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Research Article

Validity of APR in the Era of Sphincter Saving Procedures for Low Rectal Cancers

Asif Mehraj[1]*, Nisar A Chowdri[2], Saima Nanda[3], Fazl Q Parray[4], Rauf A Wani[5], Mudassir A Khan[1] and Arshad A Baba[6]

[1]Fellow, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India

[2]Professor and Head, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India

[3]Medical Officer, JKHS, Jammu and Kashmir, India

[4]Professor, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India

[5]Additional Professor, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India

[6]Fellow, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India

***Corresponding Author:** Asif Mehraj, Fellow, Department of Colorectal Surgery, SKIMS, Srinagar, Jammu and Kashmir, India.

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Abstract

Background: Distal rectal cancers present a challenging task for surgeons in terms of providing a Sphincter Saving Procedure (SSP) as compared to Abdomino Perineal Resection (APR) and maintaining oncological safety. Because of better understanding of cancer biology, better surgical techniques, newer neoadjuvant therapies and advent of surgical staplers, SSP's are more preferred option.

Aim: The aim of our study was to determine the various types of surgical treatment options in practice for distal rectal tumours and to compare the trend of APR and SSP at a high volume centre. Secondary outcome was to compare quality of life (QOL) between APR and SSP group.

Methods: This was a Retrospective study of 3 years carried out in department of colorectal surgery at SKIMS, Srinagar. Patients with rectal cancer within 10cm from anal verge who underwent APR and other SSP were included.

Results: A total of 143 patients were included in the study. Overall, APR was done in 29 (20.28), LAR in 101 (70.63%) and local excision in 13 (11.4%) patients. In lesions ≤ 6 cm and ≤ 7.5 cm APR constituted 29.6 % and 26.13 % respectively. There was no significant difference in overall QOL between patients subjected to APR and LAR. However, urinary frequency (p = 0.0001), abdominal pain (p = 0.0001) and embarrassment (p = 0.0001) were more in APR as compared to SSP group.

Conclusion: APR still continues to be a valid surgical option in very low rectal cancers without significantly affecting the quality of life as compared to low anterior resection. However, the rate of Sphincter saving procedures has increased manifold over the past few decades.

Keywords: *Low Rectal Cancer; APR; Sphincter preservation*

Introduction

Management of low rectal tumors is challenging for the surgeon as well as the patient as it involves subjecting the patient to a temporary, permanent or no stoma without compromising oncologic safety. Technically working in the confines of deep pelvis is a daunting task for achieving these results. The decision whether to leave a patient with a permanent stoma or save his sphincter is of utmost importance. Surgery for low rectal cancer has gradually evolved towards more sphincter saving procedures (SSP), mainly as a result of

- Better understanding of cancer biology
- Improved surgical techniques
- Better neo adjuvant therapy and
- Use of surgical staplers.

With the advent of advanced gadgets and better understanding of tumour characteristics, more and more patients are subjected to sphincter saving procedures (SSP) instead of abdominoperineal resection(APR).

The importance of distal resection margin is being overshadowed by circumferential resection margin. The main limit for sphincter preservation is not the longitudinal distance between the tumour and the anal sphincter, but the circumferential distance between the tumour and the skeletal muscles of the pelvic floor. This new concept transforms a 1 cm discussion to a 1 mm one [1].

Low Anterior Resection (LAR) is the most commonly performed SSP in distal rectal tumours, besides other options like various forms of Transanal Excision (TAE) (Transanal minimally invasive surgery, TAMIS, Transanal endoscopic microsurgery, TEMS), intersphincteric resections and other hybrid procedures (Transanal abdominal Transanal, TATA). Most studies have reported an APR to LAR ratio of 1:3 or 1:4, suggesting that LAR may be oncologically superior to APR [2-4].

Depending of the experience of the surgeon and specialization of the hospital, the rate of APR in rectal cancer surgery varies from 8% to 53% [5].

Objectives

Primary outcome measure of our study was to determine the various types of surgical treatment options in practice for distal rectal tumours and to compare the trend of APR and SSP in a high volume centre. Secondary outcome measure was to assess the quality of life (QOL) in patients undergoing SSP in comparison to APR.

Patients and Methods

This was a retrospective study of 3 years (2014-2016), carried out in the Colorectal Division of Department of General and Minimal Access Surgery SKIMS, Srinagar, India, which is a tertiary care institute and a high volume centre for colorectal surgery. Institute approval was sought to collect the data for publication purpose. Data was collected from Operation theatre record register, Medical Record Department (MRD), Pathology Department Archives Store and OPD follow up register. Documented carcinoma rectum < 10 cm from AV, Patients who have underwent APR and Low Anterior Resection as recorded in case sheets were included in the study. Patients undergoing Anterior resections, simultaneous surgical procedures, unresectable tumours at laparotomy and excision done for other benign pathologies were excluded from the study.

