

Patients With Temporary Ostomies

Veterans Administration Hospitals Multi-institutional Retrospective Study

Mohammed Iyoub Mohammed Ilyas ♦ David A. Haggstrom ♦ Melinda A. Maggard-Gibbons ♦ Christopher S. Wendel ♦ Susan Rawl ♦ Christian Max Schmidt ♦ Clifford Y. Ko ♦ Robert S. Krouse

ABSTRACT

PURPOSE: The purpose of this study was to describe clinical outcomes of patients with temporary ostomies in 3 Veterans Health Administration hospitals.

DESIGN: Retrospective descriptive study, secondary analysis.

SAMPLE AND SETTING: Veterans with temporary ostomies from 3 Veterans Health Administration hospitals who were enrolled in a previous study. The sample comprised 36 participants all were male. Their mean age was 67.05 ± 9.8 years (mean ± standard deviation). Twenty patients (55.6%) had ileostomies and 16 patients (44.4%) had colostomies.

METHODS: This was a secondary analysis of data collected using medical record data. Variables examined included etiology for creation and type of ostomy, health-related quality of life, time to reversal, reasons for nonreversal, postoperative complications after reversal, and mortality in the follow-up period.

RESULTS: Colorectal cancer and diverticular disease were the main reasons for temporary stoma formation. The reversal rate was 50%; the median time to reversal was 9 months in our sample; temporary ileostomies were reversed more often than temporary colostomies ($P = .18$). Comorbid conditions were identified as the main reason for nonreversal. Mortality was not significantly different between the reversal and nonreversal groups. No significant differences were reported with health-related quality-of-life parameters between reversal and nonreversal groups.

CONCLUSIONS: This study identified that the proportion of temporary ostomies was limited to 50%. Complications during the index operation, medical comorbidities, and progression of cancer are the main reasons for nonreversal of temporary stomas. Study findings should be included in the counseling of patients who are likely to get intestinal stomas with temporary intention, and during consideration for later reversal of a stoma.

KEY WORDS: Anastomotic leak, Colorectal cancer, Colostomy, Diverticular disease, Ileostomy, Inflammatory bowel disease, Quality of life, Stoma closure, Stoma reversal, Temporary stoma.

INTRODUCTION

Intestinal ostomies are designed to temporarily or permanently divert the fecal stream to an opening of the abdominal wall (stoma); they commonly incorporate the ileum or colon. Temporary ostomies may be constructed in a loop or end configuration.^{1,2} From 725,000 to 1 million ostomy patients reside in the United States, and approximately 100,000 new ostomy surgical procedures occur annually.³ In a recent study of 4000 participants from 11 countries, about 60% of those living with

an ostomy were older than 60 years, approximately 43% were colostomies, 37% were ileostomies, 18% were urostomies, and 1% were jejunostomies.⁴

Temporary ostomies are created when restoration of intestinal continuity is contraindicated or not feasible. They also may be created with the intention of protecting a distal anastomosis, as part of a salvage surgery, or as a palliative measure. They are constructed with the intention of stoma reversal (closure), requiring reconstruction of gastrointestinal continuity when the acute clinical issues are resolved, the patient's physiology

Mohammed Iyoub Mohammed Ilyas, MBBS, MS, MRCS, University of Arizona College of Medicine, Tucson, and Southern Arizona Veterans Affairs Health Care System, Tucson.

David A. Haggstrom, MD, Richard L. Roudebush Veterans Affairs Medical Center, and Indiana University School of Medicine, Indianapolis.

Melinda A. Maggard-Gibbons, MD, MSHS, Veterans Affairs Greater Los Angeles Health Care System, Los Angeles, California.

Christopher S. Wendel, MS, University of Arizona College of Medicine, Tucson, and Southern Arizona Veterans Affairs Health Care System, Tucson.

Susan Rawl, PhD, RN, Indiana University School of Nursing, Indianapolis.

Christian Max Schmidt, MD, PhD, MBA, Richard L. Roudebush Veterans Affairs Medical Center, and Indiana University School of Medicine, Indianapolis.

Clifford Y. Ko, MD, UCLA School of Medicine, Los Angeles, California.

