20]. In our study, pelvic hematoma occurred in 1 case (1.4%) and required re-exploration to control the bleeding source from the presacral plexus. Non-surgical complications occurred in the form of pneumonia and pulmonary edema in 2 cases in our study which is less than the reported medical morbidity by Chi and colleagues who reported 5.6% pneumonia and 3.4% urine retention [21]. In the present study, there was one case of mortality (1.4%) after 25 days due to pulmonary and cardiogenic edema in the open ISR group which is similar to the result by Park et al., (1.1%) [27]. The late postoperative complications occurred in 5 cases (7.1%) of our study. Anal stenosis occurred in 4 cases (5.7%) and is greatly associated with conservatively-treated colonic necrosis. 3 cases were treated conservatively by dilation and one case by diamond island flap. Lim et al., reported 6.3% incidence of postoperative stenosis which were treated by conservatively by Higar dilatation [18]. One case of anovaginal fistula occurred in our study after 16 months, from which a biopsy was taken and revealed recurrent adenocarcinoma. A similar result of anovaginal (1.1%) was reported by Chi, et al., [27]. The overall incidence of reoperation in our study after ISR was 12 reoperation (17.1%) in 11 cases (15.7%) which matches the reported reoperation rate (18.2%) by Laurent et al., [20]. Nine reoperation were due to postoperative complications and 2 reoperations due completely atonic external sphincter and 1 reoperation for local recurrence. From the oncological point of view, local recurrence remains the perfect reflection of the adequate resection. The overall local (4.3%) and distant recurrence (5.7%) after ISR occurred was an adverse event in 7 cases (10%) after a mean follow period of 24 months.

Local recurrence occurred in 3 cases (4.3%) after a mean period of 24 months in our study which is similar to the reported local recurrence (5.4%) by Lim et al., after a mean follow-up period of 29 month. The most common site of distant recurrence was the liver (4.3%). Distant recurrence in short term studies about ISR ranges between 2% and 24% [20,21,28].

Conclusion:

Intersphincteric resection with total mesorectal excision offers a safe option for sphincter preservation with reasonable surgical, functional and oncological outcome.

References


الملخص العربي

المقدمة: تحتل اورام القولون والمستقيم المرتبة السادسة في مصر من حيث انتشار الورم وتتمثل اورام المستقيم حوالي 22% من هذه الاصليات والتي يكون اغلبها تحت سن 65 عاما. تطورت مراحل استعمال اورام المستقيم بسبب تطور وسائل التشخيص وطريقة التشخيص الفعال والمغناطيسي واستخدام العلاج الكيميائي والاشعاعي ما قبل الدخول الجراحي. يتطلب الاستعمال الناجح لهذه الورم المعرفة الجيدة بطرق انتشار الورم وفسيولوجيا عمل عصب الورم وحيد حزام آمان وتركس بين 2-3 مستويات للحصول على أفضل النتائج بعد الجراحة.

وتشمل البدائل الجراحية المتاحة لاستعمال اورام المستقيم السفلي على طريقتين الأولى عمل تحويل دائمة للبراز مع استعمال السماح الشرجي الداخلي والخارجي والثانية استعمال الورم من بين عضلي مجرى الشرج بعد حزام آمان مع الحفاظ على الورم الشرجي الخارجي.

تعرف عملية استعمال المستقيم من بين عضلي مجرى الشرج بأنها عملية متحركة لاستعمال اورام مستقيم المجاور أو العضبة للقناع الشرجي بعد حزام آمان كافي من خلال استعملاء جزء أو كل العضلة الداخلية للشرج، ويتميز هذا النوع من الجراحات بالحفاظ على جودة أفضل للحيوية من خلال الحفاظ على فتحة الشرج ورابط مضاعفات من حيث انكماصة الورم والتأثير على الفقدة الجنسية. ومع تطور مناظير البطن أمكن استعمال اورام المستقيم عن طريق المنظور الجراحي مع الحصول على نتائج أفضل من حيث تقليل مدة الجرح داخل المستشفى ومدى الجرح وتقليل التكاليف الكلية.

الهدف من البحث: تقييم نتائج المدى القصير لاستعمال سرطان المستقيم السفلي مع الحفاظ على الورم الشرجي الخارجي.

تتمثل هذه الدراسة على سبعون مريضا بعد اتمام جميع الفحوصات المعملية والاشعاعات الضوئية التشخيصية، وتحديد مكان ودرجة الورم المستقيم. تم عمل الدراسة بالاشتراك بين مركز اورام جامعة المنصورة بالتعاون مع جامعة سانديز، رولا بريطانيا. ثبت بالنتائج ان عملية استعمال الورم مع الحفاظ على الورم الشرجي لورم المستقيم والتي تقع على مسافة أقل من 5 سم من فتحة الشرج ممكنة وأمنة من حيث النتائج الوظيفية والجراحية وارتفاع الورم.