Int Surg 2015;**100**:436–443
DOI: 10.9738/INTSURG-D-14-00168.1

Temporary Diverting Ileostomy via the Umbilicus: a Small Case Series

C. D. Mushaya, Raaj Chandra, Wendy Sansom, James Keck

Institute of Surgery, Box Hill Hospital, Eastern Health, Melbourne, Australia VIC, Australia

The umbilicus, a natural orifice, which is used as an access port during laparoscopic surgery, can be used as a stoma site with potential superior cosmetic results as one less incision is then required. Our objective was to assess the efficacy and safety of the umbilical stoma in a selected group of patients. This is a prospective case series in hospital patients admitted as emergency or elective. Patients who underwent laparoscopic colorectal surgery with a planned ileostomy at Box Hill Hospital were approached and invited to participate in the study, with the stoma being fashioned on the umbilicus. Outcomes of interest included demographics, the details regarding the original indication for operation, operative and hospital related outcomes, postoperative bowel related complications, and other surgical and medical complications. Outcomes of a total of 10 (5 males) patients who underwent umbilical covering ileostomy during the study period were analyzed. Two patients with ulcerative colitis had the second stage of their operation converting their end stomas to loop stoma. These were counted twice, totaling 12 stomas in 10 patients. Three patients had their umbistomas after receiving neoadjuvant treatment for rectal cancer. The median period patients have had umbistomas is 113 days. Overall morbidity during the initial operation was low, except for 1 patient who had a small bowel injury. There was no mortality. Minor peristomal skin changes were the most common postoperative complication. Three patients had their stomas reversed with excellent cosmesis. Umbistomas appear to be a safe and effective way to fashion covering stomas post laparoscopic surgery and save the patient an added incision with excellent cosmetic results.

Key words: Umbilical stoma – Ileostomy – Laparoscopic bowel surgery

It is clear that patients do not acquire stomas by choice, so it is of utmost importance for the surgeon to lighten the weight by giving the patient the best possible stoma. We believe in selected patients, an umbilical stoma can be such a stoma, even though it challenges the orthodox surgical thinking of where a stoma should be sited.

The first recorded umbilical stoma is that of Margaret White as reported by William Cheselden[1] of London in 1750. The conventional ileostomy site

Corresponding author: Chrispen Mushaya, Institute of Surgery, The Townsville Hospital, Townsville, QLD 4811, Australia.
Tel.: +61 747 961 721; Fax: +61 747 961 767; Email: cdmushaya@yahoo.co.uk

Fig. 1 Fewer problems with leakage if the spout was at least 2 cm.

often leaves an extra and often unattractive scar. The other down sides to a right iliac fossa stoma is the formation of a peristomal hernia. Closure can be difficult and siting is generally required. The umbilicus was initially suggested by Turnbull[2] in the open era as a colostomy site. However, with the advent of laparoscopic colorectal surgery, the umbilicus seems an even more attractive stoma site since it is used as an access port.

To our knowledge, this is the only study on umbilical derivative stomas post laparoscopic bowel surgery in the Western world. The aim of our pilot study is to assess the efficacy and safety of this technique in a selected group of patients, document complications, clinical outcomes, and patient satisfaction as well as cosmetic end results.

Materials and Methods

A prospective documentation of patients undergoing umbilical stomas (umbistomas) at a single institution (Box Hill Hospital) between July 2013 and March 2014 was conducted after Eastern Health ethics approval. Appropriate demographics including sex, age, BMI, preoperative diagnosis, and comorbidities were obtained. Outcomes, measured by operating time, length of hospital stay, return of bowel function, and complication rates were assessed.

Wounds were monitored during daily rounds and follow-up visits for signs of infection. Patients were seen in follow up at 2 weeks, 6 weeks, then every 3 months until their reversal.

After closure of the umbistoma, return of bowel function was defined as first passage of flatus or bowel movement with tolerance of oral diet.

Technique

Informed consent was initially obtained from the patient with alternative options being discussed as well. The planned operation was carried out in standard fashion. The stomal therapy nurse also marked the otherwise traditional ileostomy site before surgery in case the procedure was converted to open.

