Table 1: Patient and tumor characteristics

Factor ▪ Category	TaTME registry data results Total: 1594 cases
Gender, n (%)	
▪ Male	1080 (67.8)
▪ Female	514 (32.2)
Age in years, mean ± SD (range)	63.7 ± 12.4 (19 – 93)
ASA score, n (%)	
I + II	1271 (80.7)
III + IV	303 (19.3)
Missing	*20 (1.3)*
BMI in kg/m^2, mean ± SD (range)	26.3 ± 4.4 (15.6 – 44.2)
Smoking, n (%)	
▪ Smoker	230 (14.4)
▪ Non-smoker	1364 (85.6)
Presence of co-morbidities, n (%)	
▪ Diabetes mellitus	178 (11.2)
▪ Ischemic Heart Disease	222 (13.9)
▪ Active Inflammatory bowel disease	30 (1.9)
▪ Steroid use at time of surgery	16 (1.0)
Previous unrelated abdominal surgery, n (%)	275 (17.3)
Clinical tumor height from anal verge on rigid sigmoidoscopy in cm, median (range)	6.0 (0–17)
Tumor height from anorectal junction on MRI in cm, median (range)	4.0 (0–14)
Pre-operative MRI staging, n (%)	
▪ ≥mrT3	930 (69.0)
▪ mrN+	764 (57.3)
Pre-operative CRM involvement on MRI*, n (%)	274 (23.4)
Received neoadjuvant therapy, n (%)	895 (56.1)
TRG response post neoadjuvant therapy, n (%)	
▪ mrTRG 1 & 2 (No or small residual tumor)	446 (52.0)
▪ mrTRG 3 (Mixed fibrosis and tumor)	220 (25.6)
▪ mrTRG 4 & 5 (Mainly or only tumor)	192 (22.4)

SD: standard deviation. ASA: American Society of Anesthesiologists. BMI: Body Mass Index. MRI: Magnetic Resonance Imaging. CRM: Circumferential Resection Margin. N+: Positive nodal status (N1 or N2). TRG: Tumor regression grading on MRI.

*CRM involvement on MRI is defined as involved if the distance of tumor or malignant lymph node to the mesorectal fascia was less than 1 mm on MRI. Percentages for *Missing* values use the total number of cancer cases as the denominator (i.e. 1594). Percentages for the variables are calculated out of the total number of actual results available excluding the missing values.

Table 2: Operative details.

OPERATIVE CHARACTERISTICS Factor ▪ Category	TaTME registry data results Total = 1594 cases n (%)
Indication	
▪ Benign	54 (3.4)
▪ Cancer	1540 (96.6)
Operations performed	
Cancer cases:	
▪ High anterior resection	122 (7.9)
▪ Low anterior resection	1411 (91.6)
▪ Total & subtotal colectomies	7 (0.5)
Benign cases:	
▪ Low anterior resection	9 (16.6)
▪ Proctectomy (close rectal) + IPAA	6 (11.1)
▪ Proctectomy (TME plane) + IPAA	37 (68.5)
▪ Completion proctectomy	1 (1.9)
▪ Total colectomy	1 (1.9)
Synchronous 2 team operating	665 (41.7)
Transanal initial dissection:	
▪ Mucosectomy	83 (5.8)
▪ Total intersphincteric	78 (5.5)
▪ Partial intersphincteric	208 (14.7)
▪ Pursestring	1027 (72.5)
▪ Other*	21 (1.5)
▪ *Missing*	*177 (11.1)*
Conversion	
▪ Abdominal	69 (4.3)
▪ Perineal	21 (1.3)
▪ Both abdominal and perineal	12 (0.8)
Stoma	
▪ No defunctioning stoma	177 (11.7)
▪ Ileostomy	1282 (85.0)
▪ Colostomy	50 (3.3)
▪ *Missing*	*85 (5.3)*
Anastomotic technique	
▪ Manual	512 (34.0)
▪ Stapled	996 (66.0)
▪ *Missing*	*86 (5.4)*

STAPLED ANASTOMOSES

Stapled configuration

- End-to-end
- Side-to-end
- Colonic J pouch
- Ileal pouch-anal anastomosis
- *Missing*

485 (49.6)
433 (44.3)
24 (2.5)
36 (3.6)
18 (1.8)

