

# Optimizing the Care of Malignant Bowel Obstruction in Patients With Advanced Gynecologic Cancer

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**QUESTION ASKED:** What is the impact of implementing a pilot interprofessional malignant bowel obstruction (MBO) program for the care of women with advanced gynecologic cancer?

**SUMMARY ANSWER:** After implementation of the MBO program, women admitted to hospital with bowel obstruction had shorter average cumulative length of stay in the hospital (13 v 22 days; adjusted  $P = .003$ ) within the first 60 days of MBO diagnosis and improved median overall survival (99 v 243 days;  $P = .002$ , adjusted for initial cancer stage and lines of chemotherapy). They can be supported effectively within the community under the structured care of the interprofessional MBO team.

**WHAT WE DID:** A pilot interprofessional MBO program was implemented in a large Canadian cancer center to provide a systematic framework to coordinate care and consensus decision-making among different specialties relevant to MBO management. Specific highlights unique to this MBO program are the collaborative approach to MBO management and integrated outpatient model of care led by specialized oncology nurses through telephone consultations between clinic appointments. The interprofessional team reviews MBO cases and formulates treatment consensus and supportive care plans. Standardized clinical processes, assessment tools, and documentation in the electronic medical record are incorporated to facilitate seamless transition between in- and outpatient care. Patient educational materials have been developed to empower patients to recognize and effectively communicate their

symptoms. We performed a retrospective analysis to compare clinical outcomes of women with MBO before and after implementation of the MBO program.

**WHAT WE FOUND:** Compared with the baseline group (ie, before MBO program implementation), the MBO program group had a different treatment pattern and was more likely to receive two or more MBO interventions. The MBO program group had shorter hospital admission and seems to have better survival after MBO diagnosis.

**BIAS, CONFOUNDING FACTORS, REAL-LIFE IMPLICATIONS:** There are no universal guidelines for optimal management of MBO and treatment approach varies based clinical factors and disease prognosis. A collaborative and programmatic approach to MBO management enabled efficient use of institutional resources to maximize patient outcome and better support their complex care needs. Importantly, the MBO program consists of a collective set of multidisciplinary interventions; therefore, it is not possible to reliably isolate the outcomes of each intervention (eg, surgery, chemotherapy, total parenteral nutrition, and supportive care). The recurrent and progressive nature of MBO may inherently hinder the ability to appropriately assess the effectiveness of MBO interventions. Education about MBO was also critical for empowering patients and their caregivers to confidently manage their symptoms and know when to seek help. The principles of this interprofessional MBO program can be adopted by other oncological disciplines or cancer institutions.

## ASSOCIATED CONTENT

### Appendix

### Data Supplement

Author affiliations and disclosures are available with the complete article at [jop.ascopubs.org](http://jop.ascopubs.org).

Accepted on June 25, 2019 and published at [jop.ascopubs.org](http://jop.ascopubs.org) on September 24, 2019: DOI <https://doi.org/10.1200/JOP.18.00793>

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**PURPOSE** Malignant bowel obstruction (MBO) is a common and distressing complication in women with advanced gynecologic cancer. A pilot, interprofessional MBO program was launched in 2016 at a large Canadian tertiary cancer center to integrate these patients' complex care needs across multiple disciplines and support women with MBO.

**METHOD** Retrospective analysis to evaluate the outcomes of women with advanced gynecologic cancer who were admitted to hospital because of MBO, before (2014 to 2016: baseline group) and after (2016 to 2018) implementation of the MBO program.

**RESULTS** Of the 169 women evaluated, 106 and 63 were in the baseline group and MBO program group, respectively. Most had ovarian cancer ( $n = 124$ ; 73%) and had small-bowel obstruction ( $n = 131$ ; 78%). There was a significantly shorter cumulative hospital length of stay ( $LOS_{sum}$ ) within the first 60 days of MBO diagnosis in the MBO program group compared with the baseline group (13 v 22 days, respectively; adjusted  $P = .006$ ). The median overall survival for women treated in the MBO program was also significantly longer compared with the baseline group (243 v 99 days, respectively; adjusted  $P = .002$ ). Using the interprofessional MBO care platform, a greater proportion of patients received palliative chemotherapy (83% v 56%) and less surgery (11% v 21%) in the MBO program group than in the baseline group, respectively. A subgroup of women ( $n = 11$ ) received total parenteral nutrition for longer than 6 months.

