

## Clinical Profile and Outcomes of Patients Undergoing a Turnbull-Cutait Transanal Pullthrough Procedure with Delayed Coloanal Anastomosis (DCAA) at the Philippine General Hospital

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**Rationale/Objectives:** The Turnbull-Cutait transanal pullthrough procedure with delayed coloanal anastomosis has been widely used before the advent of intestinal stapling devices. It is a viable option for rectal reconstruction for benign and malignant conditions, and is able to maintain intestinal continuity without the use of a temporary diversion. It has also been used in salvage operations for pelvic sepsis, failed anastomosis, and tumor recurrence that will otherwise require a permanent ileostomy. This study will describe the technique, as well as the outcomes of patients who underwent the procedure.

**Methods:** This is a retrospective descriptive study conducted to report the outcomes of patients who underwent the Turnbull-Cutait transanal pull-through with delayed coloanal anastomosis at the Philippine General Hospital from January 2008 to December 2013. Eleven patients were identified using an institutional retrospective database. Clinical data and outcomes were collected using a standard form.

**Results:** Ten of the 11 patients had an unremarkable postoperative course. One patient had an anastomotic dehiscence. The mean operative time was 229.9 minutes for the 1st stage and 28.2 minutes for the second stage, with a mean blood loss of 463.6 cc for both stages. The mean interval between the two stages was 7.9 days, with an average postoperative length of stay of 8.27 days. The average follow-up was 4.5 years. Functional outcomes were acceptable (average Wexner score 5.63), except for one patient who had an anastomotic dehiscence. No perioperative mortality was noted.

**Conclusion:** Turnbull-Cutait trans-anal pullthrough procedure with delayed coloanal anastomosis appears to be a safe procedure. The study suggests that it is an alternative strategy in rectal cancer in providing a sphincter-saving surgery, with the establishment of gastrointestinal continuity, and without the need for a proximal diversion. Stoma-less surgery has a notable health economic impact especially in developing countries because it eliminates the costs associated with the use of stoma appliances.

**Keywords:** delayed coloanal anastomosis, rectal cancer, rectal reconstruction, transanal pullthrough, Turnbull-Cutait

Surgical resection has remained the mainstay of curative treatment for carcinoma of the rectum. Sphincter-saving surgical operations are preferred compared to the more physiologically impairing, and socially distressing abdominoperineal resection (APR).<sup>1</sup> A decrease in APR rates has been observed in other countries<sup>2-5</sup> and several centers in the Philippines.<sup>6-7</sup> Most sphincter-saving operations entail the creation of a temporary defunctioning stoma in an attempt to prevent morbid anastomosis-related complications, particularly those who have received neoadjuvant radiation.<sup>8-9</sup> The Turnbull-Cutait transanal pullthrough procedure with delayed coloanal anastomosis (DCAA), without proximal diversion has been shown to be a viable option in preventing complications associated with primary coloanal anastomosis and stoma-related issues. The DCAA technique was also seen to be beneficial for patients who underwent preoperative pelvic surgery and patients with pelvic sepsis where a coloanal anastomosis can be performed without having a protecting stoma.<sup>10-16</sup>

Sphincter-saving surgeries entail a two-staged procedure. The first stage being resection with construction of the neorectum and proximal diversion; the second stage involves reversal of the diverting stoma. A stoma carries inherent complications, concerns, and costs, however. Therefore, having an option of doing a procedure with decreased rate of dehiscence that can forego the use of a diverting stoma shows promise.

This study aimed to describe the technique of the Turnbull-Cutait trans-anal pullthrough with DCAA and report operative (operative time, blood loss, interval between stages, length of stay), perioperative (30-day

morbidity and mortality), and functional (incontinence) outcomes of patients who underwent the procedure.