MANUAL ANASTOMOSES

Manual configuration

- End-to-end
- Side-to-end
- Colo-anal J pouch
- Ileal pouch-anal anastomosis

334 (65.2)
136 (26.6)
30 (5.9)
12 (2.3)

Height of anastomosis from anal verge in cm, median (range)

- Manual
- Stapled

2.0 (0-9.0)
4.0 (0-11.0)

Operative time, mean ± SD (range)

- Total operative time, hours:minutes
- Perineal phase time, hours:minutes

$4:12 \pm 1:42$ (0:30 – 12:13)
$2:03 \pm 1:03$ (0:14 – 7:47)

Intraoperative adverse events

- Technical problems during transanal phase
- Incorrect dissection plane
- Pelvic bleeding >100mls
- Visceral injuries during transanal phase, total
  - Urethral injury
  - Rectal tube perforation
  - Vaginal perforation
  - Hypogastric nerve divisions
  - Bladder perforation

330 (18.0)
91 (5.7)
67 (4.2)
28 (1.8)
12 (0.8)
7 (0.4)
5 (0.3)
2 (0.1)
2 (0.1)

APE: Abdomino-perineal excision. IPAA: Ileal Pouch-Anal Anastomosis. TME: Total mesorectal excision. SILS: Single incision laparoscopic surgery. SD: Standard Deviation
*Other transanal phase surgical approaches include extra-levator dissection and abdomino-perineal excision.
Percentages for *Missing* values use the total number of cases as the denominator (i.e. 1594). Percentages for the variables are calculated out of the total number of actual results available excluding the missing values.

Table 3: Anastomosis-related morbidity

POST-OPERATIVE COMPLICATIONS Factor ▪ Category	TaTME registry data results Total: 1594 cases n (%)
Anastomotic leak:	
▪ Early*	124 (7.8)
▪ Delayed^	32 (2.0)
Pelvic abscess	75 (4.7)
Anastomotic fistula	12 (0.8)
Anastomotic sinus	15 (0.9)
Anastomotic stricture	58 (3.6)
ANASTOMOTIC FAILURE§	
Number of events diagnosed	316
Number of patients affected	250 (15.7)
Management of anastomotic failure:	
Early anastomotic leak score	
A – Conservative management	23 (20.7)
B – Re-intervention without laparotomy	68 (61.3)
C – Laparotomy required	20 (18.0)
Missing	*13 (10.5)*
Total number of patients requiring re-interventions due to anastomotic failure / total number of patients undergoing a re-intervention at any time point	135 /311 (43.4)
Total number of re-interventions for anastomotic failure at any time point	141
Type of re-interventions for anastomotic failure	
Surgical	108 /141 (76.6)
Radiological	27 (19.1)
Endoscopic	6 (4.3)

*Early anastomotic leaks were diagnosed within 30-days of the primary colorectal resection.

^Delayed anastomotic leaks were diagnosed after 30-days of the primary colorectal resection.

§Anastomotic failure is defined as the defined as the overall incidence of anastomotic-related morbidity, including early and late AL, pelvic abscess, anastomotic-related fistula, chronic sinus and persistent anastomotic stricture following primary rectal resection.

Table 4: Univariate and multivariate analyses of patient-related and technical risk factors for early anastomotic leak.

Factor ▪ Category	Event Rate %	UNIVARIATE ANALYSIS			MULTIVARIATE ANALYSIS		
		Adjusted Odds ratio	95% Confidence Interval	P value	Adjusted Odds ratio	95% Confidence Interval	P value
PATIENT–RELATED FACTORS							
▪ Gender	Female 4.1	1			1		
	Male 9.5	2.475	1.529–4.006	<0.001	2.173	1.331 – 3.548	0.002
▪ BMI	<30kg/m^2 6.9	1			1		
	≥30 kg/m^2 12.4	1.901	1.238–2.918	0.003	1.589	1.012 – 2.494	0.044
▪ Smoker	Non-smoker 7.0	1			1		
	Smoker 12.2	1.831	1.172–2.861	0.007	1.576	0.991 – 2.506	0.055
▪ Diabetic	Non-diabetic 6.5	1			1		
	Diabetic 18.0	3.154	2.037–4.883	<0.001	2.700	1.702 – 4.282	<0.001
▪ Tumor height on MRI from ARJ	≤4cm 6.9	1			1		
	>4cm 9.8	1.466	1.010–2.127	0.043	0.607	0.401 – 0.920	0.019
▪ Tumor size	≤25mm 5.5	1			1		
	>25mm 10.4	1.997	1.291–3.088	0.002	1.883	1.212 – 2.926	0.005
▪ ASA	I-II 6.8	1					
	III-IV 12.2	1.917	1.275–2.881	0.002			
▪ Neoadjuvant therapy	No 9.2	1					
	Yes 6.7	0.713	0.494–1.029	0.070			