Robert S. Krouse, MD, Corporal Michael J. Crescenz Veterans Affairs Medical Center, and University of Pennsylvania Department of Surgery, and Leonard Davis Institute of Health Economics, Philadelphia, Pennsylvania.

This work was supported by the Veterans Affairs Health Services Research and Development Service (Merit Award IIR-02-221). The funder had no role in study design, collection, analysis and interpretation of data, writing of this report, or in the decision to submit the article for publication.

The authors declare no conflicts of interest.

Correspondence: Robert S. Krouse, MD, Corporal Michael J. Crescenz Veterans Affairs Medical Center, Surgical Service (112), 3900 Woodland Ave, Philadelphia, PA 19104 (robert.krouse@va.gov).

DOI: 10.1097/WON.0000000000000478

and clinical status are improved, or adequate time has been allowed for the anastomosis to heal.

A retrospective review of data from the National Inpatient Database between 2008 and 2012 showed an average temporary stoma creation rate of 76,551 per year (46% colostomies and 54% ileostomies), with an annual reversal rate of 65.5% (50,155 patients per year).⁵ The reversal rate was lower among black patients, the uninsured, and those with low-income status.⁵ A review of the California Office of Statewide Health Planning and Development patient database between 1995 and 2010 showed reversal of nearly 72% of temporary stomas created in trauma patients by 5 years from the date of index operation.⁶ Postoperative complications such as anastomotic leakage or fistula formation following the index operation, advanced primary disease, local recurrence of tumor, and other associated comorbidities have been identified as risk factors associated with nonreversal of temporary ileostomy in patients who underwent sphincter-preserving surgery for rectal cancer.⁷

Ostomy reversal procedures may be associated with significant morbidity. Reversal of colostomy has been shown to be associated with surgical site infections (32%), anastomotic leak (12%), and unsuccessful reversal (10%).⁸ Ileostomy reversal is associated with an overall complication rate of 17.3%; complications include small bowel obstruction (7.2%), wound sepsis (5.0%), need for an exploratory laparotomy to complete the reversal (3.7%), and mortality (0.4%).⁹ Consideration of potential postoperative complications influences the decision to reverse a stoma constructed with temporary intention.

The purpose of this retrospective study was to describe the clinical outcomes of patients with temporary ostomies in 3 Veterans Health Administration hospitals. Our primary aim was to identify the proportion of patients who had their temporary stoma reversed. The secondary aim was to examine type of ostomy formed, etiology for stoma formation, time between formation and reversal of stoma, reasons for nonreversal of stoma if any, postoperative complications after reversal of stoma, and mortality in the follow-up period.

METHODS

This study is a secondary analysis using data from a previous study, "Health Related Quality of Life in Patients with Intestinal Stomas" (VA HSRD IIR 02-221, 2003-2005).² The original study was conducted at 3 academically affiliated Veterans Administration (VA) medical center sites: (1) Southern Arizona VA Health Care System, Tucson, Arizona; (2) VA Greater Los Angeles Healthcare System, California; and (3) Richard L. Roudebush VA Medical Center, Indianapolis, Indiana. These sites were chosen to ensure ethnic, geographic, and racial diversity. The study was approved by the human subjects protection committees at each of the aforementioned sites and written informed consent was obtained from all participants.

Patients with an ostomy were identified using International Classification of Diseases, Ninth Revision (ICD-9) procedure codes from the VA Patient Treatment File with ICD-9 codes for attention to or status of an ostomy ("V codes") from VA Outpatient Encounter File, dispensing of ostomy equipment from the VA pharmacy file, and ostomy nurse patient lists. The use of multiple VA databases ensured inclusion of all possible patients over the study period. Patients were eligible if they had been seen for VA care within 1 year prior to the initiation of the

study and at least 2 months had elapsed since index surgery. Participants were administered a mailed questionnaire that included the City of Hope Quality of Life (mCOH-QOL)-Ostomy and 36-Item Short-Form Health Survey for Veterans (SF-36V) questionnaires. The COH-QOL-Ostomy¹⁰ is based upon a 4-dimensional framework consisting of ostomy health-related quality of life (HRQOL); they are physical, psychological, social, and spiritual well-being. A score for total HRQOL, as well as these 4 domains, is calculated as the average of nonmissing items, with responses on a scale from 0 to 10 and coded as 10 being the best response. The SF-36V¹¹ is a modified SF-36¹² adapted for use with US veterans that closely resembles the current SF-36 version 2, one of the most commonly used health status measures for measuring HRQOL; it yields an 8-scale health profile as well as physical and mental health summary measures.