**CONCLUSION** Implementation of a comprehensive, interprofessional MBO program significantly affects patient care and may improve outcomes. Unique to this MBO program is an integrated outpatient model of care and education that empowers patients to recognize MBO symptoms for early intervention.

**J Oncol Pract 15:e1066-e1075. © 2019 by American Society of Clinical Oncology**

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## INTRODUCTION

Malignant bowel obstruction (MBO) is a common occurrence in women with advanced gynecologic cancer, particularly ovarian cancer.<sup>1-3</sup> Previous retrospective series reported that MBO developed in up to 51% of women with recurrent ovarian cancer and median survival after MBO diagnosis ranged from 45 to 169 days.<sup>2-5</sup> The development of MBO is typically subacute and progresses to distressing symptoms such as inability to eat, vomiting, and abdominal cramps and distension.<sup>6,7</sup> MBO management often mandates extended hospital admission. Despite initial interventions, most of these women will experience recurrent episodes of MBO over time, which negatively affects their quality of life.<sup>1</sup> Although MBO is a frequent complication, there are no guidelines on MBO treatment approaches.

## Pilot MBO Program

Optimal and efficient management of MBO is an unmet clinical need.<sup>2</sup> To address this complex clinical challenge, a pilot MBO program with an integrated outpatient model of care was launched in June 2016 at a large Canadian tertiary cancer center. The dedicated interprofessional MBO team consists of medical, surgical, gynecologic, and radiation oncologists, palliative care physicians, diagnostic and interventional radiologists, total parenteral nutrition physicians, specialized oncology nurses, dietitians, pharmacists, and social workers. After review of literature, the MBO working group developed the following: (1) expert consensus MBO clinical care algorithms for inpatients and outpatients; (2) patient education materials; (3) standardized MBO symptom triage and management

## ASSOCIATED CONTENT

### Appendix

### Data Supplement

Author affiliations and support information (if applicable) appear at the end of this article.

Accepted on June 25, 2019 and published at [jop.ascopubs.org](http://jop.ascopubs.org) on September 24, 2019; DOI <https://doi.org/10.1200/JOP.18.00793>

tools; and (4) guidance on advanced care planning and involvement of palliative care (Data Supplement).

Using the MBO program framework, patients suspected of having MBO underwent prompt review to establish a diagnosis, were triaged according to the standardized MBO assessment tool, and treated on the basis of the Princess Margaret Cancer Centre MBO algorithm (Data Supplement). The MBO assessment tool is a one-page questionnaire focused solely on bowel function, such as bowel movement frequency, stool consistency, nausea, vomiting, flatus, abdominal pain, bloating, early satiety, fluid consumption, and medications taken (eg, laxatives, opioid analgesia). Patient undergo additional radiological imaging on the basis of symptoms. Once diagnosed with MBO, patients receive immediate MBO symptom management (ie, bowel rest, parenteral rehydration, and pharmacologic management) and are reviewed by MBO team members for consideration of surgical intervention, chemotherapy, total parenteral nutrition (TPN), and best supportive care on the basis of disease prognosis. Early discussions regarding goals of care and advanced care planning are incorporated. Patient care is systematically documented in the electronic medical record to ensure effective communication within the interprofessional network.

