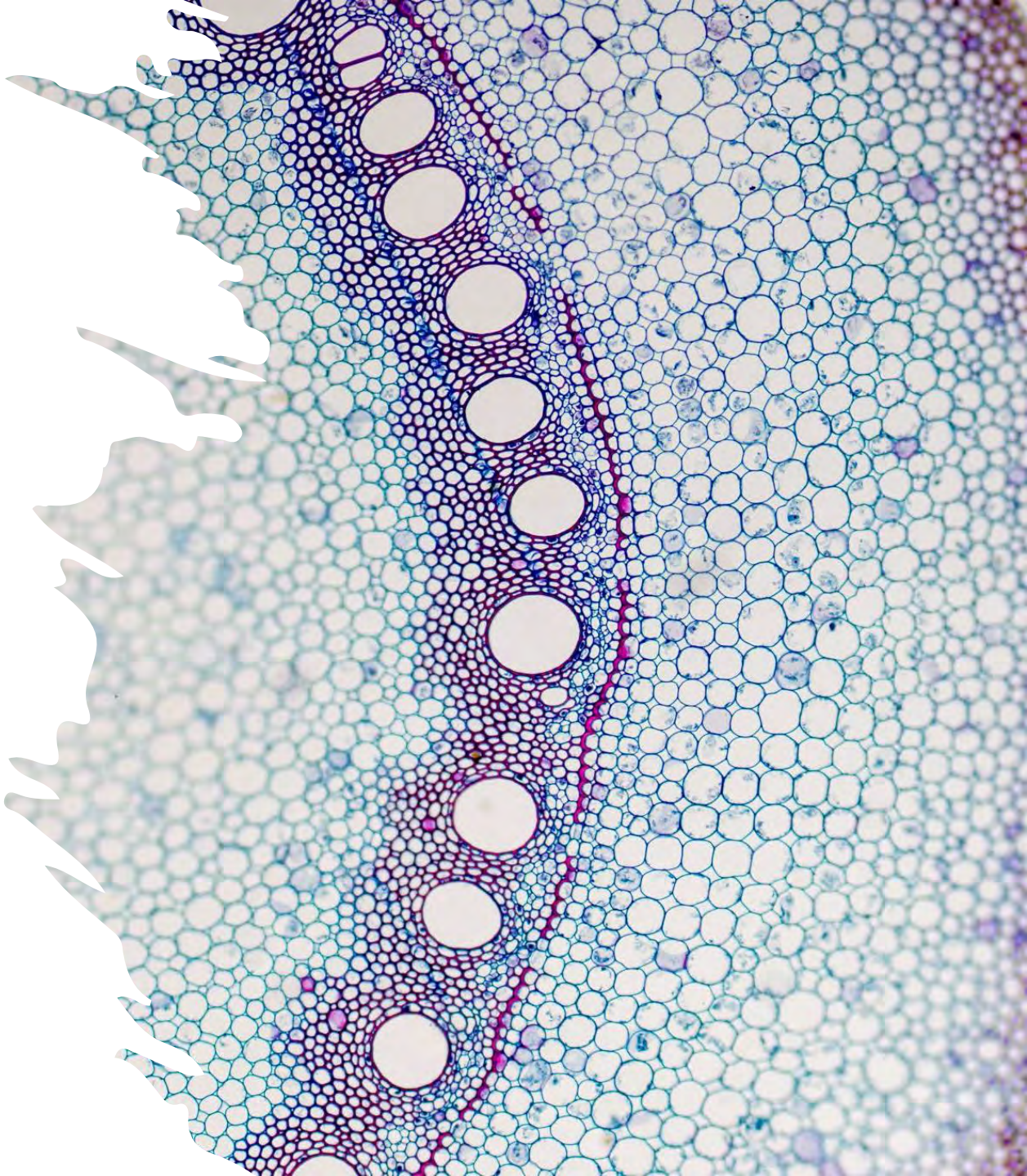
Malignant Bowel Obstruction

Sudeep Pandey, Evgenia Granina



Patient’s Basic Information

Age : 42 years

Sex : Female

Marital Status : Married, with 2 daughters

Substance use : Non smoker (“Smoked 100 cigarettes in her lifetime”) Non-consumer of alcohol No drug use or abuse