We allocated patients to two groups:

- Group A including patients who underwent APR.
- Group B including patients who underwent various types of sphincter saving procedures (SSP) like LAR, TAE and TAMIS.

To assess the QOL, phone numbers were collected from the medical records and out of 143 patients only 126 patients could be contacted. Out of 126, 16 patients had died. 5 patients refused to participate, so 105 (21 APR group and 84 SSP) patients were available for the assessment of QOL score using EORTC QLQ-CR27.

All the data was collected and tabulated in Excel work sheet. Statistical analysis of data was done using Microsoft Excel and SPSS software.

Results

Data of 143 rectal cancer patients was included in the study. More than 50 % of patients were above 50 years of age and almost 25% were younger than 40 years. Mean (± SD) age was 46.1 (± 7.89) years (Table 1).

Age (years)	Frequency	Percentage
< 30	15	10.48
30 - 39	22	15.38
40 - 49	31	21.68
50 - 59	29	20.28
60 - 69	34	23.78
> 70	12	8.4

Table 1: *Age distribution.*

Surgical operations performed included 29 APR's, 101 LAR's and 13 Local Excisions (including 8 TAE and 5 TAMIS) (Figure 1).

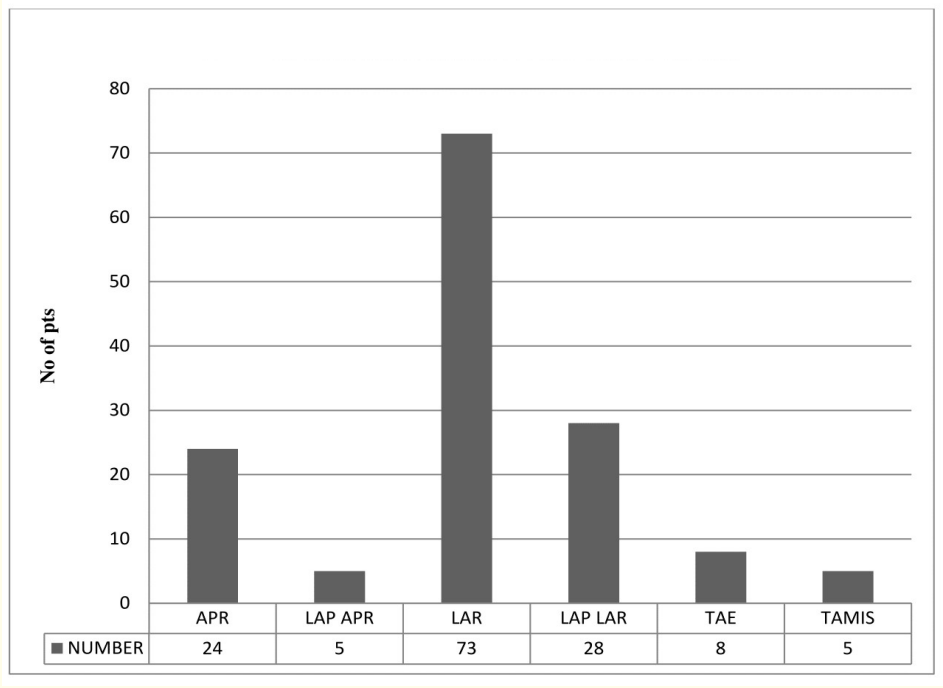

Figure 1: *Surgical Procedure.*

The two groups were comparable in terms of age and gender (Table 2).

Parameter		Group A	Group B	P Value
Mean Age (Years)		52.03	48.51	0.236
Gender	Male	16 (55.2%)	54 (47.37)	0.472
	Female	13 (44.8%)	60 (52.63)	

Table 2: *Age and gender distribution.*

A total of 143 patients were operated for rectal adenocarcinoma. APR was performed in 29 (20.28%), LAR in 101 (70.63%) and LE in 13 (11.4%) patients, hence SSP in 114 (79.72%). Apart from distance from anal verge, 2 patients whose growth was at 4 cm, were subjected to APR in view of poor sphincter control prior to surgery. Remaining patients had satisfactory to good preoperative sphincter tone as assessed by the operating surgeons.

We further did subgroup analysis of patients whose growths were within 6cm and 7.5cm from anal verge. Rate of APR was 29.6% and 26.13% respectively (Table 3).