## Methods

A retrospective descriptive study was undertaken to report the technical and clinical results of Turnbull-Cutait trans-anal pull-through with DCAA at the Philippine General Hospital (PGH) from January 2008 to December 2013. Approval of the study protocol by the UP Manila Technical Research Ethics Board (UPMREB) and the PGH Expanded Research Office (EHRO) was obtained. Patients were identified through a search on the Integrated Surgical Information System (ISIS), the electronic database of the Department of Surgery. Eleven patients were selected. The patients' hospital records were retrieved. A Data Collection Form was filled out.

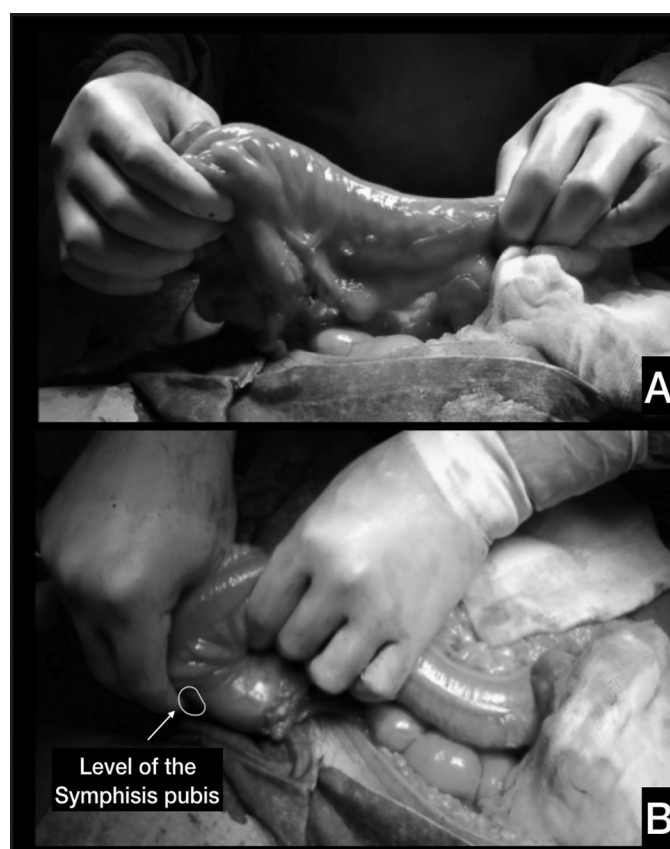
The surgical procedure was performed by one of the authors (ML), or by a Colorectal Surgery trainee under his direct supervision. The operation was done in two stages: the rectal resection with exteriorization of the proximal colon, followed by DCAA seven to 10 days later. The details of the procedure are illustrated below.

For the first stage, the patient was placed in a dorsal lithotomy position under general anesthesia and resection was done through an abdominal approach. The left colon was mobilized. A complete splenic flexure takedown was mandatory. The inferior mesenteric vessels were ligated at their roots (high tie); and the rectum was dissected down to the pelvic floor following the concepts of total mesorectal excision (TME). High ligation of the inferior mesenteric vessels, with splenic flexure takedown, ensured that an appropriate amount of bowel length is provided (Figure 1A & B). This was then followed by a perineal transanal approach, with either a mucosectomy, or an intersphincteric resection. The external anal sphincters were always preserved. The proximal colon was then brought down through the anus without tension, with a segment of about 6 to 8 centimeters of descending colon exteriorized (Figure 2). The stump was then secured to the perianal skin with braided absorbable 3-0 interrupted sutures (Figure 3) and wrapped in saline-soaked gauze. The viability of the colon was visually assessed during daily dressing changes. The anastomosis was scheduled