Patients known to the MBO program are categorized according to a color-code system: (1) red for patients with active MBO requiring inpatient management; (2) orange for patients with active MBO suitable for outpatient management; (3) yellow for patients with no MBO but who are at risk for development of MBO; (4) green for patients with no bowel symptoms to suggest MBO; and (5) blue for patients with active MBO diagnosis and whose main treatment goal is for comfort care by the palliative care team (Data Supplement). Patients deemed suitable for outpatient management (orange and yellow codes) are proactively followed by specialized oncology nurses through telephone consultations between outpatient clinic appointments with their clinicians (surgical, medical or palliative care teams). If MBO resolves and patients are symptom free for at least 1 month, they transition to different color code (yellow or green). Written patient-education materials including a “Know How to Maintain Good Bowel Function” pamphlet and low-residue diet information were provided to all patients as part of the MBO program.

All MBO cases are discussed at the regular MBO multidisciplinary case conference to review radiological imaging and consensus treatment recommendations. Treatment plans are documented particularly if a patient is deemed not suitable for surgery and thereby will be cotreated by medical oncology and palliative care teams.

## METHODS

Since June 2016, a pilot, interprofessional MBO program with an integrated outpatient model of care was launched at

the Princess Margaret Cancer Centre. A retrospective analysis was performed to evaluate the impact of the MBO program on cumulative hospital length of stay ( $LOS_{sum}$ ) for MBO management for all consecutive patients who presented with bowel obstruction (*International Classification of Diseases, Tenth Revision*, code: K56 or K91.3) at the Princess Margaret Cancer Centre and/or the affiliated Toronto General Hospital from April 2014 to March 2018 (based on fiscal year). Patients were identified using data from the National Ambulatory Care Reporting System, which captured patient information on hospital admission, emergency department visits, and community-based ambulatory care. Chart reviews were conducted to select patients with MBO who met the following criteria: (1) clinical evidence of bowel obstruction (history, physical, and radiologic examination); (2) bowel obstruction due to malignant deposits beyond the ligament of Treitz; and (3) diagnosis of advanced gynecologic cancer. These criteria are aligned with the definition of MBO set by the International Conference on MBO and Clinical Protocol Committee.<sup>8</sup> We excluded patients who presented with MBO at the time of initial diagnosis of ovarian cancer, as well as patients with bowel obstruction due to noncancer-related etiologies, such as adhesion incarcerated hernia, sigmoid volvulus, and radiation stenosis.

For all eligible patients, a detailed chart review was conducted and reviewed by at least two authors (Y.C.L., K.N., and S.C.). The following data fields were extracted and recorded: patient demographics, tumor characteristics (ie, primary tumor site, histopathology, cancer stage, *BRCA1/2* mutation status, presence of ascites), treatment history (ie, dates, types and lines of treatment), nutritional markers (ie, albumin, height, weight), and MBO management and treatment outcome. Patients with ovarian cancer who underwent chemotherapy were classified according to their antecedent treatment-free interval at the time of MBO diagnosis as either platinum sensitive (longer than 6 months) or platinum resistant (6 months or shorter).

## Statistical Analysis

The primary objective of this study was to compare the cumulative days of hospitalization for the first 60 days of MBO diagnosis before and after implementation of the MBO program. The difference between groups was estimated using the general linear model, controlled for age, histology, and platinum-sensitivity status. Survival outcomes were compared using the Kaplan-Meier method and log-rank test, with censoring at date of last follow-up in May 2018.

All *P* values were two-sided, and *P* < .05 was considered statistically significant. Descriptive summaries included mean and confidence intervals for quantitative measures and case numbers and percentages for qualitative measures.

## RESULTS

A total of 312 patients were identified from hospital records using the aforementioned selection criteria. Of those, 143 were excluded for the following reasons: bowel obstruction due to postoperative ileus ( $n = 86$ ), adhesions ( $n = 40$ ), incarcerated hernia ( $n = 5$ ), sigmoid volvulus ( $n = 3$ ), radiation stenosis ( $n = 2$ ), and MBO at the time of initial ovarian cancer diagnosis ( $n = 7$ ). The remaining 169 patients were divided into two groups for comparison: the baseline group (preimplementation of MBO program) and MBO program group (postimplementation of the MBO program).