In this case series, the loop of ileum destined for the ileostomy was brought out without tension through the umbilical Hasson port site. The skin incision is made vertically just below the umbilicus. It is important to widen the fascial incision to allow "2 fingers" as is done with a traditional ileostomy. The distal limb was identified with a diathermy burn on the bowel. A transverse incision was made involving the antimesenteric two-thirds of the ileum and a 2-cm spout constructed by everting the afferent limb. We found there were fewer problems with leakage if the spout was at least 2 cm (Fig. 1). This is because the umbilicus is often the deepest part of the abdominal wall, a well spouted stoma allowed for better appliance application.

A contrast enema was performed before closure of the stoma. Closures were performed through a circumstomal approach with full mobilization of the stoma. The loop of ileum was freed by sharp dissection to separate the bowel from fascia and peritoneum followed by anastomosis. The method of anastomosis was stapled functional end to end. The abdominal wall was closed with interrupted nonabsorbable sutures and the skin wound leading to the umbilicus was closed vertically with subcuticular monocryl and the umbilicus left to drain.

Results

From July 2013 to March 2014, a total of 10 (5 males) patients underwent umbistomas and 3 were closed. Median age was 53 with a median BMI of 26. Patient characteristics are summarized in (Table 1).

All the patients had a planned ileostomy for fecal diversion. A total of 4 patients had their umbistomas created as part of surgery for malignancy and 3 patients received neoadjuvant chemoradiotherapy. Six operations were for benign pathology of which one was a perforated sigmoid post colonoscopy. This patient underwent a lapa-

Table 1 Characteristics of participants

ID	Age	Sex	Diagnosis	Procedure	BMI	Stoma active, d	Discharged home, d	Days with stoma	Type of stoma	Stoma reversed
1	57	F	Colonoscopic perforation	Anterior Resection	23	2	7	49	Loop	Yes
2a	46	F	Ulcerative colitis	Subtotal colectomy	24	1	4	161	End	Converted
2b	46	F	Ulcerative colitis	Proctectomy and J-pouch	24	2	4	103	Loop	No
3	63	M	Low rectal cancer	ULAR	33	2	5	116	Loop	Yes
4	76	F	Diverticula mass	LAR	28	2	7	155	Loop	No
5	62	M	Ulcerative colitis	Proctocolectomy + J-pouch	26	1	17	129	Loop	No
6	76	M	Low rectal cancer	ULAR	37	2	7	128	Loop	No
7a	23	M	Ulcerative colitis	Subtotal colectomy	26	2	17	111	End	Converted
7b	23	M	Ulcerative colitis	Proctocolectomy + J-pouch	22	2	17	128	Loop	Yes
8	64	F	Low rectal cancer	ULAR	27	1	3	51	Loop	No
9	49	M	Low rectal cancer	ULAR	28	1	4	37	Loop	No
10	39	F	Ulcerative colitis	Subtotal colectomy	24	1	6	34	End	No

roscopic high anterior resection and loop ileostomy since the patient was at higher risk for anastomotic complication due to purulent peritonitis and sepsis. One was for a diverticular mass with the inflammatory process involving the rectum. The other 4 were for ulcerative colitis that underwent laparoscopic subtotal colectomy and loop ileostomy and subsequent laparoscopic restorative proctocolectomy. Three patients have had their umbistomas reversed with the patients having had their umbistomas for 49 days, 116 days, and 239 days, respectively. Seven patients still have their umbistomas and managing well.

Return of bowel function, evidenced by active stoma output occurred on a median of postoperative day 2, but patients tolerated a light (low fiber) diet by day 3. Patients' hospital stay was a median period of 7 days after their first operation.