Subjects who identified their ostomies as temporary with plans for reversal were included in the present study. The mailed questionnaire queried whether the respondent's ostomy constructed during the index operation was permanent or temporary (created with intention or plans for reversal in future). Medical records (electronic and paper charts) of individual patients, including their operative reports, were reviewed to ensure that subjects had an ostomy constructed with temporary intention. Patients with incomplete or conflicting data were excluded from the study. Patients who were undergoing further treatment for cancer at the time of data collection (chemotherapy or radiation therapy) were excluded from the survey, as this could alter their health status and impact outcomes.

Follow-up data collection was completed between January 2012 and October 2015. The primary end point evaluated for this study was the number of patients who had their stoma reversed. Secondary variables were type of ostomy formed, etiology for stoma formation, time between formation and reversal of stoma, and reasons for nonreversal of stoma. Postoperative complications after reversal of stoma and mortality in the follow-up period, including death, were also evaluated. The follow-up period extended from date of index surgery wherein the temporary stoma was created until the date of data collection at each of the 3 sites or until death.

DATA ANALYSIS

Survival differences between the 2 groups of patients (reversed vs nonreversed and cancer vs non-cancer) were evaluated using a Kaplan-Meier analysis. We report the estimated mortality percentage from the survival function at selected years elapsed; these percentages do not necessarily correspond to an integer number of subjects, but we have provided the rounded approximate count as illustration. Crude mortality proportions (not accounting for censoring) were reported without statistical comparisons for illustrative purposes but not for inference. Median time to death was compared between groups using the Wilcoxon rank sum test. Proportions of subjects reversed, stoma characteristics, complications, reasons for formation of index stoma, and failure to reverse an ostomy are presented descriptively. Mean subscales from COH-QOL-Ostomy and SF-36V were compared between reversal and nonreversal groups with 2 sample *t* tests. The time to reversal and duration of follow-up are summarized by median, range, and interquartile range (IQR, the 25th to 75th percentiles).

RESULTS

Thirty-eight patients were identified who had a temporary ostomy formed after bowel resection; 2 patients were excluded from the study due to incomplete data. Therefore, analysis was performed using the remaining 36 patients. All were male and their stomas were created between January 1980 and October 2004. Their follow-up period ranged between 58 and 430 months (mean 128 months). The median follow-up time was longer in patients without reversal compared to those with reversal (136 months vs 99 months, $P = .047$).

Colorectal cancer was the reason for stoma formation in 50% ($n = 18$) of cases, followed by diverticular disease and inflammatory bowel disease, responsible for 22.2% ($n = 8$) and 11.1% ($n = 4$), respectively. Colonic ischemia or bleeding led to 3 temporary ostomies (8.4%). Other reasons accounted for 8.3% ($n = 3$); they were nonmalignant bowel obstruction, cecal perforation, and unknown causes (Figure 1).

More than half of temporary stomas were ileostomies (56%; $n = 20$, Figure 2). Ileostomies were formed more often (60%; $n = 12$) to protect a distal anastomosis after surgery for cancer. More than a third of temporary colostomies (36.5%; $n = 6$) were formed during surgery for diverticulitis or related complications.

During the follow-up period, 50.0% ($n = 18$) of patients had their stomas reversed, with a median duration between the formation and reversal of stoma of 9 months (IQR 5-14 months, range 2-23 months). Significant variation in the rates of stoma reversal was observed between the 3 centers (25%, $n = 3/12$; 33.3%, $n = 3/9$; 80%, $n = 12/15$; $P = .008$), with a median duration to reversal ranging from 8.5 to 13 months. Although not statistically significant, more ileostomies were reversed than were colostomies (60%; $n = 12$ vs 37.5%; $n = 6$; $P = .18$) (Table 1). Two patients in the colostomy reversal group experienced complications after reversal, necessitating formation of a second stoma in one and inability to complete the reversal in the other due to locally advanced cancer.

