

Outcomes of palliative surgery for bowel obstruction in end of life ovarian cancer care in a tertiary cancer centre

Bernard Kennedy^{1,*}, Kate Sexton¹, Noreen Gleeson¹¹Department of Gynaecology, St James Hospital, D08 NHY1 Dublin, Ireland*Correspondence: kennedybernard@outlook.com (Bernard Kennedy)

DOI:10.31083/j.ejgo4206162

This is an open access article under the CC BY 4.0 license (<https://creativecommons.org/licenses/by/4.0/>).

Submitted: 29 August 2021 Revised: 8 October 2021 Accepted: 14 October 2021 Published: 15 December 2021

Objective: We studied the demographic of patients with ovarian cancer in end of life care undergoing palliative surgery for bowel obstruction in relation to its success in restoring bowel function and enhancing other aspects of palliative care, including discharge from the acute hospital setting. **Methods:** Hospital data on all consecutive ovarian cancer patients who underwent palliative surgery for bowel obstruction over five years up to end December 2017 was analysed. Successful palliation was measured by relief of bowel obstruction and discharge from the acute hospital setting. **Results:** Twenty-eight patients were identified. The mean age at time of surgery was 64.75 years. Histology was high grade serous in the majority (63.5%). Substantial co-morbidities were cardiovascular (10.7%) and respiratory (14.3%) at initial diagnosis. Surgery was performed on average after 13 days of conservative management of bowel obstruction (Standard deviation (SD) 10.6 days). All had some procedure for bowel decompression; 82% (23) required stoma including gastrostomy 10% (3); jejunostomy 3% (1); ileostomy loop 25% (7), double barrel ileostomy 3% (1), end ileostomy 10% (3); colostomy loop 10% (3), end colostomy 14% (4); end ileostomy & loop colostomy 3% (1). No stoma was required in 18% (5). 42.8% (12) had an anastomosis to bypass obstruction and five of these did not require a stoma. Postoperative complications arose in 30%. Sixteen had protracted hospital stay after surgery, 14 for clinical reasons and 2 for social/domestic reasons. Two patients died in the acute hospital following surgery. Median survival following surgery was 84 days. **Conclusions:** The management of bowel obstruction in end of life care in ovarian cancer is a common and challenging clinical task. Surgery to palliate bowel obstruction was successful in the majority of this cohort of patients with advanced ovarian cancer in end of life care.

Keywords

Ovarian cancer; Bowel obstruction; Palliative surgery

1. Introduction

Ovarian cancer accounts for 3.7% of malignancies in Irish women. The 5-year survival is dependent on the stage at diagnosis, with a 5-year survival of over 80% for stage 1 disease dropping to 15% for stage IV disease [1]. Ovarian cancer typically presents late [2] and the common histopathological type, high grade serous cancer has a predilection for omental and mesenteric tissue metastasis possibly due to the cancer's metabolic requirement for fatty-acid-based catabolism [3]. The disease burden and tumour infiltration can mechanically alter enteric and colonic transit, and mesenteric carci-

nomatosis and destruction of the bowel wall myenteric plexus can cause functional bowel obstruction and distension [4].

Gastrointestinal dysfunction is common in end of life for many cancer sites [5]. Although the true incidence of bowel obstruction in ovarian cancer is not known, several retrospective studies have suggested that it occurs in 25 to 50% of all cases [6]. Relief of actual or imminent bowel obstruction is often part of the primary surgical cytoreductive effort. Relief of bowel obstruction in the subsequent care pathway and especially in the advanced end of life setting is very challenging. Bowel obstruction usually occurs in parallel with a deterioration in performance status in patients with advanced cancer and malignant bowel obstruction is often associated with anaemia, hypoalbuminaemia, alterations in hepatic enzymes, dehydration and prerenal renal impairment and cachexia [3].

When death is deemed to be imminent the medical management of obstruction with a focus on comfort measures such as subcutaneous hydration, antiemetics, analgesics, anxiolytics, and continued gastric drainage via nasogastric or percutaneous gastrostomy drain, may be sufficient to facilitate patient transfer to the optimum end of life environment. When survival is expected to run for several weeks, surgical intervention is considered with the intent of discharge to palliative care in the community, with more comfort and without a nasogastric tube.

