



INTERSPHINCTERIC RESECTION OF LOW RECTAL CANCERS AS AN ALTERNATIVE TO ABDOMINO-PERINEAL RESECTION

1. Introduction

Surgery for rectal cancer in recent years has focused on anatomic and functional preservation of the sphincter without compromising oncological outcomes. Radical surgical treatment of cancers in lower third of the rectum has traditionally included low anterior resection (LAR) and abdomino-perineal resection (APR). Historically, the decision-making for sphincter-saving procedures has been related to the distance between the tumour and the anal sphincter complex. In the 1980s, a distal margin of 5 cm was required. In the ensuing decades, the “2-cm-rule” was accepted and adopted. This rule has been challenged, however, and currently a distal margin of 1 cm is accepted as being appropriate for optimal oncologic outcome. This provides a greater proportion of rectal cancer patients with the possibility of sphincter preservation. Recently, adequacy of the circumferential resection margin is being considered of equal, if not greater, importance in the risk of local recurrence of rectal cancer.

In recent years, intersphincteric resection (ISR) has been proposed to offer sphincter preservation in patients with very low rectal lesions, as an alternative to APR. Schiessel and colleagues initially described the technique of ISR. During ISR, a trans-anal division of the rectum, with removal of part or the entire internal anal sphincter (IAS) after TME, is performed, thus obtaining an adequate distal margin. Restoration of bowel continuity is achieved by performing a hand-sewn colo-anal anastomosis.

2. Indications and Technique

When planning for proctectomy with ISR for rectal cancer, careful patient selection is paramount. Tumour height, its relationship to each component of the sphincter complex, and the presence or not of regional lymph node or distal metastases needs to be evaluated.



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Inclusion criteria for performance of ISR include the following:(i)tumours located 30 mm from anal verge;(ii)tumours located 15 mm from dentate line;(iii)tumours located 1 cm from ano-rectal ring;(iv)local spread restricted to the rectal wall or the IAS;(v)adequate preoperative sphincter function and continence;(vi)absence of distant metastases.

Contraindications to the performance of ISR are the presence of faecal incontinence, T4 lesions, undifferentiated tumours, as well as tumours invading the pubo-rectalis and the external anal sphincter (EAS).

2.1. Surgical Technique:-

The principle of the ISR technique is based on an anatomic dissection plane between the IAS and EAS.

The technique incorporates a combined abdominal and peri-anal approach. Initially, high ligation of the inferior mesenteric vessels is done. This is followed by TME down to the level of the pelvic floor. TME can be performed via a laparotomy or laparoscopically. Subsequently, a per-anal resection of the IAS is undertaken. The distal resection line may be at the inter-sphincteric groove (total ISR), between the dentate line and the inter-sphincteric groove (subtotal ISR), or at the dentate line (partial ISR).

Additional manoeuvres to reduce the risk of local tumour cell implantation include closure of the rectal stump, cytotoxic washout, and pathological evaluation of the distal margin with frozen section analysis.

The specimen is usually delivered per anum. A hand-sewn colo-anal anastomosis with construction of a colon J-pouch, transverse coloplasty, or straight anastomosis is performed.

Certain groups, especially in Japan, perform lateral pelvic lymph node dissection for TNM stage III tumours. A de-functioning temporary stoma is fashioned, which is closed 6 weeks to 12 months from the primary operation.

2.2 Short-Term Adverse Events

The overall operative mortality associated with ISR is 0.8%. The cumulative morbidity rate is reported to be 25.8%. Anastomotic leak was experienced after a mean of 9.1%, and the rate of pelvic sepsis was 2.4%.

The rate of clinically apparent anastomotic leakage following stapled anastomosis following anterior resection is in the range of 3–15%. Rates of leakage rise significantly for more distally sited anastomoses. Anastomotic leakage is associated with postoperative anastomotic stricture, cancer recurrence, poor postoperative function, as well as increased operative mortality. In conclusion, ISR can be performed with acceptable rates of anastomotic leakage and low operative mortality.

2.3. Oncologic Outcomes

Radical surgical removal of the tumour is the only chance for permanent cure of rectal cancer, despite all progress in the development of oncologic therapy. Rullier and colleagues reported a local recurrence rate of 2% in a series of 92 patients undergoing ISR. Most patients (78%) had T3 lesions, and 88% underwent long-course neoadjuvant radio-chemotherapy. The overall 5-year survival rate was 81%, with a 5-year disease-free survival of 70%. Yamada et al. reported a similarly low 2.5% cumulative 5-year local recurrence rate, a 5-year disease-free survival rate of 83.5% for stage II patients and 72% for stage III patients.