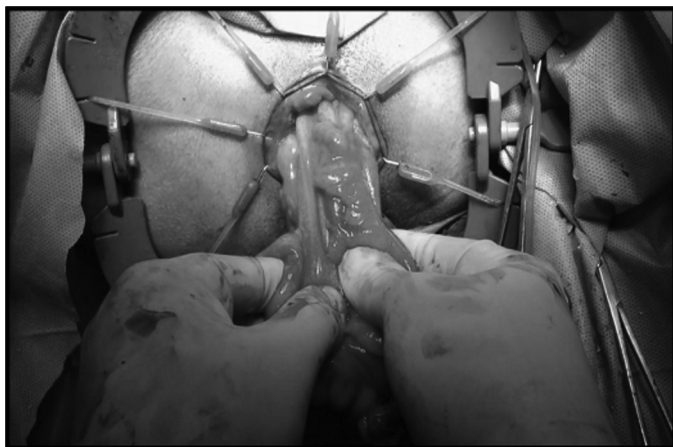
seven to 10 days later. In the interim, the patients were expected to be fully ambulatory and allowed a general liquid diet.

During the second stage of the procedure, the colonic stump was assessed for viability and resected. No dissection was done between the colonic serosa and anal canal in order to preserve the adhesions that have formed between them. A handsewn coloanal anastomosis using absorbable multifilament 3-0 interrupted sutures was performed (Figure 4). Gentle flushing of the anastomotic site was then done daily.

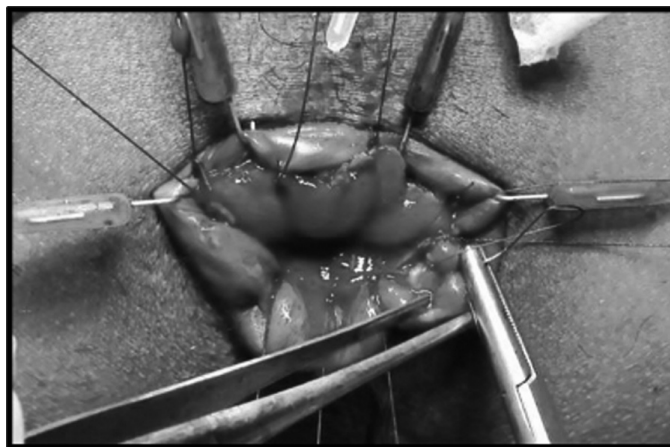
The patients' demographic data were obtained using a standardized form. Operative data including operative time, intraoperative blood loss, interval between the first



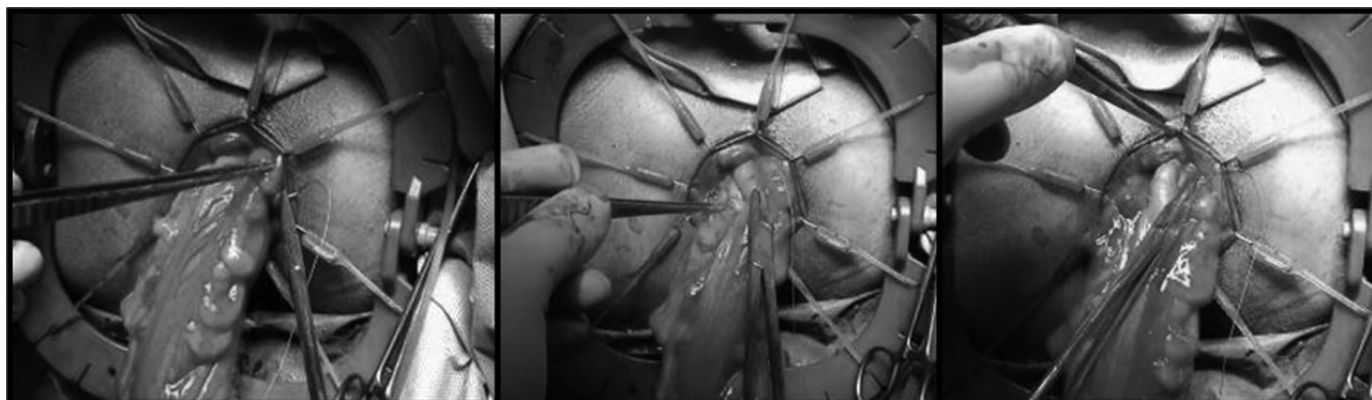
**Figure 1.** Mobilization of the left colon. A) An appropriate bowel length is achieved after high ligation of the inferior mesenteric vessels and splenic flexure takedown. Note that the mobilised colon can be lifted well above the abdominal cavity. B) Sufficient bowel length has been mobilized when the proximal point of resection can be brought past the level of the symphysis pubis (arrow).