		Frequency	Percentage
Overall	Group A	29	20.28
	Group B	114	79.72
≤ 6 cm	Group A	29	29.6
	Group B	69	70.4
≤ 7.5 cm	Group A	29	26.13
	Group B	82	73.87

Table 3: *APR vs SSP.*

We compared the staging of patients subjected to APR and sphincter saving procedures (Table 4). Tumour staging was done using MRI pelvis and CECT abdomen, Pelvis and Chest. Majority of patients presented with T3 stage (63.64%) and node positive disease (76.22%). Patients subjected to APR were more locally advanced (44.83% T4) as compared to SSP group. Patients subjected to LE were early stage rectal cancers (T1 84.61%, T2 15.39%). 2 patients with T2 lesion subjected to LE received adjuvant chemoradiotherapy. We also compared the QOL scores between APR and SSP group of patients, using EORTC QLQ-CR29. There were no significant differences in specific functional scores between the two groups (Table 5). In terms of specific symptom scores there was no significant difference in QOL between the two groups apart from better scores in SSP group with respect to urinary frequency, abdominal pain and embarrassment over the APR group (Table 6).

Stage	Overall N = 143 (%)	APR group N = 29 (%)	LAR group N = 101 (%)	LE group N = 13 (%)
T1	11 (7.69)	0 (0)	0 (0)	11 (84.61)
T2	16 (11.19)	0 (0)	14 (13.86)	2 (15.39)
T3	91 (63.64)	16 (55.17)	75 (74.26)	0 (0)
T4	25 (17.48)	13 (44.83)	12 (11.88)	0 (0)
N+	109 (76.22)	23 (79.31)	86 (60.14)	0 (0)

Table 4: *Staging of rectal cancer patients.*

Functional Score	Score APR (Mean ± SD)	Score LAR (Mean ± SD)	P Value
Body Image	84.13 ± 14.95	83.55 ± 13.87	0.8475
Anxiety	85.71 ± 26.34	82.03 ± 30.64	0.5635
Weight	100 ± 0	94.11 ± 17.80	0.082
Sexual Interest (Men)	45.24 ± 24.83	64.40 ± 36.23	0.0710
Sexual Interest (Women)	41.02 ± 19.97	56.55 ± 34.77	0.1134

Table 5: *Comparison of Specific Functional Scores between APR group and LAR group; EORTC QLQ-CR29.*

Symptom Scale	Score APR (Mean ± SD)	Score LAR (Mean ± SD)	P Value
Urinary frequency	43.45 ± 22.38	24.84 ± 21.33	0.0001
Blood and mucus in stools	17.86 ± 15.67	17.81 ± 16.29	0.9885
Stool frequency	29.76 ± 26.59	28.43 ± 24.32	0.8021
Urinary incontinence	26.20 ± 24.61	18.30 ± 22.80	0.1128
Dysuria	16.67 ± 19.25	9.15 ± 18.26	0.0586
Abdominal Pain	32.14 ± 26.42	9.28 ± 22.22	0.0001
Buttock pain	25 ± 28.15	12.10 ± 18.04	0.0039
Bloating	13.10 ± 20.96	17.65 ± 22.35	0.3356
Dry mouth	15.48 ± 19.21	15.69 ± 23.78	0.9658
Hair loss	47.62 ± 30.67	49.02 ± 27.63	0.8170
Taste	16.67 ± 16.97	16.61 ± 22.18	0.9894
Flatulence	32.14 ± 27.94	33.66 ± 28.34	0.8013
Fecal incontinence	26.19 ± 27.75	30.06 ± 25.91	0.4918
Sore skin	28.57 ± 26.79	27.78 ± 24.41	0.8822
Embarrassment	47.62 ± 26.34	23.86 ± 24.54	0.0001
Stoma care problems	30.95 ± 28.59		
Impotence	28.75 ± 25.68	19.70 ± 29.92	0.1552
Dyspareunia	40.48 ± 29.75	31.61 ± 33.29	0.2042

Table 6: *Comparison of the Specific symptom scores between APR group and LAR group (EORTC QLQ-CR29).*

Discussion

The standard approach of curative treatment in rectal cancer is surgery. Early stage cancers may be successfully treated with local excision. However the vast majority of rectal cancers present at advanced stages and need more extensive surgery in the form of LAR or APR. Treatment of distal rectal tumours is challenging in providing a continent anal opening. Sphincter preservation with coloanal anastomosis in LAR has become an established option for low rectal cancers, however most patients with rectal cancer involving anal canal are routinely treated with APR.

Colorectal cancer generally tends to be more common in elderly, but the incidence among younger patients is increasing. Both the incidence and mortality rates of CRC have been decreasing in the United States [6]. The observed decline in incidence is largely attributed to an increase in screening, specifically colonoscopy, which is recommended for all adults 50 years or older [7]. Conversely, the incidence of CRC in adults younger than 50 years, for whom CRC screening is not recommended, appears to be increasing, and these patients are more likely to present with advanced disease [8,9].

Several individual studies from Indian subcontinent consistently document a relatively high proportion of young age rectal cancer, with a mean age of around 40 - 45 yr [10-12]. In our study proportion of patients younger than 40 years was 26.4% and mean age of presentation was 50.27 years.