Major early complications after reversal operations were noted in 33.3% ($n = 6$) patients; they were anastomotic leak, abdominal abscess formation, enterocutaneous fistula, and wound-related complications. Delayed complications included tumor recurrence at the site of ileostomy takedown and incisional hernia formation during the follow-up period. Comorbid conditions, predominantly cardiac and/or respiratory, were cited as reasons for nonreversal of stoma in 33.3% ($n = 6$) of patients. These conditions were either present at

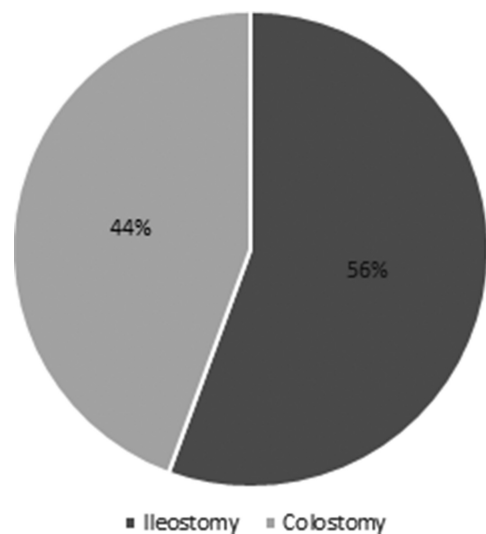


Figure 2. Types of temporary ostomy.

the time of the index operation leading to stoma formation with temporary intention or developed in the postoperative follow-up period. Progression of colorectal cancer and postoperative complications after the index operation, including anastomotic leak and fistula formation, were the other major reasons for nonreversal of temporary stomas (Table 2).

During the follow-up period, the crude mortality rate was 36.1% ($n = 13$), with a higher mortality rate in the nonreversal group (50.0%, $n = 9/18$). Progression of colorectal cancer was the principal cause of death (61.5%, $n = 8$ of total deaths). Crude mortality, which does not account for censoring, appeared to be considerably lower among patients who had stomas reversed during the follow-up period compared to those who did not undergo reversal (22.2%, $n = 4/18$, vs 50.0%, $n = 9/18$). However, accounting for follow-up time and censoring with the Kaplan-Meier analysis showed that the mortality did not significantly differ between the reversed and nonreversed groups ($P = .65$). At 10 years, mortality was 15% (approximately $n = 3$) in the reversal group versus 22% (approximately $n = 4$) in the nonreversal group; at 15 years, mortality was 58% (approximately $n = 10$) in the reversal group versus 72% (approximately $n = 13$) in the nonreversal group. The 10- and 15-year mortality rates were obtained from a survival function curve, enabling calculation of the approximate values provided for the 10- and 15-year mortality rates.

When temporary stomas formed during surgical resections for colorectal cancers were evaluated alone, the reversal rate was somewhat higher than the full sample (61.1%, $n = 11/18$), but the crude mortality rate during the follow-up period appeared to be higher in cancer subjects compared to those with stomas made for nonmalignant causes (44.4%, $n = 8/18$, vs 27.7%, $n = 5/18$, respectively). The Kaplan-Meier analysis showed that mortality was significantly higher in the cancer group ($P = .04$). At 10 years, the mortality rate was 32% (approximately $n = 6$) in the cancer group versus 10% (approximately $n = 2$) in the noncancer group; at 13 years, the mortality rate was 70% (approximately $n = 13$) in the cancer group versus 28% (approximately $n = 5$) in the noncancer group. Although not statistically significant, death during the follow-up period occurred earlier in cancer patients compared to noncancer patients (median 116 vs 156 months, respectively, $P = .06$). This difference does not account for censoring.

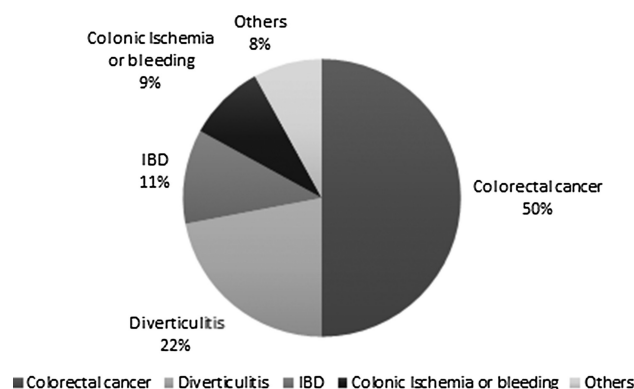


Figure 1. Reasons for temporary ostomy.