Patient selection for surgical intervention is a challenge. Laparotomy is usually required because the intraperitoneal disease and scarring makes minimal access less likely to succeed. The surgeon's overriding concern is that the intervention may be futile, as it may not relieve the obstruction, and yet cause the patient more pain, admission to an intensive care setting, protract the acute hospital stay as well as disappoint the patient and her family. Complications associated with such surgeries include high-output stomas, short-bowel syndrome, fistulae, wound break-down and infection. The mortality within 30 days from surgery is estimated at 6% [7].

The multidisciplinary gynaecological oncology team approach is key to the appropriate selection of patients with bowel obstruction for surgical intervention. Discharge from hospital is considered an important measurable outcome. In a survey of a healthy Irish population, only 5% of people expressed a wish to die in hospital, with 63% and 27% express-

ing their preference to die at home or inpatient hospice care respectively [8].

This is the first report of surgical intervention for bowel obstruction in advanced end of life care exclusively for ovarian cancer in an Irish setting. We looked at the success in achieving symptomatic relief of bowel obstruction, the surgery-related morbidity and other postoperative complications, transition from an acute hospital setting to home or hospice setting, duration of survival and readmissions. We analysed the clinical, radiological, haematological and biochemical parameters at the time of decision to operate.

2. Methods

This study was a retrospective observational study of patient demographics in those who underwent palliative surgery for bowel obstruction secondary to ovarian cancer in end of life care. The inclusion criteria were consecutive patients with ovarian cancer (all histologies) who had discontinued chemotherapy or other active disease modifying agents, and who subsequently developed bowel obstruction which was refractory to standard medical care. The decision to perform a palliative surgery was determined on a case by case basis. Clinicians considered the patient's clinical status, co-morbidities, patient's and family's expectations and the likelihood of facilitating discharge from hospital when deciding on suitability for surgery. The institution did not have pre-determined selection criteria for considering/excluding patients for such surgery. Those who underwent palliative surgery for bowel obstruction between 1st of January 2013 and 31st of December 2017 at the gynaecological oncology centre of St James's Hospital Dublin formed the study cohort.

Eligible patients were identified from the cancer data base, and the diagnosis was confirmed by reviewing the patient records. Patients were excluded if the surgery was not performed with the explicit aim to provide palliation from malignant bowel obstruction symptoms, and we excluded patients with bowel obstruction due to gynaecological malignancies other than ovarian cancer.

Complete data regarding admission, diagnosis, and pre- and post-op hospital care was gained from individual patient hospital records. Electronic and paper charts were reviewed. Time and location of death were derived from a combined review of medical and death records.

Details studied included use of conservative measures such as nasogastric tube insertion, IV fluid rehydration, and bowel rest, prior to surgery. Histological diagnosis, and stage of cancer at primary presentation, age, comorbidities. ECOG & Karnofsky performance scores were recorded at initial presentation to the gynae oncology service, and when admitted with bowel obstruction. Preoperative haemoglobin, serum sodium, potassium, calcium, creatinine, albumin were reviewed to assess prevalence of electrolyte disturbances, altered renal or hepatic function, and anaemia. Preoperative radiological findings were recorded, including the site of bowel obstruction, and single or multilevel obstruction.

Postoperative outcomes were the duration of hospital stay, survival following surgery, complications including ICU admission, high stoma output, wound infections, and all other postoperative complications. We documented where the patient was discharged to, and whether there were further admissions to an acute hospital. Date and location of death (hospital, hospice, or home) were recorded.

All information was anonymised and stored on a password-protected computer.

Data Analysis was performed using IBM SPSS Statistics V26 (IBM Corp., Chicago, IL, USA).

3. Results

A cohort of 28 women met the inclusion criteria over a 5-year period 2013–2017. All patients previously underwent laparotomy and cytoreductive surgery during their treatment. Histological diagnoses were 18 high grade serous (63.5%), 4 clear cell (14.3%), 3 endometrioid (10.7%), 2 undifferentiated adenocarcinoma (7.1%), and 1 neuroendocrine cancer (3.6%).

Twenty-seven patients had Stage III or IV disease at primary presentation. Performance status at initial presentation with cancer was recorded as ECOG 0 (15), 1 (3), 2 (1), and was not recorded in 9 cases. Co-morbidities included cardiovascular in 3 (10.7%) and respiratory in 4 (14.3%) at initial diagnosis. No patients had renal or vascular disease at time of initial cancer diagnosis. The mean age at time of palliative surgery was 64.75 (Range 36 to 84). Performance status was recorded in ten patients preoperatively as ECOG 2 (1), 3 (8), 4 (1).