**Figure 2.** The proximal colon is brought down through the anus without tension, and with sufficient vascular supply. An additional 6cm to 8cm of the bowel is brought beyond the anal verge.



**Figure 4.** After seven to 10 days, the patient is brought back to the operating room. The exteriorized colonic segment is transected at the level of the anal verge, and a handsewn coloanal anastomosis using braided absorbable 3-0 interrupted sutures is performed.



**Figure 3.** The exteriorized segment of colon is anchored to the perianal skin with braided absorbable 3-0 sutures.

and second stage, and length of stay (LOS) was recorded. Perioperative morbidities were recorded. Patient follow-up were made using clinic visits and through phone call to check for their functional outcomes using the Wexner Fecal Incontinence score.

## Results

Eleven patients underwent a Turnbull-Cutait transanal pull-through with DCAA over a five-year period. Ten males and one female underwent the procedure with

a mean age of 51.8 (range 31-72) years for primary treatment of rectal cancer. One patient had hypertension, and one had diabetes. The nutritional status was assessed using body mass index (BMI) and serum albumin. Two (18%) had low BMI, while one (9%) was obese. Six patients (55%) had hypoalbuminemia. A summary of the patient's characteristics is noted in Table 1.

The outcomes (operative data, perioperative complications, and functional outcomes) are summarized in Table 2. The mean operative time for the first stage of the operation was 3.36 (range: 3-6.5) hours, and 28.18 minutes (range: 15-45 minutes) for

the second stage. Mean operative blood loss was 465 mL (range: 200-1100 mL). The average postoperative LOS was 8.27 days (range: 5-19 days). One patient had an anastomotic dehiscence. This was detected on the second day after DCAA. An immediate re-do coloanal anastomosis was performed, and a loop ileostomy was brought out as a means of proximal bowel diversion. Consequently, the patient stayed longer in the hospital (19 days) compared to the the rest of the cohort. No mortality was reported.

All eleven patients were followed up through clinic visits and telephone calls. The mean followup was 4.54 years (range: 3-6 years). Functional outcomes were assessed using the Wexner incontinence score.<sup>25</sup> Majority reported acceptable continence with a mean score of 5.63 (range: 2-12). One patient did report a poor functional outcome (Wexner score: 12). A summary of the patient outcomes is noted in Table 2.

At the time of writing of the manuscript, nine of the 11 patients are well with no documented recurrence. Two had since died—one after developing unresectable liver metastases (28 months), and another with heavy nodal recurrence (30 months). The three-year overall and disease-free survival after the technique is 82 percent.

## Discussion

Hochenegg first described the technique of abdominoperineal transanal pullthrough in 1888.<sup>17</sup> Several other authors had since modified the procedure.<sup>14,18</sup> Turnbull and Cutait published their version of the technique, which they applied to malignant and benign anorectal conditions, as well as abdominal salvage operations.<sup>19-20</sup>

The primary rationale for performing a DCAA is to reduce the risk of anastomotic failure. This is achieved by allowing the colonic segment to form adhesions with the anal canal prior to eventual anastomosis. The adhesions decrease the potential for retraction and anastomotic dehiscence. Another hypothesis to explain the reduced number of leaks associated with DCAA is the negation of anastomotic tension since the pulled-through colonic segment remains free of the sphincter mechanism after the initial surgery. This allows the colonic stump, which is of adequate length, to freely retract until hindered by adhesion formation. The degree of retraction still leaves behind enough colonic length beyond the eventual site of anastomosis leading to it being truly tension-free.<sup>14</sup> Finally, a DCAA allows early detection of necrosis of the colonic stump from a poor vascular supply. Viability

