Posterior pelvic exenteration for primary rectal cancer

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Abstract

Background Indications for and the prognosis of posterior pelvic exenteration (PPE) in rectal cancer patients are not clearly defined. The aim of this study was to analyse the indications, complications and long-term results of PPE in patients with primary rectal cancer.

Methods A retrospective review included patient demographics, tumour and treatment variables, and morbidity, recurrence, and survival statistics. These results were compared with a group of female patients who underwent standard resection for primary rectal cancer in the same period (non PPE group).

Results The series included 30 women with an average age of 56.7 years (range 22–78). Tumour location was recorded in three cases in the upper rectum, 13 cases in the medium rectum and 14 cases in the lower rectum. A sphincter-preserving procedure was performed in 70% of the patients. Mean operative time was 4.2 h (range 2–7.5 h). Overall major morbidity rate in this series was 50% and mean hospital stay was 19.7 days (range 9–60 days). There was no hospital mortality. Pathological reports showed direct invasion of uterus, vagina or rectovaginal septum in 19 cases, involvement of perirectal tissue in 25 cases and positive lymph nodes in 18 cases. Comparison between PPE and non PPE groups showed no differences in mean tumour diameter, histological grade and tumour stage, but patients in the first group were younger. Although low tumours were seen more frequently in the PPE group ($P = 0.003$), the rate of sphincter-preserving procedure was comparable in both groups. Operative time was longer ($P = 0.04$) and morbidity was higher ($P = 0.0058$) in the PPE group. Local recurrence with or without distant metastases for the whole series was 30%. Five-year survival rate for patients who underwent curative resections (TNM I–III) was 48% in the PPE group *vs* 62% in the non PPE group ($P = 0.09$).

Conclusions In the present series, PPE prolonged operative time, increased postoperative complications and showed a trend toward poor prognosis in recurrence and survival. However, PPE offers the only hope for cure to patients with a primary rectal cancer that is adherent or invades reproductive organs.

Keywords Rectal cancer, surgery, posterior pelvic exenteration

Introduction

Posterior pelvic exenteration (PPE) involves the removal of the rectum, sigmoid colon, internal reproductive organs, draining lymph nodes and pelvic peritoneum in women. This procedure is mainly indicated in primary rectal adenocarcinoma with adherence or invasion to the uterus and vagina. For some authors, the indications for PPE include anterior or circumferential lesions in women [1] and selected cases of anterior local recurrence [2]. Originally, this radical technique required a combined abdomino-perineal procedure with definite colostomy. In the last two decades, when the tumour involves the upper and/or medium rectum and an adequate margin of resection can be obtained distally, a sphincter-saving procedure can be performed (the so called supralevator PPE) [1,3]. PPE for rectal carcinoma remains a radical procedure associated with a significant morbidity, but, currently, in experienced centres, hospital mortality should be less than 5% [1–6]. Precise indications, the specific morbidity related to the procedure and the impact in recurrence and survival of primary rectal cancer are not clearly defined in the available literature. Most of the series are heterogeneous, mix patients with different techniques and include cases with primary and recurrent rectal cancer [1,2,4–6]. The aim of this study was to

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analyse the correlation between the indications of PPE and pathological findings, postoperative complications, and the long-term results of this procedure in patients with a primary rectal cancer.

Patients and methods

The medical records of women who underwent the PPE procedure for a primary rectal cancer between January 1990 and December 2003 were retrospectively reviewed. PPE was defined as an extirpation of the rectum and sigmoid colon in block with the internal genitals and draining lymph nodes. Abdominoperineal resection (APR) adds a perineal phase with ablation of the anorectum and sphincteric muscles leaving the patients with a permanent sigmoid colostomy. In cases of supralevator PPE, the exenteration reaches from 3 to 5 cm below the distal margin of the lesion, restoring intestinal continuity with a low colorectal or coloanal stapled anastomosis. Major morbidity was defined as a significant complication whose treatment required surgery and/or prolonged hospital stay. Tumours were staged according to the International Union Against Cancer/American Joint Committee on Cancer TNM staging system (sixth edition, 2002) [7]. Correlation between the surgical indications and three variables of pathological study were made: histologically proven tumour invasion to contiguous organs, the involvement of perirectal tissue (T3 tumours) and lymph node metastases. Local recurrence was defined as tumour relapse in the pelvis and/or in the perineum. Tumour recurrence at other sites was labelled as distant. Patients undergoing PPE were compared to female patients operated in the same period for primary rectal cancer without exenteration (non PPE group). For statistical analysis the Student and Wilcoxon tests for independent samples were employed, considering $P < 0.05$ statistically significant. Survival curves were estimated by the Kaplan-Meier method and compared by the Cox-Mantel log-rank test. Data were processed with the STATA 7.0 computer package of the Departament of Biostatistics, School of Public Health, University of Chile.