### Clinical Characteristics of Patients With MBO

The clinical characteristics of the 169 patients are listed in [Table 1](#). Overall, median age at MBO diagnosis was 62 (range, 31 to 91) years. The predominant primary cancer diagnoses were ovarian cancer ( $n = 124$ ; 73%), uterine cancer ( $n = 30$ ; 18%), and cervical cancer ( $n = 15$ , 9%). Most patients ( $n = 134$ ; 80%) had stage III-IV disease at the time of diagnosis. The median duration from initial cancer to MBO diagnosis was 35 (range, 3 to 205) months. At initial MBO diagnosis, most patients presented with small-bowel obstruction ( $n = 131$ ; 78%). On imaging, approximately half of all patients had a single transition point ( $n = 83$ ; 50%) and low-grade obstruction ( $n = 89$ ; 53%).

### Hospital Admission Due to MBO

The average cumulative LOS ( $LOS_{sum}$ ) in hospital within the first 60 days of MBO diagnosis was significantly shorter in the MBO program group (13 days [95% CI, 10 to 16] v 22 days [95% CI, 18 to 26];  $P = .006$ , adjusted for age, histology, platinum sensitivity, and surgery; [Fig 1A](#)). This magnitude of difference was similar when comparing the mean  $LOS_{sum}$  for the first 90 days and 180 days of MBO diagnosis. For the first 90 days of MBO diagnosis, the mean  $LOS_{sum}$  was 14 days (95% CI, 11 to 17) versus 23 days (95% CI, 18 to 27; adjusted  $P = .006$ ; [Fig 1B](#)). Expanding to the first 180 days of MBO diagnosis, the mean  $LOS_{sum}$  was 15 days (95% CI, 11 to 19) versus 23 days (95% CI, 15 to 31;  $P = .113$ ; [Fig 1C](#)). Since the initial diagnosis of MBO, patients had a median of two hospital admissions (range, 0 to 8) and the median time interval between MBO-related admissions was 26 (range, 1 to 880) days.

The median overall survival (OS) for all patients with MBO was 141 (95% CI, 100 to 189) days. Notably, patients treated under the MBO program lived longer compared with the baseline group: median OS compared with baseline group: 243 (95% CI, 142 to 323) days versus 99 (95% CI, 79 to 133) days;  $P = .002$ , adjusted for initial cancer stage and lines of chemotherapy; [Appendix Fig A1](#), online only).

### MBO Intervention and Outcome

The palliative care team contributed to the care of women with MBO, and their involvement was similar in both the

MBO program group and the baseline group (81% v 82%, respectively). Compared with the baseline group, patients in the MBO program group received less palliative surgery (11% v 21%, respectively) but more chemotherapy (83% v 56%, respectively; [Table 2](#)). The proportions of patients who received TPN (27% v 23%), stent procedure (8% v 5%), or radiation therapy (5% vs 4%) were relatively similar between the MBO program and baseline groups, respectively. Of note, the proportion of patients who received two or more interventions was higher in the MBO program group (42% v 33% of baseline group).

Just above half ( $n = 37$  of 63; 59%) of the patients in the MBO program group would recover from the first episode of MBO ([Table 2](#)). Of those, most ( $n = 25$  of 37; 68%) subsequently had another episode of MBO. Similarly, half of the patients ( $n = 54$  of 106; 51%) in the baseline group recovered from the first episode of MBO and of those, 31 of 54 (57%) had recurrent MBO episodes. Complications that occurred due to MBO included bowel perforation (MBO program group v baseline group: 13% v 5%) and fistulizing disease (MBO program group v baseline group: 6% v 12%).

Of the 111 patients who received chemotherapy at the time of MBO, approximately 33% ( $n = 37$  of 111) subsequently received up to three additional lines of chemotherapy at the time of disease progression.