**Table 1.** Clinical characteristics of patients that underwent T-C DCAA. UP-PGH, 2008-2013.

Patient	Age	Comorbid condition	BMI	Albumin (g/L)	Stage (TNM)	Neoadjuvant treatment
1	39 / M	none	25	27	IIIB ( $T_3N_1M_0$ )	SCRT
2	36 / M	none	23	40	IIIA ( $T_2N_2M_0$ )	LCCRT
3	54 / M	none	20	35	IIA ( $T_3N_0M_0$ )	SCRT
4	64 / M	Hypertension	26	38	IIA ( $T_3N_0M_0$ )	LCCRT
5	64 / M	none	23	37	IIIB ( $T_3N_1M_0$ )	LCCRT
6	31 / M	none	26	29	IIA ( $T_3N_0M_0$ )	LCCRT
7	72 / M	none	22	33	IIIB ( $T_3N_1M_0$ )	LCCRT
8	47 / M	none	18	25	IIA ( $T_3N_0M_0$ )	LCCRT
9	41 / M	none	21	20	IIA ( $T_3N_0M_0$ )	SCRT
10	72 / M	none	21	36	IIA ( $T_3N_0M_0$ )	SCRT
11	50 / M	Diabetes	22	34	IIIC ( $T_3N_2M_0$ )	LCCRT

BMI - body mass index

SCRT - short course radiotherapy

LCCRT - long course chemoradiotherapy

**Table 2.** Outcomes of patients who underwent T-C DCAA. UP-PGH, 2008-2013.

Patient	CRM (-/+)	OR time in minutes		Interval between 1st & 2nd stage (days)	total blood loss (in cc)	post-op LOS (days)	Morbidity (30-day)	Mortality (30-day)	Wexner Score
		1st stage	2nd stages						
1	(-)	180	30	8	200	8	none	none	2
2	(-)	180	20	10	350	7	none	none	3
3	(-)	180	25	10	250	6	none	none	3
4	(-)	210	30	5	400	6	none	none	5
5	(-)	210	35	9	250	5	none	none	6
6	(-)	240	20	7	750	9	none	none	3
7	(-)	180	25	7	250	8	none	none	9
8	(-)	390	40	9	1500	19	anastomotic dehiscence	none	12
9	(-)	240	30	7	500	8	none	none	4
10	(-)	240	25	8	250	8	none	none	6
11	(-)	270	30	7	400	8	none	none	9
Mean		229.9	28.2	7.9	463.6	8.27			

\*CRM - circumferential resection margin.

LOS - length of stay

of the distal segment to be anastomosed can be assured if the distal colonic stump is free of necrosis in the 7 to 10 days before the second stage.

Delayed coloanal anastomosis has found utility as an adjunct to the performance of total mesorectal excision in low rectal cancers.<sup>14</sup> The use of DCAA after laparoscopic resections have resulted in comparable outcomes with the open technique.<sup>20</sup> Moreover, in reoperations involving anastomotic stricture, chronic pelvic abscess, rectovaginal fistula, failed Hartmann's reversal, and anastomotic cancer recurrence, it has been shown that DCAA is a valuable option that avoids the need to create a permanent stoma.<sup>22</sup> A recent systematic review has showed that DCAA offered a low rate of anastomotic leak (0-7%), pelvic abscess (0-11.8%), sepsis (6.8-10%), and use of stoma (1-6%), with reasonable fecal continence, as measured by the Wexner Fecal Incontinence score.<sup>23</sup>

The authors report their initial experience with the use of the Turnbull-Cutait (T-C) transanal pullthrough with DCAA in patients with rectal cancer. The outcomes reported, albeit short-term, show that the technique is safe. During the waiting period for the 2nd stage of operation,

patients were advised with minimal ambulation. There was tolerable amount of perianal pain. There were no note of overall negative impact on their QoL. They were placed on general liquids with oral nutritional supplements in order to achieve their daily total caloric requirement. No TPN supplementation was done.

