

## Intersphincteric Resection for Rectal Adenocarcinoma: Technique, Indications and Results

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### Abstract

**Aim:** to describe the technique and indications of ISR and review the oncological and functional results of this technique in the management of very low rectal adenocarcinoma.

**Methods:** This is a literature review of intersphincteric resection in the management of rectal adenocarcinoma.

**Results:** Intersphincteric resection allows extending the indications of sphincter-sparing surgery to very low rectal adenocarcinoma. Morbidity, mortality, pathological data and long-term oncological outcomes are good. Functional outcomes are good in 51% of the cases.

**Conclusion:** These results would help the physician to better inform patients with low rectal tumors about the predictive outcomes of this technique and assist him in choosing among the different options available.

**Keywords:** Rectal neoplasm; Intersphincteric resection; Outcomes

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### Introduction

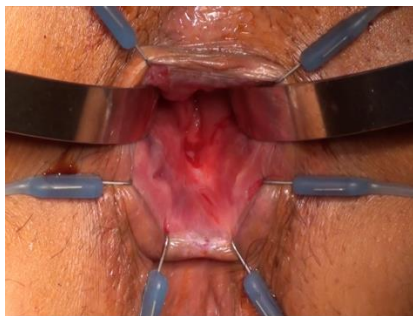
Many advances have been made in the management of low rectal adenocarcinoma during the past three decades that allowed the reduction of abdominoperineal resections' (APR) rates with permanent colostomy. Improvements in the surgical technique such as total mesorectal excision allowed standardization of oncologic surgical resections and reduction of local recurrences. Also, development of coloanal anastomosis by perineal approach [1] and circular staplers democratized performing safely very low colorectal anastomosis. Additionally, neoadjuvant chemoradiotherapy became the standard of care for advanced mid and low rectal adenocarcinoma, allowing the reduction of local recurrences, tumor downsizing and opened new perspectives in the management of low rectal cancer such as non-surgical treatment and complete pathological response [2,3]. There was also evolution of concepts with the reduction of the oncological distal margin from 5 cm to 2 cm then to only 1 cm. Despite these advances, up to 30% of patients with low rectal cancer will undergo APR with permanent abdominal colostomy. The actual recommended indications for conservative management of low rectal adenocarcinoma are tumors located, at least 2 cm from the dentate line [4].

To avoid permanent abdominal colostomy, Schiessel et al. [5] introduced in 1994 the concept of intersphincteric resection (ISR) in the management of very low rectal cancer. In this technique, rectal excision is associated with partial or complete resection of the internal sphincter in order to obtain an adequate distal margin while restoring bowel continuity, and therefore, allowing to extend the indications of sphincter-preserving surgery to tumors located less than 2 cm from the dentate line [5-8]. Although promising in its concept, there are many concerns about the oncological (lateral and distal margins, survival) and particularly the functional results of ISR.

The aim of this article is to describe the technique and indications of ISR and review the oncological and functional results of this technique in the management of very low rectal adenocarcinoma.

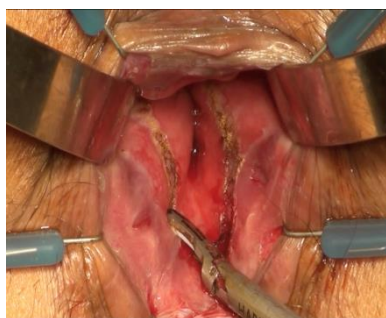
### Surgical technique [7-9]

The surgical procedure is performed in Lloyd-Davies position. After complete mobilization of the rectum to the pelvic floor by abdominal approach, the ISR is performed by perineal approach. The use of a self-holding retractor facilitates the exposition and the access to anal area.



**Figure 1:** Exposition in the perineal position with a self-holding retractor. The tumor is visible as a white posterior scar just above the dentate line

A circular incision, with monopolar, is performed 1 cm below the inferior border of the tumor, as a landmark to facilitate the exposure of the internal sphincter.