Forty-one patients (24%) received TPN for a median duration of 69 (range, 9 to 739) days. At baseline, the median body mass index was 22 (range, 14 to 38)  $kg/m^2$  and serum albumin level was 33 (range, 23 to 44) g/L. Of those, nine patients were able to resume oral diet as they responded to treatment (two underwent diverting stoma surgery and all had chemotherapy). A subgroup of 11 patients (27%) received TPN for longer than 6 months, up to 2 years. The complication rate related to line sepsis was 24% ( $n = 10$  of 41) in patients who received TPN.

### Cost Analysis for Hospital Admission

The cost per hospital admission (in Canadian dollars) for patients treated as part of the MBO program (mean, \$12,284; median, \$8,810; range, \$840 to \$42,179) was less than for the baseline group (mean, \$18,934; median, \$12,800; range, \$978 to \$138,556). Similarly, the cost per patient, including multiple episodes of hospital admissions, in the MBO program group (mean, \$17,358; median, \$15,032; range, \$1,523 to \$84,106) was less than that in the baseline group (mean, \$24,885; median, \$17,871; range, \$2,506 to \$138,556).

## DISCUSSION

To our knowledge, this is the first study to demonstrate the benefit of an interprofessional MBO program toward improving the complex care of patients with MBO secondary to gynecologic cancer. Patients who were treated under the MBO program were discharged sooner from hospital and supported as outpatients than those treated before

**TABLE 1.** Clinical Characteristics of Patients With Advanced Gynecologic Cancer Who Developed Malignant Bowel Obstruction

Characteristic	Baseline Group (n = 106)	MBO Program Group (n = 63)
Age at MBO diagnosis, median (range), years	63 (31-84)	60 (33-91)
Time from initial cancer to MBO diagnosis, median (range), months	31 (3-205)	37 (5-124)
<i>BRCA1/2</i> mutation carrier		
Yes	18 (17)	10 (16)
No	33 (31)	27 (43)
Variant of unknown significance	2 (2)	5 (8)
Primary cancer and histologic type		
Ovarian cancer		
High-grade serous carcinoma	69 (65)	44 (69)
Low-grade serous carcinoma	2 (2)	4 (6)
Other subtype*	4 (4)	1 (2)
Uterine cancer		
High-grade serous carcinoma	6 (6)	4 (6)
Endometrioid adenocarcinoma	5 (5)	5 (8)
Other subtype†	9 (8)	1 (2)
Cervical cancer		
Squamous cell carcinoma	7 (7)	2 (3)
Adenocarcinoma	4 (4)	2 (3)
Platinum sensitivity of ovarian cancer at MBO diagnosis		
Sensitive	15 (14)	10 (16)
Resistant	59 (56)	38 (60)
FIGO stage at initial cancer diagnosis		
I-II	7 (21)	9 (15)
III-IV	83 (79)	50 (80)
Characteristics at first MBO diagnosis		
Site of MBO		
Large bowel only	19 (18)	10 (16)
Small bowel only	81 (76)	50 (79)
Large and small bowel	6 (6)	3 (5)
No. of transition point of MBO		
None	25 (24)	9 (14)
Single	53 (50)	30 (48)
≥ 2	27 (25)	24 (38)
Grade of MBO		
Low grade	58 (55)	31 (49)
High grade	44 (42)	32 (50)
Presence of other cancer characteristics at MBO diagnosis		
Ascites	49 (46)	32 (51)
Intra-abdominal mass > 5 cm	38 (36)	16 (25)
Extra-abdominal disease	39 (37)	14 (22)
Serum albumin < 30 g/L	29 (27)	7 (11)

NOTE. Data are reported as No. (%) unless otherwise indicated.

Abbreviations: FIGO, International Federation of Gynecology and Obstetrics; MBO, malignant bowel obstruction.

\*Includes endometrioid, mucinous, clear cell, and granulosa cell histologic types.

†Includes carcinosarcoma, sarcoma, and leiomyosarcoma histologic types.

implantation of the MBO program. In addition, they were more likely to receive multimodality interventions (MBO program group *v* baseline group, 43% *v* 33%) under a collaborative multidisciplinary care platform and had a longer median survival of approximately 5 months.