TECHNICAL FACTORS

Factor	Category	OR	95% CI	p	OR	95% CI	p
Perineal dissection	Open dissection^ 4.9	1					
	Endoscopic PS* 8.9	1.896	1.127–3.190	0.014			
Anastomotic height from AV	≤3cm 6.1	1					
	>3cm 10.4	1.779	1.194–2.651	0.004			
Pelvic bleeding	Negligible 7.5	1					
	Noticeable[β] 13.4	1.905	0.920–3.943	0.078			
Estimated blood loss	<500mls 6.8	1			1		
	≥500mls 25.0	4.551	1.971–10.506	<0.001	4.334	1.900–9.888	<0.001
Specimen extraction	Transanal 6.2						
	Abdominal 9.5	1.601	1.073–2.389	0.020			

BMI: Body Mass Index. ASA: American Society of Anesthesiologists. MRI: Magnetic Resonance Imaging. ARJ: Anorectal junction. AV: Anal verge.

^Open dissection includes total and partial intersphincteric and mucosectomy dissections performed open. *PS: Pursestring suture placed endoscopically. [β]Noticeable pelvic bleeding was >100 mls with 9% of cases with pelvic bleeding having >500 mls blood loss.

Table 5: Univariate and multivariate analyses of patient-related and technical risk factors for overall anastomotic failure.

Factor ▪ Category	Event Rate %	UNIVARIATE ANALYSIS			MULTIVARIATE ANALYSIS		
		Adjusted Odds ratio	95% Confidence Interval	P value	Adjusted Odds ratio	95% Confidence Interval	P value
PATIENT–RELATED FACTORS							
▪ Gender	Female 12.1	1			1		
	Male 17.4	1.537	1.129–2.092	0.006	1.419	1.030–1.955	0.032
▪ BMI	<30kg/m^2 14.6	1			1		
	≥30 kg/m^2 22.6	1.698	1.221–2.362	0.002	1.484	1.049–2.102	0.026
▪ Smoker	Non-smoker 14.7	1			1		
	Smoker 21.7	1.617	1.142–2.288	0.006	1.506	1.054–2.153	0.025
▪ Diabetic	Non-diabetic 14.2	1			1		
	Diabetic 27.5	2.296	1.600–3.295	<0.001	1.873	1.282–2.738	<0.001
▪ Tumor size	≤25mm 11.5	1			1		
	>25mm 19.1	1.813	1.313–2.504	<0.001	1.648	1.198–2.268	0.002
▪ ASA	I-II 13.7	1					
	III-IV 23.8	1.965	1.443–2.677	<0.001			
▪ Ischemic heart disease, IHD	No IHD 14.7	1					
	IHD 22.1	1.650	1.162–2.343	0.005			
▪ Neoadjuvant therapy	No 17.5	1					
	Yes 14.3	0.789	0.602–1.034	0.086			
TECHNICAL FACTORS							
▪ Anastomotic technique	Manual 18.9	1			1		
	Stapled 14.7	0.735	0.554–0.975	0.032	0.745	0.559–0.993	0.045

▪ Estimated blood loss	<500mls 13.9	1			1		
	≥500mls 34.4	3.232	1.525–6.848	<0.001	3.020	1.431–6.376	0.004
▪ Perineal operative time	≤1.5hrs 12.1	1			1		
	>1.5hrs 17.9	1.576	1.033–2.404	0.034	1.554	1.031–2.343	0.035
▪ Intraoperative problem	No 14.6	1					
	Yes 18.1	1.287	0.968–1.710	0.082			
▪ Pelvic bleeding	Negligible 15.3	1					
	Noticeable$^\beta$ 23.9	1.734	0.972–3.092	0.059			
▪ Conversion	No 15.2	1					
	Yes 23.3	1.695	1.019–2.817	0.040			

BMI: Body Mass Index. ASA: American Society of Anesthesiologists. $^\beta$Noticeable pelvic bleeding was >100 mls with 9% of cases with pelvic bleeding having >500 mls blood loss.