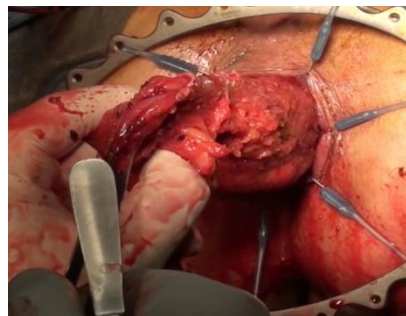
**Figure 2:** Circumferential incision serving as a landmark for the intersphincteric resection

The internal sphincter is identified as a white band-like structure. Then, the incision of the internal noun needed is continued upward between the smooth and striated sphincters under permanent guidance by the abdominal surgeon, allowing its separation from the external sphincter [7,8] .



**Figure 3:** Posterior intersphincteric dissection. The internal sphincter is visible as a white band internal to the ultrasonic device.

After circumferential excision, the specimen is extracted per anally and then resected.



**Figure 4:** Transanal extraction of the specimen after completion of the intersphincteric resection

The specimen has to be inspected by the surgeon then sent for histologic examination to verify the distal margin. Continuity of the bowel is restored by manual coloanal anastomosis, performed by perineal approach. Confection of a colonic J-pouch, transverse colostomy or latero-terminal coloanal anastomosis is advisable by most authors to improve the functional results of the patients [6].

There are mainly two types of ISR resections. Partial ISR involves a circumferential partial resection the internal anal sphincter, while in total ISR , the internal sphincter is completely excised [5,8,10]. Others variants have been described in the literature. Han and al. described a modified technique of partial ISR in which the internal sphincter is excised only on the side of the tumor, while it is preserved in the opposite side [9]. In contrast, Saito and al. described a more radical technique in which a part of the external sphincter is removed with the internal sphincter in order to extend the indications of conservative treatment [7].

### Indications

The indications of ISR proposed in the literature are not based on strong scientific evidence[11]. Most of the studies are retrospective and non-comparative. The accepted indications by most authors [5-7,9] reporting this technique are: low rectal tumors limited to the rectal wall or internal sphincter (T1 or T2 in preoperative work-up); no distant metastasis; Well-differentiated or moderately differentiated tumor and good sphincter function. Contra-indications are tumors invading the external sphincter, poorly differentiated tumors, big tumors and poor sphincter function. Some authors extended the indications to T3 tumors and in case of good response to neoadjuvant chemoradiotherapy [6,9]. In a recent paper, Rullier and al. proposed a standardized management of very low rectal tumors based on the location of the tumor [6]. The authors classified low rectal tumors in 4 types: Type I are supra-anal tumors located above 2 cm from the dentate line and treated by conventional coloanal anastomosis; type II are juxta-anal tumors located less than 2 cm from the dentate line treated by partial ISR; type III are intra-anal tumors (internal sphincter invasion) treated by total ISR; and

type IV are transanal tumors with external sphincter invasion, treated by APR.

In this context of rigorous selection criteria, an extensive and precise preoperative work-up is mandatory to carefully select eligible patients for ISR [6,8,9]. It should include preoperative digital examination by the surgeon, rigid endoscopy to locate the tumor, a chest and abdominal computed tomography to rule out distant metastasis, endorectal ultrasound for tumor-node staging and sphincter involvement and most importantly, a pelvic High-resolution magnetic resonance imaging (MRI) to determine surgical margins, especially the accurate distance between the tumor and the different components of the anal sphincter, and the lateral margin [5,6].

## Results

The results of ISR are the most crucial point to be accepted as an option in the management of very low rectal cancer. In addition to acceptable morbidity and mortality, it should insure the same quality of surgery, the same oncological outcomes and acceptable functional results.

## Morbidity – Mortality

Mortality and morbidity reported in the literature are acceptable and not different from the reported outcomes of rectal surgery. In a recent systematic review of outcomes after intersphincteric resection, postoperative mortality after ISR occurred in 0,8% of cases ranging from 0 to 6% of patients [11,12]. The interpretation of postoperative morbidity is difficult because of the heterogeneity of the definitions and reported outcomes in the literature. The weighed mean of global morbidity reported by Martin et al. was 25.8%. The rate of anastomotic leaks ranged from 0.9 [13] to 48 % with a mean weighed rate of 9,1%. Late complications were reported in up to 12% of cases and included anastomosis stenosis and mucosal prolapsed [14,5].