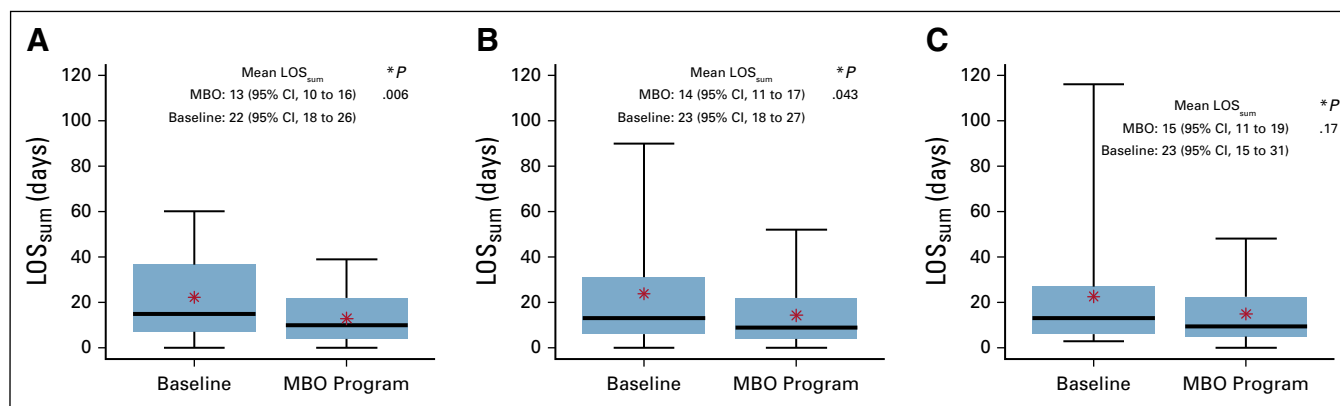
In our study, most women with MBO had recurrent ovarian cancer and, unfortunately, had recurrent MBO episodes requiring ongoing management. This finding is in keeping with those reported by Martinez Castro et al<sup>1</sup> that women with MBO and ovarian cancer have a median of three episodes of MBO before death; the median time interval between each episode is 17 (range, 1 to 727) days. The mean LOS was 13 days for each MBO episode in the aforementioned study.<sup>1</sup> In comparison, our study captured the accumulated LOS<sub>sum</sub> within the first 60 to 180 days to include the recurrent admissions for each patient. The significant improvement in LOS<sub>sum</sub> from 22 to 13 days (within the first 60 days of MBO diagnosis) is evidence for the positive impact of our MBO program in augmenting and sustaining the delivery of high-quality care support in the outpatient setting.

Unique to this MBO program is an integrated outpatient model of care and emphasis on patient education. The MBO program connects the inpatient and outpatient care teams using existing hospital resources and infrastructure. Using standardized triage and assessment tools we developed, patients' symptoms were followed proactively by specialized gynecology nurses for early intervention and support. The program also connected patients with community care services, such as home palliative care services, community ambulatory nursing care, and domestic care services, to maximize patient support at home without incurring extra costs to the hospital system. Education about MBO was also critical for empowering patients and their caregivers to confidently manage their symptoms and know when to seek help, particularly given the high risk of MBO recurrence. Patients were provided teaching and

written information packages about MBO so they could effectively communicate their symptoms and participate in decision-making. This study demonstrated how adopting measures such as standardized proactive assessments and education tools can evolve the previous inpatient model of care toward a sustainable, safe, and efficient ambulatory model of care.