TABLE 1.
Patient Characteristics by Ostomy Type

Type of Stoma	Ileostomy (n = 20)	Colostomy (n = 16)	Total (n = 36)
Age, mean (SD); range, y ^a	68.8 (11.2); 50-84	65.3 (8.4); 49-79	67.05 (9.8); 49-84
Time to reversal, median (IQR); range, mo	9 (7.5-15); 3-23	7.5 (3-14); 2-21	9 (5-14); 2-23
Ostomy reversal, n (%)	12 (60.0)	6 (37.5)	18 (50)
Length of follow-up period, median (IQR); range, mo	99 (94-136); 58-228	135 (101-154); 77-430	111 (95-140); 58-430

Abbreviations: IQR, interquartile range; SD, standard deviation.

^aAll subjects included in the study are males.

No significant differences were observed for subscales from the COH-QOL-Ostomy and the SF-36V between reversal and nonreversal groups preoperatively. The cumulative HRQOL score (mean \pm standard deviation, reversal vs non-reversal) was (6.0 \pm 2.0 vs 6.1 \pm 2.0, $P = .90$), the SF-36V Physical Component scores were 35.4 \pm 10.3 versus 31.7 \pm 13.5 ($P = .40$), the SF-36V Mental Component scores were 46.0 \pm 11.4 versus 48.4 \pm 10.4 ($P = .57$, Table 3).

DISCUSSION

Temporary ostomies are formed with the intention of reversal in the future. Multiple studies have evaluated the reversal rate and reasons for nonreversal of stomas.^{6,7,9,13-16} To our knowledge, long-term follow-up and outcomes after temporary stoma formation among veterans have not been reported in the literature. The main finding of this study is difference in reversal rate, mean time for reversal, and mortality rates in veterans versus other populations. The reversal rate of temporary stomas was lower (50%; $n = 18/36$) among the cohort of veterans included in this study when compared to previous studies involving the general population (68%-91.5%).^{9,14-21} This finding could be partially attributed to the likelihood that veterans have more comorbid conditions.²² Time for reversal of ostomies was also longer among veterans (mean 8.3 months, median 9 months) when compared to studies evaluating other populations (5.6-6.9 months).¹⁵⁻¹⁷

Reasons for nonreversal of stomas in the current study mirrored prior studies and included medical comorbidities and progression of colorectal cancer in the follow-up period. Anastomotic leaks during the index operation leading to distal stricture (anal/rectal stricture) have also been shown to be a factor against reversal of temporary stomas.^{9,10,14-16} The National Bowel Cancer Audit Project (NBOCAAP) 2013 report

TABLE 2.
Reasons for Nonreversal of Temporary Stomas

Conditions	Patients, n (%)
Medical comorbidities—cardiac, pulmonary	6 (33.3)
Progress of colon/rectal cancer	5 (27.8)
Complications from first surgery	3 (16.7)
Diagnosis of other visceral cancers	1 (5.6)
Incontinence	1 (5.6)
Unknown reasons	2 (11.1)

TABLE 3.
HRQOL and Function, by Reversal Status

	Reversal (n = 18)	Nonreversal (n = 18)	P Value
<i>COH-QOL-Ostomy</i>			
Total QOL	6.0 (2.0)	6.1 (2.0)	.90
Physical well-being	6.1 (1.8)	6.3 (2.5)	.81
Psychological well-being	6.4 (2.2)	6.2 (1.8)	.75
Social well-being	5.5 (2.0)	5.9 (3.0)	.58
Spiritual well-being	6.5 (2.8)	6.0 (1.8)	.49
<i>SF-36V</i>			
Component summary scores			
Physical component score	35.4 (10.3)	31.7 (13.5)	.40
Mental component score	46.0 (11.4)	48.4 (10.4)	.57
Health domain scale			
Physical function	46.8 (25.8)	40.5 (33.8)	.53
Role physical	45.2 (29.8)	44.1 (33.5)	.92
Body pain	50.2 (33.1)	43.2 (28.0)	.50
General health	54.6 (24.2)	44.8 (20.3)	.21
Vitality	38.3 (19.6)	38.8 (27.8)	.96
Social function	62.5 (27.8)	57.6 (28.8)	.61
Mental health	64.3 (23.5)	67.5 (21.4)	.68
Role emotional	61.3 (31.0)	57.2 (28.4)	.69