Bowel related morbidity

Our one significant complication will be described in detail. The patient had a small bowel injury after a subtotal colectomy for ulcerative colitis resulting in a prolonged hospital stay of 17 days. This required him to have an upper midline laparotomy to repair the injury. He still retained his umbilical stoma. At follow up in clinics, he complained of intermittent abdominal pains with some episodes of nausea. Investigations confirmed this to be due to stoma stenosis. He was able to get to 12 weeks at which point his symptoms had worsened with vomiting episodes. We think what contributed to the initial complication of stomal stenosis was more a technical factor of not making an adequate fascial opening. The second stage of his operation was able to be done laparoscopically, at which his small bowel was noted to be dilated from chronic obstruction. Completion proctocolectomy was done with a J-pouch and a covering loop umbistoma. After his second operation the patient had another prolonged hospital stay of 17 days because of high output stoma which was managed medically. Two weeks after discharge at follow up in clinics it was noted that his stoma had retracted and the patient was complaining of skin excoriation around his umbistoma. He was returned to theatre and the retracted stoma was able to be pulled out easily and the spout refashioned. The patient has now had his umbistoma reversed with good results.

The other patient who also had a prolonged hospital stay of 17 days became septic with lower abdominal pain after proctocolectomy and J-pouch. Computed tomography scan investigation confirmed a pelvic collection behind his J-pouch that settled after percutaneous drainage. Another patient developed adhesive small bowel obstruction after the second stage of her operation for ulcerative colitis. This required a laparoscopy at which the adhesions were noted to be in the pelvis. The adhesions were released by doing a mini-laparotomy through her old Pfannenstiel incision.

Stoma leakage and wound irritation

No appliance leakages or peristomal skin irritation were reported whilst inpatients. There was no evidence of any mucocutaneous separation. All patients could visualize their stoma with ease and could change the appliance without the need of aids

Fig. 2 Peristomal skin irritation related to the "moat."

such as a mirror. This is a very important factor for independence. As outpatients, peristomal skin irritation was the most common non-bowel–related complication. Initially patients were seen 2 weeks post discharge, but it became apparent that a 1-week review was necessary. This was due to stomal edema subsiding relatively quickly and patients experiencing appliance leakage and skin irritation. Nocturnal leakage was more troublesome for patients when it occurred. This was the case in 2 patients in the first week. At the initial postoperative review appointment, all patients had a degree of peristomal skin irritation related to the "moat" (Fig. 2). In 2 cases, the skin irritation was such that the skin was broken and weeping making appliance adherence very challenging. The problem was easily solved in all cases with the introduction of seals with or without a belt added to the convexity appliance. No further leakages were reported in any patients after stomal therapy nurse review, however 2 had persistent minor skin irritation in the "moat,"

Fig. 3 Umbilical stoma comfortable with clothing.

but not significant enough to cause patient distress requiring revision.

Patient satisfaction

Patient satisfaction with a stoma can be difficult to quantify as there are many variables to consider that impact upon quality of life. We noted though that the umbistoma was well received by our patients (Fig. 3). One patient was able to go on holiday and felt comfortable wearing bathers. Another patient has refused to have his umbistoma reversed at the moment as he feels he is not strong enough even though there is no medical contraindication. He is comfortable managing his stoma.

Events after stoma closure

Three patients have had their umbistomas closed; their outcomes are summarized in Table 2. None needed laparotomy at stoma closure. In this group, one patient had a chest infection treated with intravenous antibiotics and went home on day 6. There were no specific complications such as anastomotic leak, hemorrhage, anastomotic stenosis, or wound dehiscence, with patients having excellent cosmetic results. It is too early to say if incisional hernias are an issue with umbistomas, so our long-term follow up results will be instructive.

However, the numbers in this case series are too small to allow meaningful statistical comparison at present.

Table 2 Events associated with stoma closure

ID	Operation time, min	Bowels open, d	Non–bowel–related complications	Discharged home, d	Cosmetic result	Follow-up
1	65	2	None	5	Excellent	>4 mo
2	55	4 (passing flatus at day 2)	Pneumonia	6	Excellent	>2 mo
3	50	2	None	4	Excellent early result, but for review at 6 weeks	<1 mo

Discussion

While there is no difference in anastomotic leak rates in patients with or without a defunctioning stoma, it is known that the presence of a stoma does reduce the rate of surgical intervention needed after anastomotic leakage, potentially allowing the leak to be managed with minimally invasive techniques.[3–5]