The MBO program group has demonstrated a significant survival advantage of approximately 5 months compared with the baseline group. The median OS in the baseline group was comparable with that reported in previous studies, ranging from 45 to 169 days.<sup>1,4,5,9,10</sup> The clinical and MBO characteristics were similar between the two groups (Table 1). We hypothesize that this survival advantage is due to the overall impact of the MBO program in early identification of symptoms, tailored treatment intervention (before onset of complications), and best supportive care adapted specifically for women with MBO secondary to gynecologic cancer. A core feature of the MBO program is that patient cases were reviewed at the dedicated MBO multidisciplinary case conferences. This interdisciplinary approach likely accounts for the differences in treatment pattern between the two groups and provides an explanation of why patients in the MBO program were more likely to receive multimodal intervention. The integration of management algorithms eased patients' transition from hospital to home. After discharge, patients were proactively followed by specialized gynecology nurses and community services. In addition, patients were screened and referred promptly to allied health professionals, such as dietitians for nutrition assessment and low-fiber diet education. All these measures would collectively enable early intervention for patients who developed or were at risk for developing another episode of MBO.

There is ongoing controversy regarding the use of TPN in patients with incurable cancer who develop bowel



**FIG 1.** Box plots of accumulated hospital length of stay (LOS<sub>sum</sub>) before and after implementation of the malignant bowel obstruction (MBO) program. (A) First 60 days after MBO diagnosis. (B) First 90 days after MBO diagnosis. (C) First 120 days after MBO diagnosis. (\*) Adjusted for age, histology, platinum-sensitivity status, and surgery.

**TABLE 2.** Care Management of Patients With MBO Before and After Implementation of MBO Program

Type of Care	Baseline Group (n = 106)	MBO Program Group (n = 63)
Hospital admission		
Length of stay in first 60 days of MBO, median (95% CI), days	22 (18 to 26)	13 (10 to 16)
No. of admission episodes per patient, median (range)	2 (0-7)	2 (0-8)
No. emergency department episodes, median (range)	1 (0-8)	1 (0-9)
No. of ICU admission episodes	5	1
MBO intervention		
Palliative care team involvement	87 (82)	51 (81)
Surgery	22 (21)	7 (11)
Diverting stoma, No.	16	6
Bypass surgery, No.	3	0
Bowel resection, No.	1	0
Exploratory laparotomy, No.	2	1
Stent	5 (5)	5 (8)
Chemotherapy	59 (56)	52 (83)
Platinum-based doublet or single agent, No.	21	22
Taxane-based agent, No.	29	24
Liposomal doxorubicin, No.	17	16
Other single agents, No.*	8	14
Clinical trial agent, No.	6	5
Hormonal therapy, No.	2	2
Radiation therapy	4 (4)	3 (5)
Total parental nutrition	24 (23)	17 (27)
Patients receiving two or more interventions	35 (33)	27 (43)
Outcome		
MBO resolution		
Resolution from first episode of MBO	54 (51)	37 (59)
Progressive MBO	52 (49)	26 (41)
Recurrent MBO episodes	31 (29)	25 (40)
Complications due to MBO		
Bowel perforation	5 (5)	8 (13)
Fistulizing disease	13 (12)	4 (6)

NOTE. Data reported as No. (%) unless otherwise indicated.

Abbreviations: ICU, intensive care unit; MBO, malignant bowel obstruction.

\*Includes gemcitabine, cyclophosphamide, topotecan, and trabectedin.

obstruction. Prior studies investigating the use of TPN in patients with advanced gynecologic cancer and MBO invariably reported short median OS of 40 to 93 days, with concerns of complication rates up to 54%, such as catheter-related infection.<sup>11-15</sup> However, embedded within these studies was a subgroup of patients who survived for extended periods (24% survival at 6 months and 8% survival beyond 1 year).<sup>11-13,16-18</sup> The predictive factors of who would benefit from TPN for an extended period are still unclear. Similarly, we found that 27% of patients receiving TPN seemed to derive extended benefit, surviving beyond 6 months and up to 2 years. Owing to the availability of

a home TPN service at our center, patients who were deemed suitable for TPN would commence TPN in the hospital and, in parallel, would be trained to self-manage their TPN before being discharged. Once discharged, they would be followed by the home TPN program and be supported to self-administer TPN overnight at home. The catheter complication rate for our patients receiving TPN was 24%, likely attributed by the frequent use of a central catheter for an extended period.

