Feasibility and Functional Outcome of Laparoscopic Intersphincteric Rectal Resection for Ultra-Low Rectal Cancer

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Abstract

Aim-Background: The Aim of this study is to evaluate the feasibility and analyze the functional outcome of laparoscopic intersphincteric resection (LISR) in ultra-low rectal cancer. The preservation of anal function following curative operations for low rectal cancer is becoming increasingly important. Laparoscopic intersphincteric resection of the rectum is the utmost sphincter saving operation for rectal cancer. The rectum is laparoscopically resected along with the internal anal sphincter, providing an adequate distal margin for even the ultra-low tumours of the rectum.

Methods: Between 2008 and 2012, nine patients, 2 with a T3 tumour that received preoperative chemoradiotherapy and 7 patients with a non-fixed T2 rectal adenocarcinoma, underwent LISR by a single surgeon. Preoperative tumour staging included endorectal ultrasonography (ERUS) and pelvic MRI. Patients with multiple distant metastases, tumour invasion into adjacent organs and invasion into the external anal sphincter and/or levator ani, were excluded from LISR. Covering ileostomy in seven patients was reversed with a satisfactory functional outcome in each case.

Results: All patients underwent LISR with curative intent. There was no postoperative mortality. Complications included anal stenosis, prolapse of the neorectum and pelvic hematoma. The overall quality of life and functional outcome were deemed satisfactory.

Conclusion: In selected patients, intersphincteric rectal resection may provide an acceptable functional outcome for ultra-low rectal cancer patients, without a permanent stoma.

Key words:
Ultra-low rectal cancer, Laparoscopic intersphincteric excision of the rectum, Sphincter saving procedures

Introduction

Until two decades ago, rectal tumours that could be palpated by an examiner’s finger were treated by abdominoperineal resection (APR). The development of circular stapling devices enabled low anterior resections for tumours 3 cm from the dentate line. Tumours situated lower than 3 cm rarely allow stapler placement across the optimal distal margin. Hence, abdominoperineal resection (APR) remains the most widely accepted treatment modality for ultra-low tumours. However, due to the obvious drawbacks of APR, the optimal surgical procedure for these tumours remains controversial; intersphincteric resection (ISR) has drawn increasing attention as it provides anus preservation and a satisfactory tumour margin. Several retrospective studies have shown satisfactory sphincter control after intersphincteric rectal resection for rectal cancer [1-9]. In addition, applying laparoscopy to this sphincter-saving procedure offers the well-known benefits of the approach.

Purpose

Sphincter-preserving operations for rectal cancer are ideally required to a) secure adequate tumour margins and b) maintain anal sphincter function. However, for tumours situated extremely low in the rectum, transection of the rectum at a sufficiently low level to secure a safe distal margin may prove extremely difficult or impossible. Low anterior rectal resection with removal of the internal sphincter is an option for ultra-low rectal cancer. The objective of this study was to describe the technique, evaluate the feasibility and analyze the functional outcome of laparoscopic intersphincteric resection in ultra-low rectal cancer.

Materials And Methods

Surgery included total mesorectal excision with internal sphincter removal and anastomosis to the dentate line. Preoperatively, all patients underwent endorectal ultrasonography (ERUS) by the operating surgeon, in order to confirm the depth of invasion.
and subsequent need for preoperative chemoradia-
tion. If ERUS and/or MRI showed tumour invasion
to the external sphincter or the levator ani, patients
were excluded from LISR and an abdominoperineal
resection (APR) was performed [4]. Moreover, pa-
patients were excluded from LISR if multiple distant
metastases or tumour invasion into adjacent organs
were shown preoperatively.