Laboratory results prior to palliative surgery showed haemoglobin <10 g/dL (12), neutrophilia (9) hypokalemia (1), hyperkalaemia (7), acute renal dysfunction with a urea >7 mmol/L (10), creatinine >100 μ mol/L (1), deranged liver function, defined as ALP \geq 130 IU/L or GTT \geq 110 IU/L or AST \geq 40 IU/L or ALT \geq 56 IU/L (6). Albumin <35 g/L (23).

The duration of bowel obstruction symptoms ranged from 2 to 42 days, median 10 days.

27 patients had radiology studies in days immediately prior to surgery. The radiological site of obstruction was jejunum (3) proximal ileal (2) mid ileal (2), distal ileal (6), recto-sigmoid (2), unspecified (12). The site of obstruction at surgery was deemed to be gastric outlet (2), jejunum (1), proximal ileal (2), mid ileal (6), distal ileal (13), left colon (3), pylorus and distal ileum (1). Radiological level of obstruction determined by CT scanning correlated exactly with the surgical level in only two of fifteen cases. All patients underwent laparotomy. Surgical procedures were stomas (23) including gastrostomy (3); jejunostomy (1); ileostomy loop (7), double barrel ileostomy (1), end ileostomy (3); colostomy loop (3), end colostomy (4); end ileostomy & loop colostomy (1). Twelve (42.8%) had an anastomosis to bypass obstruction and five of these did not require a stoma.

There were no admissions to ICU following surgery. Two patients died in hospital on postoperative days 12 and 32. Ten

(35.7%) were discharged within 17 days and without complications. Sixteen discharges were delayed: 14 for clinical adverse outcomes or cancer progression and 2 due to delay in securing family or community support. Complications arising after surgery were stomal (8) namely ischaemia requiring return to theatre (1), high output (7); other, namely protracted nausea or vomiting (4), electrolyte disturbance (4), delirium (2), pneumonia (1), line sepsis (1), wound infection (1), pleural effusion (1). High stoma output was recorded in four small bowel and two large bowel stomas.

Patients were discharged (26) to a community hospital (1), their own home (17), nursing home (4), hospice (4). Readmissions in eleven patients were due to progression of bowel obstruction (3), haematemesis (1), urinary tract infections (3), line sepsis (1), high output stoma (1), hyponatraemia (1), deep vein thrombosis (1). Ten women were hospitalised in the last 30 days of life and two of these women died in hospital. Median survival following surgery was 84 days.

Survival following surgery shows a wide variation, with a range of 12 to 678 days (Fig. 1).

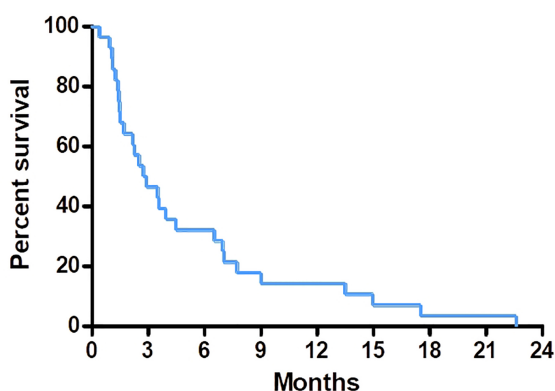


Fig. 1. Kaplan Meier Curve. Median survival of 2.82 months.

4. Discussion

Refractory malignant bowel obstruction is often encountered in the end of life care of ovarian cancer patients. Over a five year period in which 547 cases of new ovary cancer presented, the fact that only 28 patients, approximating to 5% were offered palliative bowel surgery in what was deemed to be their end of life phase highlights the rarity of the intervention. Conservative measures with hydration, analgesics, antiemetics, somatostatin analogues, anxiolytics, radiologically percutaneous gastric drainage and endoscopic procedures circumvent the need for surgery in the majority in a multidisciplinary service. The gynaecological oncology surgeon strives to carefully select those most likely to benefit from a surgical intervention that is usually by open access because the anatomical distribution of metastases and fibrosis from prior surgeries and systemic treatments in ovarian cancer limits the feasibility of minimal access. The infrequency

of the procedure prompted this review of the surgical pathway at our gynaecological oncology unit.