Abbreviations: COH-QOL, City of Hope Quality of Life; HRQOL, health-related quality of life; SF-36V, 36-Item Short-Form Health Survey for Veterans.

recommended counseling patients undergoing anterior resection by including the following information: nonclosure rate of temporary ostomy of 40% at 18 months, a median closure delay of 7 months, and an approximately 10% chance of death with a nonreversed stoma state at 18 months.²¹ Our findings support these recommendations, although the nonclosure rates may be higher in the VA population. This could be attributed to the differences in disease recurrence, comorbidities, demographics, and/or socioeconomic status between veterans and the general patient population.²² These differences should be considered during construction of temporary stomas for veterans, and the information should be provided to veterans at the time of formation of temporary stomas and during patient education thereafter.

Our study also showed clinically relevant rates of postoperative complications after reversal operations among veterans (27.8%, $n = 5$) were consistent with previous studies (26%-31%).^{17,18} The risk of postoperative complications after reversal has been shown to be a significant factor in the decision whether to reverse a stoma by both surgeons and patients.¹⁸ Our analysis also provides important information about the long-term mortality rate among patients with temporary stomas. The difference in mortality rates between individuals with an ostomy with neoplastic and nonneoplastic causes (70% vs 28% at 13 years) underscores the relationship between the etiology leading to formation of stoma and long-term outcomes.

We did not demonstrate any significant differences in HRQOL between the 2 groups preoperatively, a factor that could potentially influence patient decisions and advice from surgeons whether to reverse stomas.²³ However, our ability to

observe relationships between reversal and HRQOL was limited by our lack of longitudinal data regarding HRQOL after surgery.²³ This could explain differences between results from our study with others.²⁴⁻²⁶ We observed a difference between the reversal and nonreversal groups in General Health from the SF-36 of nearly 10 points. Additional research with greater power to detect differences is needed to determine whether stoma reversal results in a difference in how veterans perceive their overall health and other issues related to temporary ostomy creation, stoma reversal, and other domains related to HRQOL. While reports may be contradictory concerning the effect of loop colostomy versus loop ileostomy on HRQOL,^{24,27} both clearly impact these outcomes. Self-efficacy is likely also impacted,²⁴ which also influences HRQOL. Rectal cancer survivors with temporary stoma may have worse bowel function issues after takedown.²⁸ There is also evidence that overall HRQOL is not impaired prior to temporary stoma and after takedown, while issues such as physical functioning and sexual interest do improve.²⁹ Another issue that must be considered is that there may be delays in reversal for multiple reasons, such as chemotherapy for cancer survivors.^{29,30} These issues may be ignored for these ostomy patients, as the assumption is that they will have their life restored to normal. These studies provide further evidence that life will not be normal for extended periods of time with an ostomy, and may never return to prior levels.

STRENGTHS AND LIMITATIONS

To our knowledge, this is the first study to evaluate the long-term morbidity and mortality of patients after stoma formation, extending over a mean period of more than 10 years. Although our study included a small sample size and may have lacked adequate power to detect mortality and HRQOL differences by reversal status, another strength of the study was a robust mean follow-up period of 128 months. The longitudinal follow-up extending from 6 to 36 years was longer than any of the previously published studies and helps us understand the long-term clinical outcomes of these temporary stomas. While the differences noted between the 3 sites could be considered as an asset to the study that led to greater generalizability than a single-site study, it highlights that there is significant variation in outcomes and is still limited to veterans and predominantly males. The findings cannot be generalized to the nonveteran population. Finally, the retrospective and descriptive nature of this study limits the ability to infer causation.

CONCLUSIONS

Study findings provide additional knowledge about temporary ostomies. Reversal of temporary stomas may be delayed due to various reasons or may never be reversed. Complications during the index operation, medical comorbidities, and progression of cancer are the main reasons for nonreversal of temporary stomas. This information should be included in the counseling of patients who are likely to get intestinal stomas with temporary intention, and during consideration for later reversal of a stoma.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to David Horner, Octavio Bojorquez, and Mary Wagner for their contribution to the study.