Results

During the 14-year period mentioned, 30 consecutive patients, with a mean age of 56.7 years (range 22–78 years), underwent PPE. Mean pre-operative CEA was 30.44 ng/ml (range 0.9–320AJCC Cancer Staging Manual, ng/ml). Tumours were located in the upper rectum in three cases, in the medium rectum in 13 cases and in the lower rectum in 14 cases. APRs were performed in nine patients and supralevator PPEs in 21 (70%). Mean operative time was 4.2 h (range 2–7.5 h). Twenty complications were recorded in 15 patients. Non-operative complications included urinary tract infection in 7 cases, wound infection in 8 cases, two cases with pulmonary infection and one case with a prolonged ileum. Surgical complications occurred in two patients who underwent low anterior resection: one patient developed a rectovaginal fistula that required a loop ileostomy and the other was converted to Hartmann procedure due to anastomotic leak. The average hospital stay was 19 days (range 9–60 days) with no mortality. Six patients had received pre-operative chemoradiation with no clinical response in three, partial response in one and complete clinical response in two (both with complete pathological response).

Correlation between surgical indications, tumour location and pathological findings are shown in Table 1. There was no direct invasion of the suspect organ in the pathologic study in 11 patients, including two patients with complete clinical and pathological response to chemoradiation (Table 2). So, in just three patients[10%], two of them with pre-operative chemoradiation, there was no invasion of the contiguous organ, no involvement of the perirectal tissue and no metastases in the regional lymph nodes.

The average tumour diameter in the fixed specimen was 6.3 cm (range 0–14 cm). Tumour grade was well or

Table 1 Correlation between indications, tumour site and pathologic study.

Suspect organ involved	*n* (upper-medium-lower rectum)	Pathological study		
		Direct invasion	T3	Positive lymphnodes
Vagina	12 (0-3-9)	9	11	8
Uterus	8 (3-5-0)	5	6	3
Douglas pouch	7 (0-3-4)	3	6	5
Ovaric metastases*	1 (0-1-0)	1	1	1
Frozen pelvis	2 (0-1-1)	1	1	1
Total *n* (%)	30 (3-13-14)	19 (63)	25 (83)	18 (60)

*Krukemberg tumour.

Table 2 Pathological study of cases without direct invasion of adjacent genital organs.

Patient no.	Suspect organ	T2	T3	Lymph nodes status
1	Vagina	–	+	+
2	Vagina	–	+	+
3*	Vagina	–	–	–
4	Uterus	–	+	+
5	Uterus	+	–	+
6†	Uterus	+	–	–
7	D-pouch	+	–	+
8	D-pouch	–	+	+
9*	D-pouch	–	–	–
10	D-pouch	–	+	–
11	Frozen pelvis	–	+	+

*Pre-operative chemoradiation with complete clinical and pathological response; †Pre-operative chemoradiation with partial clinical response.

moderately differentiated in 27 cases (90%) and poorly or undifferentiated in three cases (10%). Nine patients underwent adjuvant postoperative chemoradiation. Stage, according to TNM classification, and recurrence are shown in Table 3. Ten patients (33%) had Stage IV tumours. The median follow-up was 32 months (range 4–120 months). Local recurrence with or without distant metastases for the whole series was 33% (10/30). Overall five-year survival rate (stages I-IV) was 30%, whereas five-year survival rate for patients who underwent curative resections (TNM I–III) was 48%.

Comparison between the PPE and non PPE groups is shown in Table 4. There were no differences in the average tumour diameter (6.3 cm *vs* 6 cm), in the rate of undifferentiated tumours (10% *vs* 12.5%), nor hospital stay (19.7 *vs* 14.8 days; $P = 0.32$).

Table 3 Staging and recurrence.

Stage	*n*	LR	DR	LR + DR	No recurrence
0	2	–	–	–	2
I	1	–	–	–	1
II A	2	1	–	–	1
II B	6	1	–	1	4
III A	–	–	–	–	–
III B	6	1	1	2	2
III C	3	1	–	1	1
IV	10	–	6	2	2
Total	30	4	7	6	13
%		13	23	20	43

LR, local recurrence; DR, distant recurrence.

Table 4 Comparison between PPE and non PPE group.