There was one morbidity in the present series in the form of an anastomotic dehiscence. They attributed this to the patient's baseline malnutrition and hypoalbuminemia. The dehiscence was encountered, despite recognition of these risk factors early into the patient's management, and intervention with a nutritional plan. The patient's anastomosis was redone. Expectedly, because of the additional manipulation, and more fibrosis eventually forming around the sphincter complex, this patient had the poorest continence score among the patients in this series. They are, at present, exploring the possibility of collecting data of anal manometry studies of patients who have undergone a coloanal anastomosis—both DCAA and the conventional technique—as a means of providing a more objective measure of sphincter function and continence.

They have since had two mortalities, with both patients succumbing to complications from advanced recurrent disease. None appear to be associated directly with the operative intervention itself.

Although not included in the series, the Turnbull-Cutait transanal pullthrough with DCAA was performed on a patient with a locally-advanced prostatic malignancy that involved the distal rectum, and two patients with rectal neuroendocrine tumor during the time of the study period. This illustrates the utility of the technique in other pelvic malignancies. The technique, of course, has also been described for employment in benign disease, and abdominal salvage surgery.

The Turnbull-Cutait Delayed Coloanal Anastomosis can be performed for patients undergoing salvage operations for pelvic sepsis, failed anastomosis, and tumor recurrence that will otherwise require a permanent ileostomy. This technique can also be used for benign and malignant conditions to establish intestinal continuity without the use of temporary diversion. In this series, majority of the indications were the latter, where patients wished to have their rectal tumor removed while maintaining gastrointestinal continuity without the use of a temporary diversion.<sup>10-16,23</sup> In this study, five patients were very particular in insisting to undergo the TC-DCAA procedure. Of note, these patients were working in sectors of society such as the food business, politics, law enforcement and maritime industry. All of them strongly expressed their desire of a stoma-less surgery.

The study suggests that DCAA can be performed safely and is viable surgical option for the curative treatment of rectal cancer. Furthermore, performing a DCAA results in significant cost savings in terms of stoma appliance purchases. A complete set (i.e. stoma bag and wafer) would cost on the average PhP 355 (US\$ 7.10). If patients were to change their appliance on a weekly basis, the expense would total PhP 18,460.00 (US\$ 369.20) annually. The daily minimum wage in the nation's capital is PhP 454.00 (US\$ 9.08).<sup>24</sup> Our institution, being a tertiary referral center, receives patients belonging to the lower income brackets. Despite being supported by the government, costs associated with

stoma care continue to be an out-of-pocket expense of the patients. Performing a DCAA has the potential of limiting these expenses.

## Conclusion

Turnbull-Cutait trans-anal pullthrough procedure with delayed coloanal anastomosis appears to be a safe procedure. The study suggests that it is an alternative strategy in rectal cancer in providing a sphincter-saving surgery, with the establishment of gastrointestinal continuity, and without the need for a proximal diversion. Stoma-less surgery has a notable health economic impact especially in developing countries because it eliminates the costs associated with the use of stoma appliances. Moreover, an option of a stoma-less surgery is beneficial for certain sectors in the Philippines society especially for persons working in the food business, politicians, and law enforcement.

## Limitations

The descriptive nature and the limited sample size is the major limitation of this study. It did not provide conclusive evidence regarding the efficacy of the technique. Without a comparison group, this study also cannot say the superiority of this technique with the current practice.

## Recommendations

A prospective randomized controlled trial may be undertaken to compare the technique of T-C transanal pullthrough with DCAA with the conventional technique, which is outright coloanal anastomosis with proximal diversion, and eventual stoma reversal. A separate study on patients undergoing the procedure as a means of abdominal salvage may also be undertaken. Understandably, such a study may be hampered by a potential lack of subjects.

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