All patients had permanently ceased chemotherapy and/or other disease modifying treatments. The high functional capacity scores at the initial presentation to the Gynaecology OPD are in-keeping with previously published literature that patients who are initially least frail are more resilient in the later stages of disease progression [9]. Performance status had declined to ECOG 3 or 4 in the majority prior to palliative surgery. Laboratory values showed anaemia and biochemical derangement and low albumin that are typical of progressive cancer and bowel obstruction and poor prognosis with malignant bowel obstruction [4, 10]. Symptoms of bowel obstruction were present for a median of 13 days. Radiology with CT scanning showed signs of bowel obstruction in all but identified the site of obstruction in only a few. The poor correlation of radiology with the surgically identified site of obstruction is not unexpected. Fibrosis resulting from the inflammation that accompanies carcinomatosis and its response to systemic treatments can prevent the bowel wall from distending in part or in total. We regard the failure of the bowel lumen to distend at all in the presence of obstruction as suggestive of extreme fibrosis that is likely to make surgery unsuccessful. Fibrosis extending to involve the mesentery can prevent the mobilisation and elevation proximal to the obstruction that is required to fashion a stoma.

Small bowel obstruction accounted for the majority of cases and this is similar to a recent series on malignant bowel obstruction in mixed gynaecological cancer [11]. That bowel mobilisation to achieve either re-anastomosis or a small or large bowel stoma succeeded in all except three patients (89%) suggests good selectivity despite the limitations of radiological assessment. When bowel stoma was not achievable, a gastrostomy was performed for three patients. Venting gastrostomy allows for discontinuation of nasogastric tubes and providing some satisfaction from resumption of limited oral intake [12]. Five (18%) patients avoided stoma formation by resection and anastomosis of the obstructed segment(s). Re-anastomosis is undertaken judiciously because obstruction with ovarian cancer is rarely discrete and there is the concern that further obstruction could evolve proximal to the site of anastomosis. Reassuringly, none of this cohort required secondary surgeries to relieve bowel obstruction.

We considered the three key elements of successful palliation of bowel obstruction in this end of life cohort as discharge from the cancer centre, not requiring ICU care post operatively, and no direct surgical mortality; 92% of cases fulfilled these criteria. Postoperative mortality was 8% and the two deaths occurred more than a week following surgery. One third of patients were discharged without any postoperative complication. Half of the delayed discharges were due to stomal complications, principally high output with resulting electrolyte imbalance and ongoing nutritional deficiency. The colostomies with high output had all had proximal anastomosis. Short bowel can be anatomical or functional and is

often a combination of both. Prolonged fasting causes villous atrophy [13]. The stomal outputs usually reduce after an undetermined period of time once oral intake is reestablished. More than 90% of patients were discharged from the cancer centre and 64% survived greater than 60 days. Engagement with palliative care in itself prolongs survival [14] and all our patients were already under the umbrella care of the palliative team. Sixty percent of patients avoided further acute hospital admissions. Avoiding death in the acute hospital is expected to enhance quality of end of life care for both patients and family and also the cost [15]. Surgical management of malignant bowel obstruction is a valuable tool for consideration in the collaborative palliative approach in end of life care for women with ovarian cancer.

Limitations of this study include the small sample size and absence of a comparison group. Decision to operate was individualised for each case, so limited information regarding the factors that influence appropriate patient selection and their outcomes can be drawn from this study. Despite these limitations, the results of this review give reassurance to gynaecological oncologists that there is a role for palliative surgery in end of life care for women with malignant bowel obstruction from ovarian cancer. The number of patients in this study is small reflecting the high level of selectivity that is deemed appropriate in order to achieve best results. A prospective and randomised study is unlikely to be achievable and there is a high level of experiential multidisciplinary individualised decision making required to commit a patient in end of life to laparotomy.

5. Conclusions

“Primum non nocere”. The gynaecological oncology surgeon strives to avoid surgical interventions in end of life care unless convinced that they will enhance the quality of survival. Prolonging survival may be an added bonus. Even when faced with a nasogastric tube on continuous drainage that decision is not always easy. This series reassures us that there is clearly a role for palliative surgery, even in patients with a poor performance status, as surgery can succeed in restoring the dignity and the other benefits of completing life beyond the acute hospital setting. We recommend the highest level of decision making in the multidisciplinary setting to achieve this, as the factors that predict good surgical outcome remain unclear.

