

Table (1): Demographic and preoperative data of the studied groups.

<u>Demographic data</u>	Group A (N=37)		Group B (N=37)		X2	P
	No.	%	No.	%		
<u>Gender</u>						
Male	21	56.7%	17	45.9%		
Female	16	43.3%	20	54.1%	0.36	0.85
<u>Age (years)</u>	62.58±12.3		61.03±13.98		0.38	0.812
<50	8	21.6%	11	29.7%		
50-70	23	62.1%	21	56.7%	0.65	0.72
>70	6	16.2%	5	13.6%		
<u>BMI in kg/m2 mean ±SD</u>	30.53±3.33		29.03±3.12		1.874	0.061
<u>ASA status</u>						
I	7	18.9%	2	5.4%		
II	4	10.8%	7	18.9%	6.56	0.08
III	22	59.5%	18	48.6%		
IV	4	10.8%	10	27%		
<u>Site of tumour(cm) from anal verge measured by colonoscope</u>						
Sigmoid ≥15 cm	4	10.8%	4	10.8%		
Upper rectum ≥10-15cm	23	62.2%	28	75.7%	2.15	0.34
Middle-low rectum <10cm	10	27%	5	13.5%		
<u>Tumor stage</u>						
I	1	2.7%	2	5.4%		
II	14	37.8%	10	27%	1.54	0.67
III	18	48.6%	22	59.5%		
IV	4	10.8%	3	8.1%		
<u>Previous abdominal/pelvic surgery</u>						
Yes	12	32.4%	10	27%	0.25	0.61
no	25	67.6%	27	73%		
<u>MRI T</u>						
T1	3	8.1%	2	5.4%	6.52	0.083
T2	4	10.8	3	8.1%		
T3	29	78.4	22	59.5%		
T4	1	2.7%	10	27%		
<u>MRI N</u>						
N0	7	18.9%	3	8.1%	5.19	0.061
N1	11	29.7%	22	59.5%		
N2	19	51.4%	12	32.4%		
Steroid treatment	3	8.1%	1	2.7%	0.26	0.63
Serum albumin(>3.5gm/dl)	37	100%	37	100%	0.0	1.00
Diabetes Mellitus	5	13.5%	7	%18.9	0.39	0.52
Hypertension	8	21.6%	15	40.5%	3.09	0.07
Coronary artery diseases	1	2.7%	2	5.4 %	0.34	0.55

Table (2): Intraoperative variables in studied groups.

	Group A	Group B	t/ X2	P
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	(N=37)		(N=37)			
	No.	%	No.	%		
Surgical procedure						
sigmoid colectomy(high anterior resection)	4	10.8%	4	10.8%		
Low anterior resection(upper 2/3 rectum cancer)	23	62.2%	28	75.7%	2.15	0.34
Ultralow anterior resection(lower 1/3 cancer rectum)	10	27%	5	13.5%		
Mobilization of the splenic flexure						
Yes (partial,total)	30	81.1%	34	91.9%	1.85	0.17
no	7	18.9%	3	8.1%		
IMV dissection						
Yes	32(86.5%)		28(75.7%)		1.41	0.23
No	5(13.5%)		9(24.3%)			
Blood loss(ml)						
<500 ml	33	89.2%	35	94.6%	0.72	0.39
>500ml	4	10.8%	2	5.4%		
Size of stapler (mm)						
34	2	5.4%	5	13.5%	1.78	0.77
33	23	62.2	20	54.1		
31	5	13.5%	5	13.5%		
29	3	8.1%	4	10.8%		
28	4	10.8%	3	8.1%		
Operative time in minutes (mean±SD)	150±13		184±10		4.89	0.00**
mean Anastomotic time(min)	13±1.2		23.5±13.7		8.62	0.00**
Intraoperative anastomotic line bleeding	1(2.7%)		2(5.4%)		0.34	0.55
Intraoperative anastomotic leakage	2(5.4%)		3(8.1%)		0.21	0.64
Dealing with anastomotic leak						
Re-anastomosis	1(2.7%)		2(5.4%)		0.13	0.71
suturing	1(2.7%)		1(2.7%)			
Urinary bladder/ureteric injury						
Absent	36	97.3%	35	94.6%	0.44	0.55
Present	1	2.7%	2	5.4%		
Intestinal injury						
Absent	35	94.6%	36	97.3%		
Present	2	5.4%	1	2.7%	0.44	0.55
Splenic injury						
Absent	36	97.3%	35	94.6		
present	1	2.7%	2	5.4%	0.44	0.55
Dealing with splenic injury						
Preservation	1	2.7%	1	2.7%	0.44	0.55
splenectomy	0	0%	1	2.7%		

* Significant

Table (3): Postoperative parameters and complications.