REFERENCES

- Cataldo PA. Technical tips for stoma creation in the challenging patient. *Clin Colon Rectal Surg.* 2008;21:17.
- Krouse RS, Mohler MJ, Wendel CS, et al. The VA ostomy health-related quality of life study: objectives, methods, and patient sample. *Curr Med Res Opin.* 2006;22(4):781-791.
- United Ostomy Associations of America, LLC. Advocacy Toolkit: Be a Champion for People with an Ostomy or Continent Diversion. https://www.ostomy.org/wp-content/uploads/2017/12/UOAA_Advocacy-Toolkit_2017.pdf. Published 2017. Accessed April 8, 2018.
- Claessens I, Probert R, Tielemans C. The Ostomy Life Study: the everyday challenges faced by people living with a stoma in a snapshot. *Gastrointest Nurs.* 2015;13(5):18-25. doi:10.12968/gasn.2015.13.5.18.
- Zafar SN, Changoor NR, Williams K, et al. Race and socioeconomic disparities in national stoma reversal rates. *Am J Surg.* 2016;211(4):710-715.
- Godat L, Kobayashi L, Chang DC, Coimbra R. Do trauma stomas ever get reversed? *J Am Coll Surg.* 2014;219(1):70-77.e1.
- Kim YA, Lee GJ, Park SW, Lee WS, Baek JH. Multivariate analysis of risk factors associated with the nonreversal ileostomy following sphincter-preserving surgery for rectal cancer. *Ann Coloproctol.* 2015;31(3):98-102.
- Adam N, Rahbar S, Skinner R. Outcomes of colostomy reversal in a public safety net hospital: the end or beginning of a new problem? *Am Surg.* 2015;81:1084-1087.
- Chow A, Tilney HS, Paraskeva P, Jeyarajah S, Zacharakis E, Purkayastha S. The morbidity surrounding reversal of defunctioning ileostomies: a systematic review of 48 studies including 6,107 cases. *Int J Colorectal Dis.* 2009;24(6):711-723.
- Grant M, Ferrell B, Dean G, Uman G, Chu D, Krouse R. Revision and psychometric testing of the City of Hope Quality of Life-Ostomy questionnaire. *Qual Life Res.* 2004;13(8):1445-1457.
- Kazis LE, Miller DR, Clark J, et al. Health-related quality of life in patients served by the Department of Veterans Affairs: results from the Veterans Health Study. *Arch Intern Med.* 1998;158(6):626-632.
- Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care.* 1992;30:473-483.
- Den Dulk M, Smit M, Peeters KC, et al. A multivariate analysis of limiting factors for stoma reversal in patients with rectal cancer entered into the total mesorectal excision (TME) trial: a retrospective study. *Lancet Oncol.* 2007;8(4):297-303.
- Gessler B, Haglund E, Angenete E. Loop ileostomies in colorectal cancer patients—morbidity and risk factors for nonreversal. *J Surg Res.* 2012;178(2):708-714.
- David GG, Slavin JP, Willmott S, Corless DJ, Khan AU, Selvasekar CR. Loop ileostomy following anterior resection: is it really temporary? *Colorectal Dis.* 2010;12(5):428-432.
- Pan HD, Peng YF, Wang L, et al. Risk factors for nonclosure of a temporary defunctioning ileostomy following anterior resection of rectal cancer. *Dis Colon Rectum.* 2016;59(2):94-100.
- Sier MF, van Gelder L, Ubbink DT, et al. Factors affecting timing of closure and non-reversal of temporary ileostomies. *Int J Colorectal Dis.* 2015;30(9):1185-1192.
- Waterland P, Goonetilleke K, Naumann DN, Sutcliffe M, Soliman F. Defunctioning ileostomy reversal rates and reasons for delayed reversal: does delay impact on complications of ileostomy reversal? A study of 170 defunctioning ileostomies. *J Clin Med Res.* 2015;7(9):685-689.
- Lordan JT, Heywood R, Shirol S, Edwards DP. Following anterior resection for rectal cancer, defunctioning ileostomy closure may be significantly delayed by adjuvant chemotherapy: a retrospective study. *Colorectal Dis.* 2007;9:420-422.
- Bailey CM, Wheeler JM, Birks M, Farouk R. The incidence and causes of permanent stoma after anterior resection. *Colorectal Dis.* 2003;5:331-334.
- National Bowel Cancer Audit Annual Report 2013. <http://www.hscic.gov.uk/catalogue/PUB11105/nati-clin-audi-supp-prob-bowe-canc-2013-rep1.pdf>. Accessed April 13, 2016.
- Agha Z, Lofgren RP, VanRuiswyk JV, Layde PM. Are patients at Veterans Affairs medical centers sicker? A comparative analysis of health status and medical resource use. *Arch Intern Med.* 2000;160:3252-3257.
- Krouse R, Grant M, Ferrell B, Dean G, Nelson R, Chu D. Quality of life outcomes in 599 cancer and non-cancer patients with colostomies. *J Surg Res.* 2007;138(1):79-87.