Variable	PPE $n = 30$	non PPE $n = 75$	*P*-value
Age (mean)	56.7	65.9	0.0016
Pre-operative CEA (mean)	30.4	26.7	0.58
Tumour site lower rectum (%)	47	22.5	0.003
Preserving sphincter procedure (%)	70	78	0.43
Operative time (h)	4.2	2.3	0.04
TNM* (%)			
Estadio I	10	12.6	
Estadio II	27	22.5	0.41
Estadio III	30	33.8	
Estadio IV	33	31.1	
Recurrence & (%) (TNM I–III)	45	24	0.06
5-year survival (%) (TNM I–III)	48	62	0.09

*TNM 2002. & LR, DR and combined recurrence (LR + DR).

Discussion

In these series PPE was employed in 28% of the female patients with primary rectal cancer. The PPE group was younger and had more tumours located in the distal rectum than the non PPE group. However, the rate of sphincter-saving procedure was similar in both groups. PPE with preservation of the anal sphincter mainly depends on the location and the stage of the lesion. Those tumours with direct invasion of the sphincter muscles, with a distal margin below 4 cm to the dentate line or complicated with a rectovaginal fistula usually are candidates for an APR with a definite colostomy. In tumours located in the upper two thirds of the rectum are more likely to achieve a good distal clearance and to perform a sphincter-preserving procedure with colorectal or coloanal anastomosis.

In our experience, PPE increases the operative time, the morbidity and the hospital stay. Therefore, it is quite important to clearly define the indications of PPE. Direct invasion of the uterus, vagina, rectovaginal septum, cervix or Douglas pouch represented 90% of the indications in this series and others [3,5,6,8–12]. The frozen pelvis, especially after pre-operative radiation, challenges the expertise of the pelvic surgeon, but it may be the only chance for cure. In the present study the pathologic findings showed direct invasion of the uterus, vagina or cul-de-sac in 63% of the cases (19/30). Eight of the remaining 11 patients had involvement of perirectal fat tissue and/or metastases in the lymph nodes. According to the criteria employed in this work, only in three cases (10%) would a standard resection without exenteration have been the correct procedure.

Although magnetic resonance (MR) imaging may contribute to improve staging rectal cancer, diagnostic accuracy is moderate and variable [13,14]. For adjacent organ invasion and lymph node involvement, a recent meta-analysis showed that MR imaging, computed tomography (CT) and endoluminal ultrasound (US) were comparable, while for rectal tissue invasion, US showed better diagnostic accuracy than that of CT and MR imaging [15]. In restaging irradiated tumours, MR imaging has the accuracy of 52% in T stage and 68% in lymph node stage [16].

The main goals of PPE are to decrease the local recurrence and to achieve a better free-disease survival in patients with primary rectal cancer involving the reproductive organs. In our experience, local failure was high and survival was low in patients who underwent PPE as compared to the non PPE group, in the limit of statistical significance ($P = 0.06$ and $P = 0.09$, respectively). Although a small series with PPE showed better results in local recurrence [11], the relevance of this procedure on local recurrence and survival is not clear in the literature. To date, published series are small, mixing patients who underwent PPE and total pelvic exenteration for primary tumours and for pelvic recurrence and including some patients treated with pre-operative chemoradiation. In the last 15 years, there are five reports of PPE for primary rectal cancer including 95 patients (ranging from 18 to 37 cases each one), with an average mortality rate of 6% and five-year survival between 49 and 64% in patients operated on with curative intention [2,4,5,10,11].

In our series, 50% of the cases underwent pre-operative (6 cases) or postoperative (9 cases) chemoradiation. Although in the past the indications of radiation therapy were not clearly assessed in the management of these lesions, currently there is a trend to use pre-operative chemoradiation for T3 tumours and/or suspected lymph node metastases. As mentioned above, MR imaging can provide valuable information in assessing administration of pre-operative radiotherapy [13]. Tumour downstaging has been associated to improved local control and patient survival [17].

In conclusion, PPE was indicated in 28% of the female patients with a primary rectal cancer. The main indication was the direct invasion of the uterus and the vagina. Based on the criteria mentioned above, the correlation between the surgical indications and pathologic report in 90% of the cases was positive. Comparison with the non PPE group showed no differences in average diameter of the tumours, tumour grade, pre-operative CEA and tumour stage. The PPE group had younger patients and low tumours were more frequent, but in both groups the percentage of sphincter preserving procedure was similar. PPE increased the operative time, hospital stay and overall morbidity. The prognosis of the PPE group was worse that of the non PPE group, although this difference was not statistically significant. PPE offers the only hope for cure in patients with a primary rectal cancer that is adherent to, or invades reproductive organs. It seems reasonable to add pre-operative combined chemoradiation in the management of these patients, most of them with T3 lesions and/or involvement of regional lymph nodes. Further investigations are necessary to fully elucidate this issue and the real prognosis of PPE in females with primary rectal cancer.

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