	Group A (N=37)		Group B (N=37)		t/ X2	P
	No.	%	No.	%		
Hospital stay(days)						
7 days	34	91.9%	31	83.8%	1.13	0.23
≥7 days	3	8.1%	6	16.2%		
Time of analgesic intake(days)						
<3 days	16	43.2%	9	24.3%	2.96	0.08
>3 days	21	56.8%	28	75.7%		
Seroma/Hematoma						
Absent	36	97.3%	35	54.6%	0.34	0.55
Present	1	2.7%	2	5.4%		
Wound infection (surgical site infection)						
Absent	35	94.6%	33	89.2%	0.72	0.39
Present	2	5.4%	4	10.8%		
ileus	1	2.7%	2	5.4%	0.34	0.55
Anastomotic leak						
Yes	5	13.5%	3	8.1%	0.50	0.47
no	32	86.5%	34	91.9%		
Grade of anastomotic leak						
B	1	2.7%	2	5.4%	1.74	0.18
C	4	10.8	1	2.7%		
Median time of diagnosis of anastomotic leak(days)	6.3±1.9		5.1±1.2			
Postoperative bleeding from anastomotic line						
Yes	2	5.4%	1	2.7%	0.34	0.55
no	35	94.6%	36	97.3%		
Stricture of anastomotic line	1	2.7%	3	8.1%	1.05	0.3
Intra-abdominal abscess	5	13.5%	3	8.1%	0.56	0.45
Adhesive Intestinal obstruction	1	2.7%	2	5.4%	0.34	0.55
impotence	0	0%	1	2.7%	0.87	0.39
Recto-vaginal fistula	0	0%	1	2.7%	0.87	0.39
Surgical re-intervention						
Yes	6	16.2%	6	16.2%	0.0	1.0
no	31	83.8%	31	83.8%		
Clavien-Dindo classification.						
Grade I	3 (8.1%)		6 (16.2%)		1.13	0.28
Grade II	5 (13.5%)		4 (10.8%)		0.12	0.72
Grade III	9 (24.3%)		13 (35.1%)		1.03	0.32
Grade IV	2 (5.4%)		3 (8.1%)		0.21	0.64
Grade V	1 (2.7%)		2 (5.4%)		0.34	0.55
Overall postoperative complications	18/37	48.6%	22/37	59.4%	0.87	0.35

Table (4): Univariate analysis of anastomotic leak.

	Anastomotic leakage (n=8)	No Anastomotic leakage (n=66)	p-value
Age(median)	53±13	61±24	0.29

Gender				
Male	6	75.0%	25	37.8%
Female	2	25.0%	41	62.2%
ASA score				
I	3	37.5%	41	62.2%
II	2	25.0%	12	18.2%
III	2	25.0%	7	10.6%
IV	1	12.5%	6	9.0%
BMI in kg/m2 mean $\pm$ SD	32.53 $\pm$ 2.38		29.4 $\pm$ 1.2	
Diagnosis				
Cancer sigmoid	2	25.0%	6	9.0%
Cancer rectum	6	75.0%	60	91.0%
Clavien-Dindo classification				
I				
II	1	12.5%	22	33.3%
III	1	12.5%	19	28.7%
IV	5	62.5%	15	22.7%
	1	12.5%	10	16.3%
Surgical approach				
Antegrade	3	37.5%	34	51.5%
retrograde	5	62.5%	32	48.5%
Surgical procedures				
Sigmoid colectomy	2	25.0%	6	9.0%
Rectal resection	6	75.0%	60	91.0%
Perioperative blood loss				
<500	1	12.5%	47	71.2%
>500	7	87.5%	19	28.8%
Days in hospital, mean				
<7days	2	25.0%	51	77.2%
$\geq$ 7 days	6	75.0%	15	22.8%
90-day mortality(n)	3	37.5%	0	0.0%
Reoperation				
Yes	4	50.0%	9	13.6%
no	4	50.0%	57	86.4%
Wound infection				
Yes	6	75.0%	1	1.5%
no	2	25.0%	65	98.5%
Bleeding from anastomosis				
Yes	2	25.0%	1	1.5%
no	6	75.0%	65	98.5%

* Significant

**strongly Significant

Table (5): Multivariate analysis of anastomotic leak.