## Oncological outcomes

One of the major concerns after ISR is the quality of surgery regarding surgical margins. In the published studies, distal margin ranged from 10 mm to 29 mm with a mean weighed value reported by Martin et al of 17.1 mm [11,12,15] Similarly, negative lateral margin (> 1 mm) was achieved in 96% of patients showing that ISR is performed respecting the recommended rules of oncological safety.

Also, ISR is reported to have good long-term oncological outcomes. The 5-year survival and disease-free survival rates ranged respectively from 62 [12] to 96% and 69 to 86% with a mean weighed rate reported by Martin et al. in their systematic review of 86.3% and 78.6 %. The mean local recurrence rate was low (6.7 per cent)

ranging from 0 to 23 per cent [14-18]. In their study including 404 patients with very low rectal adenocarcinoma, Rullier et al. found no difference in overall survival and disease-free survival between classical coloanal anastomosis, partial intersphincteric resection and total ISR. All these data suggest that intersphincteric resection has the same oncological outcomes than classical approaches.

## Functional outcomes

Functional results of ISR are difficult to interpret in the literature due to the heterogeneity of assessment tools used by the authors. Some have used continence scores such as the “Jorge and Wexner continence score” or the “Kirwan classification system” while others have used institution-specific general questionnaires. Therefore, caution is necessary in the interpretation of data. Overall, 51.2% of the patients are reported to have “perfect continence” (range: 30 to 86.3%) [8,17,19]. The median number of bowel movements per day ranged from 2.2 to 3.7 [8,12,14]. In their systematic review, Martin et al reported that an average weighed mean of 29.1% (15.3 to 43.0) of patients experienced fecal soiling (mild soiling to incontinence to solid stool), 23.8% (16.7 to 30.9) reported incontinence to flatus and 18.6% (6.7 to 30.5) complained of urgency [17].

Bretagnol and al. compared functional outcomes between classical coloanal anastomosis and ISR in 170 patients using both “Jorge and Wexner continence score” and the “Kirwan classification system”. They found that ISR had statistically lower Wexner scores (10.8 vs. 6.9.  $P < 0.001$ ) and that less patients had “good continence” according to “Kirwan classification system” (52% vs. 81%.  $P < 0.01$ ).

On the other hand, perineal pseudo-continent colostomy (PCPC) is another option for very low rectal cancer after APR, which prevents the definitive abdominal colostomy. In this technique, the colostomy is placed in the perineum, allowing to preserve the body image of the patients with reported acceptable functional results[21]. Dumont et al. compared in a small retrospective study functional outcomes between PCPC and ISR [22]. They reported similar Wexner scores in the two groups (10 vs. 11.  $P = 0.4$ ), while ISR was associated with higher incontinence (41% vs. 58%) and difficult evacuation rates (46% vs. 0%.  $P < 0.001$ ). The authors concluded that the pseudocontinence of PCPC has the same impact on continence as the voluntary continence of ISR and that continence function should not be a determinant for preferring ISR to the PCPC procedure.

The internal sphincter plays an important role in anal continence and its partial or complete excision may explain these reported functional results. Anal manometric objective data have shown that ISR is associated with a permanent decrease of resting pressure and transitory decrease of the maximum squeeze

pressure [8]. Additionally, some authors analyzed risk factors for poor functional outcomes [4,23] after ISR. They found that tumors located less than 4 cm from the anal verge and total intersphincteric resections are associated to worse continence results.

## Conclusion

The intersphincteric resection is an extreme option to allow sphincter preservation in case very low rectal tumors. The available data in the literature showed that it has acceptable morbidity and mortality with good short and long term oncological outcomes. However, only half of the patients will have good functional outcomes, and that very low rectal tumors and total intersphincteric resections are associated to worse continence results. These results would help the physician to better inform patients with low rectal tumors about the predictive outcomes of this technique and assist him in choosing among the different options available (APR with perineal or abdominal colostomy, ISR).

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