Past medical history: Not significant

Past surgical history: Laparoscopic knee surgery

Family history : Not significant

Documented Allergies:

- Adhesives and Band aid - Blistering
- Doxycycline - Difficulty swallowing solids
- Compazine - “Jittery”

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Oncologic History

June 2016:
US revealed bilateral ovarian masses

July 2016:
Total abdominal hysterectomy and bilateral salping-oophorectomy

September 2016:
Appendectomy & peritoneal biopsies.
Pathology demonstrated Mixed adenoneuroendocrine carcinoma

Oct 2016 – Mar 2017:
12 cycles of adjuvant FOLFOX

October 2019:
Worsening peritoneal carcinomatosis

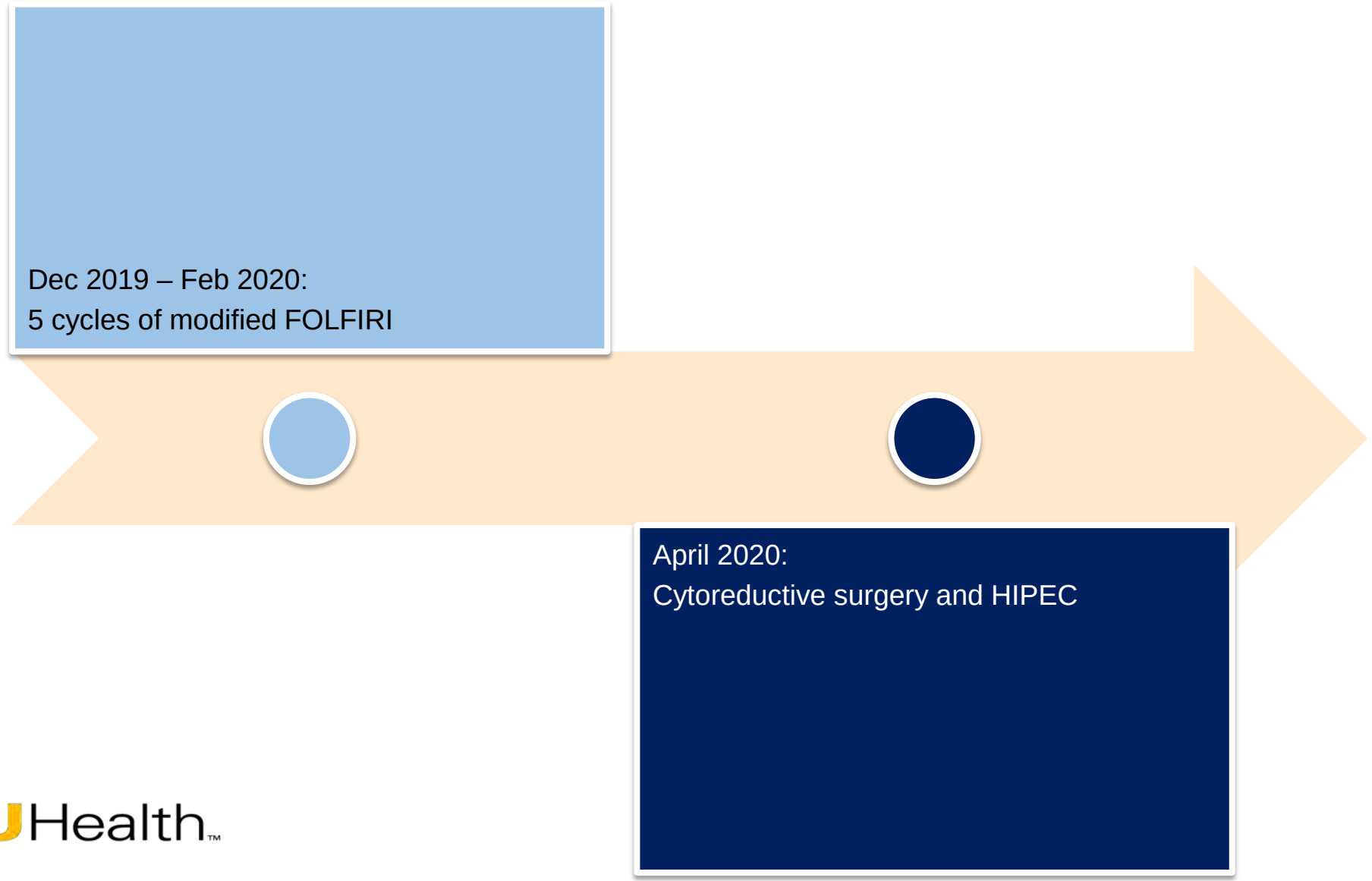
November 2019:
Diagnostic laparoscopy; biopsy confirmed peritoneal carcinomatosis positive for recurrent disease