From 2008 to 2012, nine patients with a rectal tu-
mour below 3 cm from the anal verge were treated
by curative LISR, by a single surgeon. Patients with
T3 or N1 tumours and no invasion of the external
anal sphincter or levators, received preoperative ex-
ternal beam radiation with sensitizing chemotherapy
(Volumetric Modulated Arc Therapy. 50,40 cGy in
28 fractions of 1,8 cGy each, over 6 weeks, concurs-
ing with continuous infusion 5-FU and LV on the first
and last 5 days during radiotherapy) [10-12]. T2N0
tumours in patients that underwent LISR were not
treatable by local excision due to tumour size, un-
clear preoperative node status or patient compliance.
A temporary diverting ileostomy was carried out in
all patients, which was closed after 6 - 10 weeks if
no adjuvant therapy had been administered. Where
postoperative chemotherapy was deemed necessary,
the stoma was maintained for the duration of the ad-
juvant therapy and subsequently closed 6 weeks after
completion. Follow-up assessment was performed on
an outpatient basis. Sphincter function was evaluated
clinically every 3 months after stoma closure, for one
year [13]. Five patients have currently completed the
1-year follow-up and 2 are still under evaluation of
sphincter function. All patients were interviewed on
frequency of bowel movements, ability to defer de-
faecation, soiling, urgency, and overall quality of life
related to defaecation. Function was assessed using
the Wexner Continence Score. The present clinical
study has been approved from the institutional review
board.

Surgical Technique

Laparoscopic intersphincteric rectal resection was
initiated by placing the patient in the modified litho-
tomy position with the buttocks slightly projecting
from the end of the operating table. The right arm
was placed alongside the body and the left arm at a
70° angle to the operating table. Shoulder and right
lateral supports were fixed to the table. The scope
trocar was placed by the Hasson technique through
the umbilicus. Two 5mm trocars were introduced
along the right midclavicular line, one at the right
McBurney site and the other in the mid right abdomi-
nal region. A third 5mm operative port was placed
in the mid left abdominal region, along the left mid-
clavicular line. Routine exploration of the abdomi-
nal cavity was carried out, and any adhesions were divid-
ed. The patient was placed in a steep Trendelenburg
and right lateral position, the sigmoid was elevated to
the abdominal wall, and the sigmoid mesentery was
exposed. The peritoneum was incised along the right
anterior border of the aorta, from the sacral prom-
ontory to the inferior border of the pancreas. The
splenic flexure, the distal transverse colon and the
left colon were completely mobilized from the sub-
retroperitoneal fascia to ensure a subsequent ten-
sion-free anastomosis. The inferior mesenteric artery
was dissected and ligated 1 cm away from the aorta
with endoclips or an endoscopic linear cutter, after
identifying the left ureter and the left sympathetic
trunk. Thus, removal of the sigmoid mesentery and
lymph nodes around the inferior mesenteric artery
was achieved. The peritoneal incision was extended
caudally and anteriorly, Denonvillier’s fascia was dis-
sected, and the seminal vesicles and prostate gland or
the posterior wall of the vagina were exposed. The
mesorectum was dissected laterally and posteriorly
down to Waldeyer’s fascia. The lateral ligaments of
the rectum were gradually divided with the harmonic
scalpel from the inner boundaries of the inferior hy-
pogastric nerve fibres. Sharp dissection between the
visceral and parietal pelvic fascia down to the level
of the levators (or upper aspect of the anal canal),
allowed removal of the rectum and its mesentery as
an intact unit, and a total mesorectal excision (TME)
was thus achieved. The hypogastric nerves, once
identified, were kept out of harm’s way.

After completion of the laparoscopic abdominal
phase, the anal portion of the operation was initiated:
The patient was moved to the Loyd–Davies position.
The anal canal was exposed with self-retaining re-
tractors (Lone Star Retractor System™ / Lone Star
Medical Products Inc., Houston, TX) and the tumour
was identified under direct vision. The rectum was
irrigated with 5% povidone-iodine to prevent cancer
cell dissemination in the surgical field. Using elec-
trocautery, a circular incision was performed at the
dentate line. Mobilization of the rectum progressed
proximally along the intersphincteric plane, up to the
levator ani. Once the plane of dissection achieved
during the abdominal phase was met, access into the
abdominal cavity was accomplished.

The sigmoid and rectum, including the total me-
sorectum, were pulled out of the perineal wound and
resected. Invasion of tumour cells [4] on the dissected
plane was histologically evaluated by microscopic ex-
amination of a frozen-section specimen. In the case
of tumour invasion, the procedure was converted to
an abdominoperineal resection (APR). If no invasion