Tilney and Tekkis performed a literature search to identify studies reporting outcomes following ISR. Twenty-one studies accumulating a total of 612 patients were identified. The pooled rate of local recurrence was 9.5% with an average 5-year survival of 81.5%. Distant metastases occurred in 9.3%. In Martin's systematic review, the mean distal margin free from tumour was 17.1 mm, CRM-negative margins were achieved in 96% of patients, and the overall local recurrence rate was 6.7% (range: 0–23%). The 5-year overall and disease-free survival rate was 86.3% and 78.6%, respectively.

Rates of local recurrence following low anterior resection for the treatment of rectal cancer are commonly reported in the range of 2.6–32% following surgery alone. Preoperative chemo-radiation therapy has led to local recurrence rates in the 6% range.

Therefore, the performance of ISR for treatment of very low rectal cancer affords similar oncologic outcomes to those of conventional resections. Moreover, Saito et al. compared outcomes of patients undergoing ISR with patients undergoing APR. Similar local recurrence rates (ISR = 10.6%, APR = 15.7%, = NS) and 5-year disease-free survival (ISR = 69.1%, APR = 63.3%, = NS) were reported. Patients undergoing ISR had significantly longer 5-year overall survival compared with patients undergoing APR (ISR = 80%, APR = 61.5%, < 0.05).

In conclusion, local and distant oncologic outcomes are not comprised with ISR. It is considered that the risk of local recurrence may be a function of circumferential margin involvement rather than distal margin involvement.

Risk factors for local and distant recurrence after ISR were reported by Akasu et al. Local recurrence rate was 6.7% and distant recurrence was 13%.

In the multivariate analysis, risk factors for local recurrence included positive microscopic resection margins, focal differentiation of tumour (tumour budding), and elevated preoperative levels of CA 19-9 (>37 U/mL). The identified risk factors for distant recurrence were pN1, pN2 disease, poor differentiation, and distance of tumour from anal verge, 2.5 cm.

2.4. Ano-rectal Physiology

An important goal of sphincter-preserving surgery is to reach acceptable quality of life levels by preserving faecal continence. The main concern of the ISR technique is functional outcome. Physiologic studies have shown that anal resting pressure is due to the IAS for 55%, the haemorrhoidal plexus for 15%, and to the EAS for 30%.

Total or partial excision of the IAS is bound to affect continence. Furthermore, preoperative radiation therapy may cause additional loss of sphincter function.

Kohler et al. reported a 29% reduction in resting anal pressure following ISR. Squeeze pressure recovered to preoperative levels after 12 months.

Rullier et al. compared outcomes in patients undergoing partial or subtotal IAS resection. Subtotal excision of the sphincter was associated with significant reduction in resting but not in squeeze pressure after ISR. Of note, there have been no studies assessing ano-rectal physiology and continence after neo-adjuvant radiation and prior to ISR.

2.5. Functional Outcomes and Quality of Life

As an antithesis to an aphorism by the famed architect Louis Sullivan, in rectal cancer surgery, “function follows form” (the type of operation performed). Loss of a part of the sphincter complex, loss of the rectal reservoir, and radiation is bound to have adverse effect on continence and defaecatory function.

Bretagnol and colleagues reported that faecal continence measured by both the Kirwan and Wexner scores was significantly worse after ISR. In addition, the need for anti-diarrheal medication was higher in patients undergoing ISR compared with patients that had undergone conventional colo-anal anastomosis. Frequency, urgency, the Wexner score, and the Faecal Incontinence Severity Index (FISI) were significantly improved following colonic J-pouch reconstruction compared with straight colo-anal anastomosis.

Regarding quality of life (QOL), Bretagnol et al. used both the SF-36 and faecal incontinence quality of life (FIQL) to compare QOL between patients undergoing ISR and conventional colo-anal anastomosis. There was no difference in the QOL scores between ISR patients and conventional colo-anal anastomosis patients in the physical and mental subscales of the SF-36.

In Martin’s systematic review, the mean number of bowel movements per day was 2.7. Nearly half (51.2%) of patients reported “perfect continence,” about a third (29.1%) reported experienced faecal soiling, 23.8% had flatus incontinence, had 18.6% had urgency. In a large study assessing functional outcomes after ISR, Denost reported that half of the patients had a “good functional result,” 39% had minor faecal incontinence and 11% had major incontinence. In the same study, the only independent predictors of “good” continence were a distance of tumour greater than 1 cm from the ano-rectal ring and anastomosis higher than 2 cm from the anal verge.

Possible technical modifications when performing ISR may improve functional outcomes. These include partial ISR (when possible) and construction of a colon J-pouch.