Author contributions

NG and BK designed the research study. BK and KS performed the research. BK performed Statistical analysis. BK and NG wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the St James Hospital/Tallaght University Hospital/Trinity College

Dublin Ethics Board (Approval number 020-07 List 27-(18)), and was registered with the St James Research and Innovation Office.

Acknowledgment

We would like to express our gratitude to all those in the Gynaecology department of St James Hospital who helped during the writing of this manuscript. We would like to thank all the peer reviewers for their opinions and suggestions.

Funding

This research received no external funding.

Conflict of interest

The authors declare no conflict of interest.

References

- [1] NCRI. Measuring cancer cure in Ireland. 2019. Available at: https://www.ncri.ie/sites/ncri/files/pubs/NCRICancerCure_report_26022019.pdf (Accessed: 8 October 2021).
- [2] Pickel H, Lahousen M, Stettner H, Girardi F. The spread of ovarian cancer. *Baillieres Clinical Obstetrics and Gynaecology*. 1989; 3: 3–12.
- [3] Nieman KM, Kenny HA, Penicka CV, Ladanyi A, Buell-Gutbrod R, Zillhardt MR, *et al*. Adipocytes promote ovarian cancer metastasis and provide energy for rapid tumor growth. *Nature Medicine*. 2011; 17: 1498–1503.
- [4] Ripamonti CI, Easson AM, Gerdes H. Management of malignant bowel obstruction. *European Journal of Cancer*. 2008; 44: 1105–1115.
- [5] Teunissen SCCM, Wesker W, Kruitwagen C, de Haes HCJM, Voest EE, de Graeff A. Symptom prevalence in patients with incurable cancer: a systematic review. *Journal of Pain and Symptom Management*. 2007; 34: 94–104.
- [6] Kucukmetin A, Naik R, Galaal K, Bryant A, Dickinson HO. Palliative surgery versus medical management for bowel obstruction in ovarian cancer. *Cochrane database Systematic Reviews*. 2010; 2010: CD007792.
- [7] Pothuri B, Vaidya A, Aghajanian C, Venkatraman E, Barakat RR, Chi DS. Palliative surgery for bowel obstruction in recurrent ovarian cancer: an updated series. *Gynecologic Oncology*. 2003; 89: 306–313.
- [8] Weafer J. Irish attitudes to death, dying and bereavement. 2004–2014. 2014.
- [9] Helyer L, Easson AM. Surgical approaches to malignant bowel obstruction. *The Journal of Supportive Oncology*. 2008; 6: 105–113.
- [10] Roeland E, von Gunten CF. Current concepts in malignant bowel obstruction management. *Current Oncology Reports*. 2009; 11: 298–303.
- [11] Lee YC, Jivraj N, O'Brien C, Chawla T, Shlomovitz E, Buchanan S, *et al*. Malignant Bowel Obstruction in Advanced Gynecologic Cancers: an Updated Review from a Multidisciplinary Perspective. *Obstetrics and Gynecology International*. 2018; 2018: 1867238.
- [12] Gleeson NC, Hoffman MS, Fiorica JV, Roberts WS, Cavanagh D. Gastrostomy Tubes after Gynecologic Oncologic Surgery. *Gynecologic Oncology*. 1994; 54: 19–22.
- [13] Chappell VL, Thompson MD, Jeschke MG, Chung DH, Thompson JC, Wolf SE. Effects of incremental starvation on gut mucosa. *Digestive Diseases and Sciences*. 2003; 48: 765–769.
- [14] Temel JS, Greer JA, Muzikansky A, Gallagher ER, Admane S, Jackson VA, *et al*. Early palliative care for patients with metastatic non-small-cell lung cancer. *The New England Journal of Medicine*. 2010; 363: 733–742.
- [15] Hoverman JR, Mann BB, Phu S, Nelson P, Hayes JE, Taniguchi CB, *et al*. Hospice or Hospital: The Costs of Dying of Cancer in the Oncology Care Model. *Palliative Medicine Reports*. 2020; 1: 92–96.