

Supplementary Table 1: Non-restorative procedures

| Non-restorative cases | TaTME registry data results |
|---------------------------------------------------------------------------------------------|------------------------------------|
| Factor | n (%) |
| ▪ Category | |
| Total number of non-restorative cases | 242 (13.2) |
| Unplanned non-restorative cases | 6 (0.4) |
| Reasons for unplanned cases: | |
| ▪ Anal metastasis identified intraoperatively. | Converted to APER |
| ▪ Frozen section following initial coloanal anastomosis showed R1 resection. | APER |
| ▪ Severe diverticular disease preventing the formation of an anastomosis. | APER |
| ▪ Unable to obtain sufficient visualization to create an anastomosis due to severe obesity. | APER |
| ▪ Inadequate blood supply from the marginal artery following specimen extraction. | Hartmann's procedure |
| ▪ Difficult case with distorted and scarred tissue with intraoperative urethral injury. | Hartmann's procedure |
| Planned non-restorative cases | |
| ▪ APER | 161 (68.2) |
| ▪ Completion proctectomy | 43 (18.2) |
| ▪ Panproctocolectomy | 20 (8.5) |
| ▪ Hartmann's procedure | 9 (3.8) |
| ▪ Total colectomy and end ileostomy | 3 (1.3) |

APER: Abdominoperineal excision.

Supplementary Table 2: Post-operative morbidity: Emergency surgery re-interventions

| POST-OPERATIVE MORBIDITY | TaTME registry data results |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Factor | 1594 cases |
| ▪ Category | |
| Total number of emergency surgical re-interventions within 30-days or index admission, n (%) | 128 (8.0) |
| Ischemic left bowel management: | 10 (7.8) |
| ▪ Hartmann's procedure | Open 3: Laparoscopic 1 |
| ▪ Open total colectomy and end-ileostomy | 1 |
| ▪ Open re-do coloanal anastomosis | 2 |
| ▪ Transanal resection of neo-rectum and Endo-SPONGE® therapy | 1 |
| ▪ Abdomino-perineal excision | 2 |
| Other emergency operations within 30-days: | |
| ▪ Laparotomy for anastomotic leak | |
| ▪ Laparoscopy, drainage and formation of a stoma for anastomotic leak | |
| ▪ Examination under anesthesia ± vacuum therapy, revision of anastomosis for leak | |
| ▪ Iatrogenic jejunal perforation | |
| ▪ Small bowel obstruction secondary to: | |
| ○ Adhesions | |
| ○ Internal herniation | |
| ○ Incisional ventral hernia | |
| ○ Tight fascia around stoma opening | |
| ▪ Pancreatic necrosectomy for infected necrotic pancreas | |
| ▪ Laparotomy with anastomotic take down, hysterectomy and retroperitoneal debridement for necrotizing retroperitoneal fasciitis | |
| ▪ Laparotomy and ureteric repair for ureteric leak | |
| ▪ Stoma revision or closure for: | |
| ○ Ischemic/necrotic stoma | |
| ○ Parastomal hernia | |
| ○ Problematic high stoma output | |
| ▪ Laparoscopic retrieval of an abdominal drain | |
| ▪ Laparoscopic drainage of abdominal and pelvic collections and hematomas | |
| ▪ Lower limb fasciotomies for compartment syndrome | |

Supplementary Table 3: Histopathological data for cancer cases.

| HISTOPATHOLOGICAL DATA | TaTME registry data results |
|-----------------------------------------------|------------------------------------|
| Factor | |
| ▪ Category | |
| Total number of cancer cases | 1540 |
| Pathological T stage, n (%) | |
| ▪ ypT0 | 192 (13.3) |
| ▪ T1 | 162 (11.3) |
| ▪ T2 | 460 (31.9) |
| ▪ T3 | 596 (41.4) |
| ▪ T4 | 30 (2.1) |
| ▪ <i>Missing</i> | 100 (6.5) |
| Pathological N stage, n (%) | |
| ▪ N0 | 1008 (69.5) |
| ▪ N1 | 297 (20.5) |
| ▪ N2 | 145 (10.0) |
| ▪ <i>Missing</i> | 90 (5.8) |
| Quality of TME specimen, n (%) | |
| ▪ Intact | 1193 (85.8) |
| ▪ Minor defects | 150 (10.8) |
| ▪ Major defects | 47 (3.4) |
| ▪ Rectal perforation | 39 (2.5) |
| ▪ <i>Missing</i> | 150 (9.7) |
| Number of lymph nodes harvested | |
| ▪ Mean \pm SD | 17.9 \pm 10.1 |
| ▪ Median (range) | 16.0 (0–97) |
| Maximum tumor size in mm | |
| ▪ Mean \pm SD | 27.1 \pm 17.0 |
| ▪ Median (range) | 25.0 (0–100) |
| Distal margin in mm | |
| ▪ Mean \pm SD | 21.1 \pm 16.4 |
| ▪ Median (range) | 16.0 (0–120) |
| ▪ Positive DRM, n (%) | 10 (0.7) |
| ▪ <i>Missing, n (%)</i> | 95 (6.2) |
| Circumferential resection margin in mm | |
| ▪ Mean \pm SD | 12.1 \pm 10.0 |
| ▪ Median (range) | 10.0 (0–90) |
| ▪ Positive CRM, n (%) | 60 (4.1) |
| ▪ <i>Missing, n (%)</i> | 89 (5.8) |
| Composite poor pathological outcome: | |

▪ R1 + poor TME specimen, n(%)

134 (8.7)

TME: Total mesorectal excision. SD: Standard Deviation. DRM: Distal resection margin. CRM: Circumferential resection margin.

Percentages for *Missing* values use the total number of cancer cases as the denominator (i.e. 1540). Percentages for the variables are calculated out of the total number of actual results available excluding the missing values.