This study is subject to limitations, given the retrospective analysis of this single-institution study. This pilot MBO program requires additional validation to determine

whether it can be adopted by other institutions. The broad integration of this MBO program will depend on the organization, infrastructure, and resources available within the local health care system. Given the inherent limitation of the retrospective study, it is not possible to distinguish improvement in survival related to lead time bias, because of early recognition of MBO and measuring survival from an earlier time point, or true improvement in survival because of greater opportunity for therapy and intervention on the basis of defining impending bowel obstruction and managing it more effectively. Prospective confirmation of survival improvement requires randomized evaluation with a cluster randomized clinical trial. There is also ongoing debate as to what constitutes a clinically relevant study end point for symptom control in MBO. The recurrent and progressive nature of MBO may inherently hinder

the ability to appropriately assess the effectiveness of MBO interventions. A prospective clinical trial (Risk Stratified Multidisciplinary Ambulatory Management of Malignant Bowel Obstruction [MAMBO] Program for Women With Advanced Gynecological Cancers study; ClinicalTrials.gov identifier: [NCT03260647](https://clinicaltrials.gov/ct2/show/study/NCT03260647)) is currently underway, integrating the assessment of quality-of-life measures in patients with MBO and qualitative interviews to evaluate their care needs.

In conclusion, a collaborative approach is instrumental in optimizing care of patients with MBO and improving patient outcomes. The implementation of an interprofessional MBO program may reduce duration of hospitalization and support and empower patients in an outpatient setting without adding additional financial or infrastructure strain to a specialized cancer center.

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## PRIOR PRESENTATION

Presented at Palliative and Supportive Care Symposium, San Diego, CA, October 27-28, 2017.

## SUPPORT

Y.C.L. was supported by funding from Princess Margaret Cancer Foundation and an Australian Government Research Training Program Scholarship.

## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST AND DATA AVAILABILITY STATEMENT

Disclosures provided by the authors and data availability statement (if applicable) are available with this article at DOI <https://doi.org/10.1200/JOP.18.00793>.

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## ACKNOWLEDGMENT

We acknowledge the assistance of the Princess Margaret Cancer Centre gynecology site group, gynecology specialized nurses, total parenteral nutrition team, palliative care team, inpatient ward team, Madeline Li, and Zsolt Hering. We also thank Pamela Savage, Preeti Dhar, Stephane Laframboise, Chadi Sami, and Marcus Butler for their contributions to the malignant bowel obstruction working group and multidisciplinary meetings.



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#### **AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**

##### **Optimizing the Care of Malignant Bowel Obstruction in Patients With Advanced Gynecologic Cancer**

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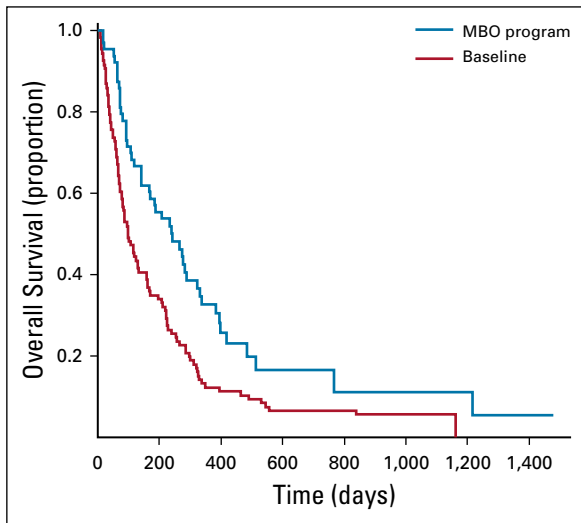
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No other potential conflicts of interest were reported.

## APPENDIX



**FIG A1.** Overall survival of patients with advanced gynecologic cancer who developed malignant bowel obstruction (MBO), before and after implementation of MBO program.