	P	OR	CI (95.0%)
Perioperative blood loss	0.089	1.985	(0.89-4.25)
Length of stay;	0.123	2.11	(0.95-3.58)
Reoperation	0.074	3.25	(0.94-6.28)
Inpatient death	0.069	2.08	(0.59-17.56)

Infection	0.01*	4.62	(1.54-7.96)
Bleeding	0.39	3.14	(0.69-11.36)

Table (6): Clinical LARS score results comparing Side-to-end and End-to-end anastomosis.

	1 Month	6 Months	24 Months	P value
Range of Bowel Frequency(per day)				
Side to end				
>7 times a day	2(5.4%)	0	0	0.12
4–7 times a day	10 (27%)	6(16.2%)	2 (5.7%)	
1–3 times a day	22(59.5%)	25 (69.4%)	27 (73%)	
<once a day	3(8.1%)	5(13.5%)	7 (18.9%)	
end-to-end				
>7 times a day	3(8.1%)	2(5.4%)	2(5.4%)	0.04*
4–7 times a day	16(43.2)	6 (17.1%)	5(13.5%)	
1–3 times a day	15(40.6%)	24 (68.5%)	23 (65.7%)	
<once a day	3(8.1%)	3(8.1%)	5 (13.5%)	
P	0.413	0.374	0.423	
Urgency of defecation				
Side to end				
Never	6(16.2%)	7(18.9%)	8(21.6%)	0.29
<once a week	19(51.4%)	23(62.2%)	22 (61.1%)	
>once a week	12(32.4%)	6 (16.7%)	6(16.2%)	
End to end				
Never	2(5.4%)	1 (2.7%)	1(2.7%)	0.56
<once a week	21(56.8%)	23 (65.7%)	24 (68.5%)	
>once a week	14(37.8%)	11 (31.4%)	10(27%)	
P	0.312	0.241	0.198	
Incontinence for Flatus				
Side to end				
Never	7(18.9%)	17 (47.2%)	29 (80.5%)	0.00**
<once/week	21(56.8%)	15(40.6%)	4(10.8%)	
≥once/week	9(24.3%)	4(10.8%)	3(8.1%)	
end-to-end				
Never	10(27%)	12(32.4%)	12 (34.2%)	0.12
<once/week	9(24.3%)	13 (37.1%)	14(37.8%)	
≥once/week	18(48.7%)	10 (27.0%)	9(24.4%)	
P	0.015*	0.16	0.0004**	
Incontinence for liquid stools				
Side to end				
Never	9(24.3%)	19 (52.7%)	30 (83.3%)	0.00**
<once/week	21(56.8%)	15(40.6%)	5(13.5%)	
≥once/week	7(18.9%)	2(5.4%)	1(2.7%)	

end-to-end Never <once/week ≥once/week	5(13.5%) 20(54.1%) 12(32.4%)	18(48.7%) 12 (32.4%) 5(13.5%)	27 (77.1%) 2(5.4%) 6(16.2%)	0.00**
P	0.208	0.336	0.318	
Clustering of stool				
Side to end Never <once a week >once a week	6(16.2%) 17(46%) 14(37.8%)	12 (32.4%) 16(43.2%) 8(21.6%)	25(67.6%) 5 (13.5%) 6(16.2%)	0.00**
End to end Never <once a week >once a week	3(8.1%) 9(24.3%) 25(67.6%)	7(18.9%) 11 (31.4%) 17(46%)	10(27%) 10 (27.0%) 15(40.6%)	0.043*
P	0.037*	0.061	0.002*	

* Significant

**strongly Significant

LARS: low anterior resection syndrome.

Table (7): percentage of satisfied QoL scores and at different time-points

	Group (A)			P	Group (B)			P
	Baseline (n)	6 month	Last follow (24 month)		baseline	6 month	Last follow (24 month)	
PWB	100.0%	78.3%*	100.0%	0.001**	97.2%	83.7%*	97.2%	0.041*
FWB	97.2%	83.7%*	97.2%	0.042*	100.0%	86.4%*	100.0%	0.048*
SWB	100.0%	86.4%	97.2%	0.098	100.0%	86.4%	89.1%	0.189
EWB	100.0%	97.2%	100.0%	0.988	97.2%	94.5%	97.2%	0.989
CCS	97.2%	81.1%*	97.2%	0.035*	97.2%	83.7%	89.1%	0.199

* Significant

QoL: quality of life.

PWB physical well-being, FWB functional well-being, SWB social well-being,

EWB emotional well-being, CCS colorectal cancer symptoms positive