24. Su X, Qin F, Zhen L, et al. Self-efficacy and associated factors in patients with temporary ostomies: a cross-sectional survey. *J Wound Ostomy Continence Nurs.* 2016;43(6):623-629.
25. Nichols TR. Quality of life in persons living with an ostomy assessed using the SF36v2: mental component summary vitality, social function, role-emotional, and mental health. *J Wound Ostomy Continence Nurs.* 2016;43:616-622.
26. Nichols TR. Quality of life in US residents with ostomies assessed via the SF36v2: role-physical, bodily pain, and general health domain. *J Wound Ostomy Continence Nurs.* 2016;43:280-287.
27. Magistri P, Scordamaglia MR, Giulitti D, Papaspyropoulos V, Eleuteri E, Coppola M. Patients' quality of life and role of the ambulatory in after-surgery stoma care. A single center experience. *Ann Ital Chir.* 2014;85:105-108.
28. Gaden S, Floodeen H, Lindgren R, Matthiessen P. Does a defunctioning stoma impair anorectal function after low anterior resection of the rectum for cancer? A 12-year follow-up of a randomized multicenter trial. *Dis Colon Rectum.* 2017;60:800-806.
29. Herrle F, Sandra-Petrescu F, Weiss C, Post S, Runkel N, Kienle P. Quality of life and timing of stoma closure in patients with rectal cancer undergoing low anterior resection with diverting stoma: a multicenter longitudinal observational study. *Dis Colon Rectum.* 2016;59(4):281-290.
30. Taylor C, Varma S. Factors affecting closure of a temporary stoma. *J Wound Ostomy Continence Nurs.* 2012;39(1):51-57.

For 4 additional continuing education articles related to the topic of ostomies, go to NursingCenter.com/CE

Instructions:

- Read the article on page 510.
- The test for this CE activity can be **taken online** at www.NursingCenter.com/CE/JWOCN. Find the test under the article title. Tests can no longer be mailed or faxed.
- You will need to create a username and password and login to your personal CE Planner account before taking online tests. (It's free!) Your planner will keep track of all your Lippincott Professional Development online CE activities for you.
- There is only one correct answer for each question. A passing score for this test is 14 correct answers. If you pass, you can print your certificate of earned contact hours and access the answer key. If you fail, you have the option of taking the test again at no additional cost.

- For questions, contact Lippincott Professional Development: 1-800-787-8985.

Registration Deadline: December 4, 2020

Disclosure Statement: The authors and planners have disclosed that they have no financial relationships related to this article.

Provider Accreditation:

Lippincott Professional Development will award 1.5 contact hours for this continuing nursing education activity.

LPD is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 1.5 contact hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, and Florida, CE Broker #50-1223.

Payment:

- The registration fee for this test is FREE for members and \$17.95 for nonmembers.

DOI: 10.1097/WON.0000000000000488

Call for Authors: Ostomy Care

- Original research reports comparing surgical outcomes for patients who undergo preoperative stoma site marking by a WOC nurse compared to patients who do not.
- Case studies, case series or original research reports focusing on stomal or peristomal complications.
- Case studies, case series or original research reports focusing on other potential sequelae of ostomy surgery including physical manifestations such as low back pain or psychosocial manifestations such as depression, altered sexual function or embarrassment.
- Original research reports confirming or challenging the assertions of the ongoing WOCN Ostomy Consensus Session including ostomy pouch wear time and minimum standards for immediate postoperative education of patient and family.