These are known to improve function in the first year after surgery. However, the effect is not sustained after 2 years

3. Case Report

The following patient is a case of Carcinoma of the Rectum operated by the Author. The patient was a 38 year old female with diagnosed carcinoma rectum. The growth was present 5 cm from the anal verge and approx 1 cm above the ano-rectal ring on per rectal evaluation. Patient completed neo-adjuvant Chemoradiation of 50.4gy with Cepacitabine therapy.

Pre-operative pelvic MRI showed a circumferential growth of 8 cm length extending from 4-5 cm above anal verge.

Due to the inferior extension of the growth, the patient was planned for an intersphincteric resection of the growth by a laparotomy and peri-anal approach.

After a lower midline laparotomy, the inferior mesenteric vessels were identified and a high ligation of the same was done, as described by Heald, et. al. Care was taken to preserve the left colic branch with removal of all lymphatic tissue around the vessels

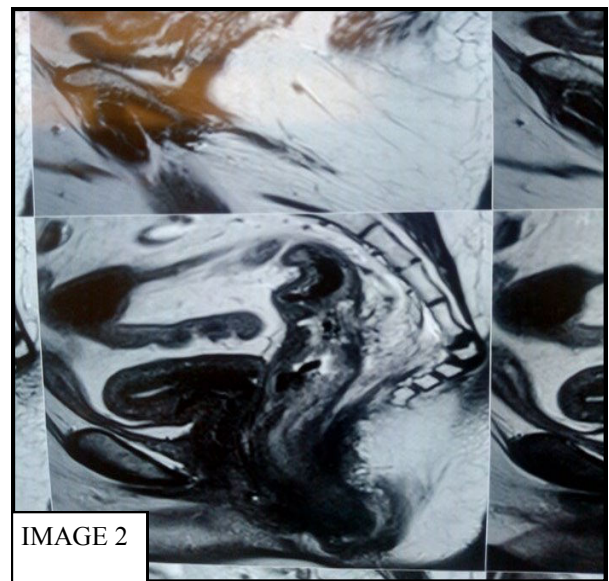
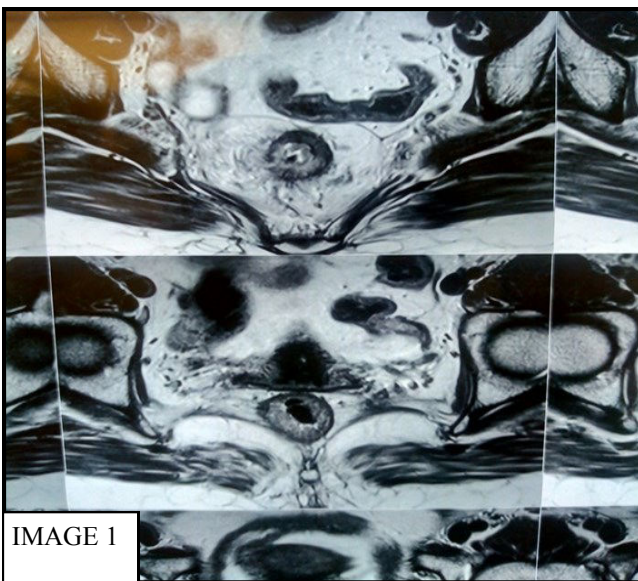


IMAGE 1 & 2:- SHOWING TRANSVERSE AND SAGITTAL CUTS OF THE RECTAL MALIGNANCY.

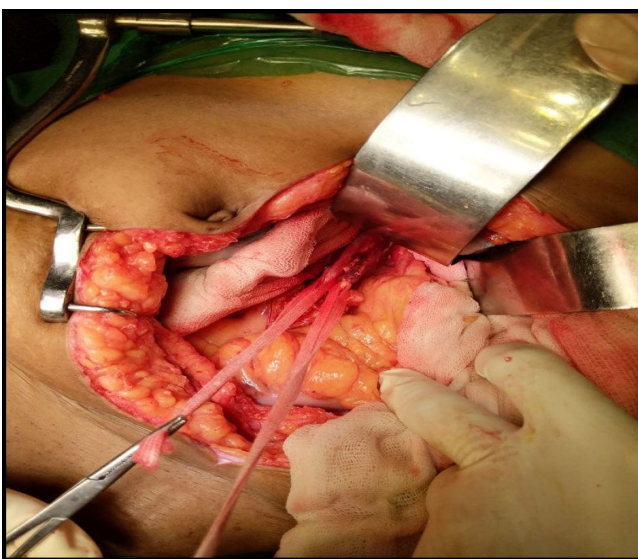


IMAGE 3:- IDENTIFICATION OF THE INFERIOR MESENTERIC VESSELS AND LIGATION AFTER PRESERVATION OF LEFT COLIC VESSELS.