The optimal mode of diversion is debatable. Although ileostomy formation is a common operation, there are only 2 papers in the literature describing umbilical stoma post laparoscopic bowel surgery.[6,7] The paper by Eto *et al*[7] does support our findings on the suitability of umbilical stomas, although this is a different population group to the western patient. We believe our paper is the first in the Western world with the largest number of patients and most days with an umbistoma. It appears that bringing the stoma out through the strong fascia surrounded by the rectus sheath and muscle gives it added strength to prevent hernia formation. Even though inferior epigastric vessels injury is normally avoided with good technique while fashioning traditional stomas, with umbistomas this would not be an issue.

Our time to reversal of ileostomy was determined by the indication for the primary surgery and postoperative management. Three patients had neoadjuvant chemoradiotherapy and also subsequently had adjuvant treatment. One of them has since had his umbistoma closed after completing his oncological treatment.

Four patients had their umbistomas fashioned for ulcerative colitis. The umbistoma created at the first stage would have been an end ileostomy, and then a loop ileostomy was fashioned at the second stage. We counted these as 2 different stomas, even though it was in the same patient. This was the case in 2 patients, which is why we ended up with 12 stomas in 10 patients.

There was no mortality in our case series, and our 1 significant complication has been described above. While laparoscopic surgery is supposed to minimize adhesion formation,[8–11] we had 1 patient develop adhesive small bowel obstruction while awaiting reversal of her umbistoma. The most common complication was minor peristomal skin changes which is also common with traditional ileostomies. Leakage around the umbilical stoma was a problem in the first week as the stoma edema resolved. The largely minor skin irritation and leakage problems were easily managed by the stomal therapy nurse with stoma appliances. We felt the role of the stomal therapy nurse was very important in the successful outcome of our study. Application of stoma bags was facilitated by the wide expanse of abdomen available around the centrally placed stoma, which is also clear of any drains that may be used. An added advantage with the umbistoma was that patients indicated they could sleep on either side which can be a concern in patients with traditionally sited stomas.

Although loop ileostomy closure is often thought of as a simple and minor procedure, it can have morbidity rates up to 33%, small bowel obstruction ranging from 0 to 15%, and wound infection up to

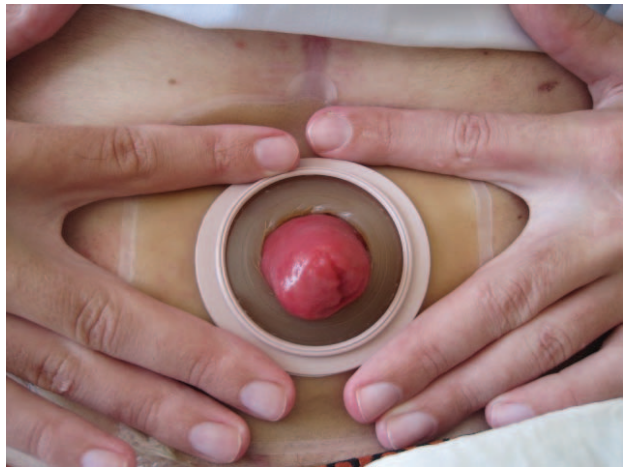

Fig. 4 Patients could easily reach and manage their stomas in the center of the abdomen.

Fig. 5 Obese patients were also able to manage their stomas well.

18.3% and anastomotic leak rates up to 8%.[12,13] We did not have any septic wound complications following closure of the umbistomas in our 2 patients. There was no intestinal obstruction post closure of umbistomas, a well-recognized associated complication. Some studies have shown that stapled anastomosis during closure of an ileostomy was associated with lower incidence of postoperative intestinal obstruction although debate still exists.[14–16] This was our preferred method of closure.