In a retrospective study of 153 patients of rectal cancer involving lower and middle rectum, Shapour Omidvari., *et al*. reported that out of 138 patients subjected to surgery 96 (70%) underwent LAR and 42 (30%) were subjected to APR [13]. Thus LAR to APR ratio was close to 1:3. In our study the overall incidence of APR as compared to other sphincter saving procedures was 20.28% which is close to 1:5. In 2007 data from Tata Memorial Hospital, Mumbai, one of the largest centres catering to colorectal cancer surgeries in India (2005 data) revealed the rate of APR being 45% as compared to 55% for LAR in low rectal cancers [14]. If we look at some of the largest clinical trials in rectal surgery, the aggregate percentage of patients subjected to APR is 39 % (Table 7) [15].

Trial name	No of pts	APR Rate (%)	NACRT
NSABPR-03	116	67	No
		50	Yes (RT)
Swedish rectal cancer trial	1168	55	Yes (RT)
Norwegian rectal cancer trial	2136	38	-
Dutch colorectal cancer trial	1805	32	-
Aggregate	4849	39	-

Table 7: *Landmark rectal cancer surgery trials.*

In tumours located ≤ 6 cm, 29.6% of patients underwent APR as compared to 70.4% who were subjected to various SSPs. At Cleveland Clinic (1995 to 2009) out of 153 low rectal cancer (< 5cm) patients, Sixty eight (44%) underwent APR and 85 (56%) patients underwent LAR. Five of the 85 LAR operations were inter sphincteric resections (< 5 cm) [16].

Jonas Geohl., *et al.* from a cancer centre in Germany reported their data from1985 to 2007 (Table 8), wherein they performed surgeries on 725 low rectal cancers within 7.5cm from anal verge. SSP were performed in 379 (52.3%) patients including LAR in 275 and inter sphincteric resection in 104 patients. APR was done on 346 (47.7%) patients [17]. In our series 26.13% patients who had their tumours within 7.5% were subjected to APR.

	1985 - 2007	1985 - 1994	P Value	1995 - 2001	P Value	2002 - 2007
N	725	303		205		217
Sex			0.035		0.561	
Male	487 (67.2%)	190 (62.7%)		147 (71.7%)		150 (69.1%)
Female	238 (32.8%)	113 (37.3%)		58 (28.3%)		67 (30.9%)
Age (Years)			0.499		0.660	
Median (Range)	62 (21-92)	61 (21 - 85)		61 (27-92)		62 (22 - 87)
Procedure			< 0.001		< 0.001	
LAR	275 (37.9)	100 (33%)		58 (28.3%)		117 (53.9%)
ISR	104 (14.3)	10 (3.3%)		55 (26.8%)		39 (18.0%)
APR	346 (47.7)	19 (63.7%)		92 (44.9%)		61 (28.1%)

Table 8: *German cancer centre data.*

One of the reasons for a low rate of APR in our study is the volume of rectal surgeries we perform at our centre. On an average we perform 80 - 100 rectal cancer surgeries and along with colon almost 250 - 300 colorectal cancer surgeries every year. In this study we have included only low and middle rectal cancers over a period of 3 years and the number is 143 for 3 years. A high volume centre has been defined as a centre where > 24 (17 - 35) rectal cancer surgeries or > 126 (85 - 167) colon surgeries are performed per year [18]. In a meta-analysis by Talya Salz., *et al*. [19], they reported that many studies that measured hospital volume and surgery type, found a positive association between higher hospital volume and higher rate of sphincter-sparing procedures. The significant odds ratios were 0.44, 0.55, and 0.73. Significant differences between APR rates for high and low volume hospitals were reported as 26.4% vs. 29.8% for high and low volume, respectively, in one study, and 47% vs. 49% for high and low volume hospitals, respectively, in another study [20,21].

Although the overall QOL among all our patients was good, few significant differences were observed between the groups. This study showed that the QOL was almost similar in patients with SSP and APR, except for urinary frequency, abdominal pain and embarrassment among which statistically significant differences were observed. In a meta-analysis, Cornish., *et al*. found no difference in general QOL between APR or LAr, although few differences were detected in specific areas [22]. In view of the LAR syndrome few studies even report worser QOL outcomes in LAR patients than in patients subjected to APR [23,24].

Conclusion

Low rectal cancer continues to be a challenge for the surgeon in maintaining balance between oncological clearance and sphincter preservation. Most of such patients can be offered continent sphincters as a result of improvement in knowledge and skills besides innovations in technology. The case volume of the centre plays a pivotal role in performing sphincter preserving operations. APR still continues to be a valid surgical option in very low rectal cancers without significantly affecting the quality of life as compared to low anterior resection.

Conflict of Interest

There are no potential conflict of interest among the author.

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