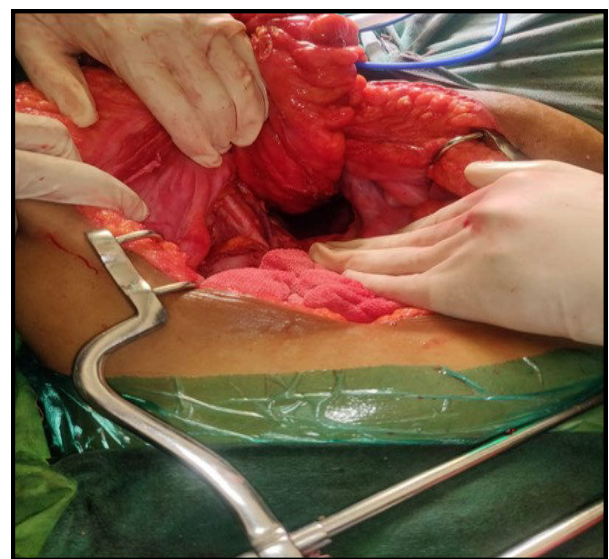


IMAGE 4:- DISSECTION OF RECTUM UPTO PELVIC FLOOR.

Dissection of the sigmoid colon and rectum was done along Toldt's Fascia down to the pelvic floor. Care was taken to achieve a Total Meso-rectal Excision with complete removal of the peri-rectal fat. The Hypogastric plexus was also preserved. After dissection of the rectum, the next step included the peri-anal mobilisation. Tagging sutures were placed from the dentate line to the external

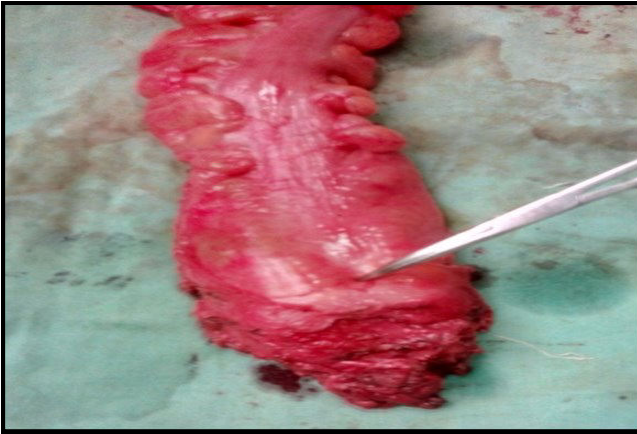


IMAGE 5:- TAGGING SUTURES TO EXPOSE ANAL CANAL

Resection of the specimen was done trans-anally in the inter-sphincteric plane as described in methods above and specimen was delivered trans-anally. Reconstruction included a coloplasty and a colo-anal anastomosis. A loop ileostomy was performed to protect the anastomosis. Closure was done with a pelvic drain and an abdominal drain.



IMAGE 6:- RESECTED SPECIMEN WITH MAINTAINED CRM

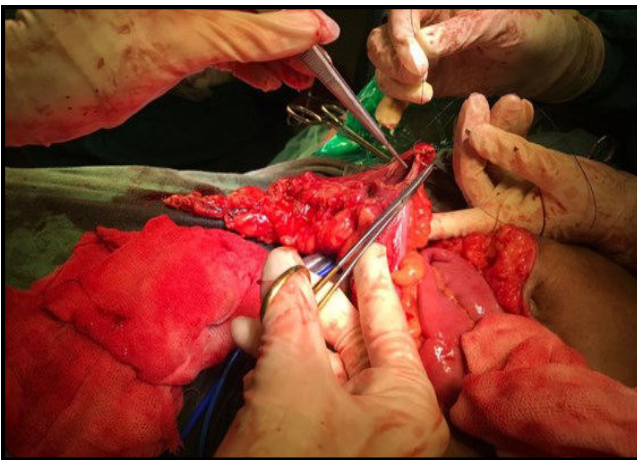


IMAGE 7:- PERFORMING A COLOPLASTY FOR NEO-RECTUM CREATION



IMAGE 8:- COLO-ANAL ANASTOMOSIS

4. Conclusion

In order to be successful in treating rectal cancer, good oncologic outcome is the first priority. Equally important is the achievement of an acceptable quality of life for the patient. The avoidance of a permanent stoma and all of the concomitant morbidity associated with it may be of greater importance to the patient.

Low anterior resection with inter-sphincteric dissection and partial or total excision of the IAS may be offered an alternative to APR in selected patients. Careful patient selection and sound operative technique, with emphasis on high-quality preoperative imaging and functional assessment, should lead to superior results.