Patient acceptance of the umbilical stoma was very high and the patients could easily reach and manage their stomas in the center of the abdomen (Fig. 4). The patients also commented on the ease of appliance emptying either seated on the toilet with legs apart or sitting backwards on the toilet. The central position facilitated appliance emptying and prevented soiling. While the majority of our patients were within a normal BMI range, median 26, our 1 truly obese patient with a BMI of 37 was still able to manage his stoma very well (Fig. 5). So far as the belt line is concerned, it never is a fixed point. It varies with the posture and the habitus of the patient and therefore the argument of beltline being synonymous with umbilicus is untenable. Some surgeons use the central port to deliver the specimen; as long as the wound has not been extended excessively it would still be feasible to fashion a derivative umbistoma.

Fig. 6 Umbilical scar post closure of stoma, background laparotomy wound is from a previous unrelated operation.

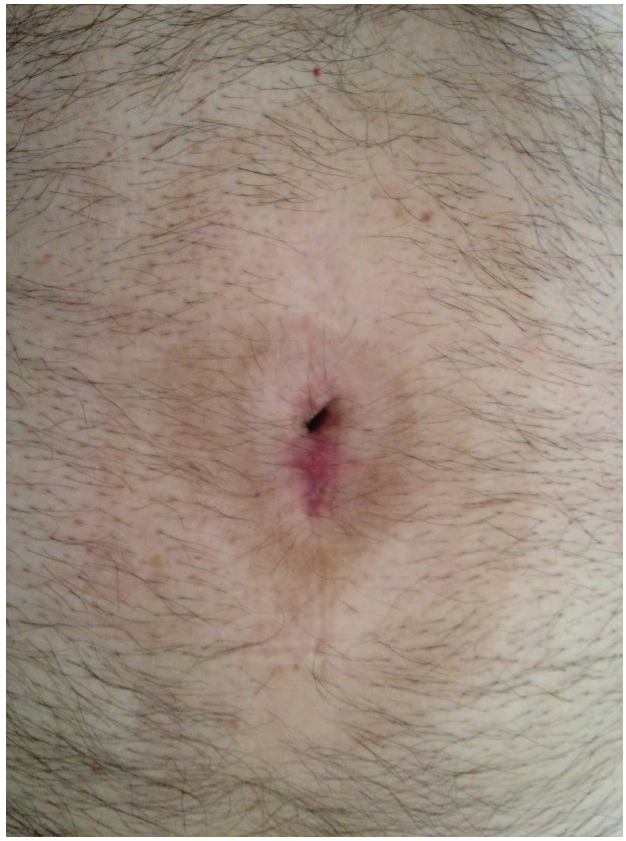

Fig. 7 Good cosmetic result post closure of umbilical stoma.

The cosmetic outcome in the three patients we have reversed so far has been excellent (Figs. 6, 7). Our technique has been to leave the umbilicus proper to drain having closed the wound leading to it. This we feel minimizes the well reported infection risk in these wounds.[17,18] The stomal therapy nurse

also indicated that the abdominal symmetry with the umbistoma was appreciated by patients as they normally dislike the unilateral bulge associated with the traditional stoma. The superior cosmetic results of the umbilicus as a diversion site are also well reported in continent urinary diversion stomas patients with neurogenic bladders.[19] Ugly scars often cause distress long after the favorable surgical results are forgotten. In this era of laparoscopic minimal wounds surgery we feel the umbistoma and its subsequent excellent cosmetic outcome offers a very feasible alternative to the traditional stoma.

Conclusion

We have presented our method of umbilical stoma for fecal stream diversion. The main advantage with our approach we feel is one less incision for the patient and superior cosmetic results. We have demonstrated that umbistomas are a very reasonable option especially with good stomal therapy support. This is a small prospective case series with a potential to change surgical practice for fecal stream diversion in this laparoscopic era of less incisions and warrants further evaluation. Comparison with a conventional stoma as a randomized multicenter trial is encouraged.

Acknowledgments

Author contribution: C. D. Mushaya designed the research; C. D. Mushaya, R. Chandra and W. Sansom performed the research; C. D. Mushaya, R. Chandra and W. Sansom drafted the paper; J. Keck critically revised the manuscript for important intellectual content. All authors have contributed to the work and agreed on the final version. None of the authors have industry ties which might bias the findings. The manuscript is not being considered by any other journal.

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