Oncologic history … Nov 2019

Was first seen by **Clinical Psychology in November 2019**

- Premorbid high levels of anxiety and **describes self as "a worrier"**
- Experiences **anticipatory anxiety** when coming to appointments at Massey Cancer center
- Patient states "I hate coming here, it makes me so anxious."
- She has **difficulty coping with situations** that have a high level of uncertainty and a low level of personal control.
- States once she “has a treatment plan in place, she will be less anxious”
- Experiencing many different emotions at this time including anxiety, anger, sadness.
- Has developed some coping skills for anxiety (e.g. meditation, distraction, household tasks).
- Working with a "parenting coach" who is a friend, she has helped her and husband talk honestly with their children about her cancer.
- IMPRESSION - Unspecified Anxiety Disorder

Post-Chemotherapy



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Follow up after CRS/HIPEC - May 2020

Lot of pain. "Not so much abdominal pain but back pain especially back spasms".
Taking Hydrocodone with no relief.

- Plan - " Largely related to back spasms continue muscle relaxers around the clock until improves. Continue heating pad and PT Recommended topical OTC lidocaine or heat/cold patch. Continue hydrocodone PRN for post op pain."

"Also having a **lot of issues with anxiety** that seems to be escalated with uncontrolled pain." "and issues sleeping at night due to both pain and anxiety." "She ended up in ER overnight for tachycardia which seems to be due to anxiety and pain."

- **Plan -** "Reasonable. Continue Ativan prn for acute anxiety. Can take BID PRN. Encouraged her to take it at night before bed since nights seem to be when her anxiety is the worse Will work on her pain as it seems to trigger her anxiety. Has good family and social support."

Follow up after CRS/HIPEC - May 2020

She also is having **some nausea.** Taking Zofran 4mg PRN.

- Plan **: “** Likely due to recovery of HIPEC, medications, decreased PO intake, reflux encouraged small frequent meals. Continue Zofran PRN. Change dose to 8mg. Increase Prilosec to BID. Continue PRN Tums, H2 blocker

Has **some appetite but eating is difficult** due to dry mouth and bad taste.

“PLAN : Patient unsure if she wants to pursue further treatment at this time. Will allow her to recover for at least another month before considering further treatment”

July 2020:
Found to have a vesicovaginal fistula; Underwent ostomy reversal and repair of vesicovaginal fistula

August 2020:
Underwent rectosigmoid anastomotic stricture dilation twice

September 2020:
EGD; Examined up to second portion of duodenum. Showed normal esophagus & duodenum, small hiatal hernia

September 2020:
Flexible sigmoidoscopy demonstrated patent but mild stenosis of end to end colo-colonic anastomosis in rectosigmoid colon

VCU Heal

01 September 2020

FIRST PALLIATIVE OUTPATIENT CONSULT

- "**Decreased ability to eat**."
- "**Very good appetite, but gets full very easily.**"
- "Has limited ability to go through her strictures, so she is very careful about what she eats."
- "**Weighs 109 lb, down from over 160 lb in April 2020.**"
- "Struggles with her bowels- diarrhea alternating with constipation."
- "Now she has **severe pain from cramping, the Dilaudid doesn't help enough now**."
- "She states Dicyclomine helps in the past, but she would get constipation pains."

ESAS

Pain: 7
Fatigue: 8
Nausea: 0
Depression:4
Anxiety: 6
Drowsiness: 0
Shortness of breath: 6
Appetite: 0
Sleep: 6

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Recommendations

- Neoplasia related pain and postoperative pain - uncontrolled
  - Start Methadone 2.5 mg p.o. BID
  - Continue with Dilaudid PRN
- Opiate induced constipation- also underlying bowel dysfunction related to her surgery would
  - Recommend MiraLax
- Weight loss-due to inability to take in p.o. Due to stricture, await procedure that is upcoming to repeat next week
  - Would recommend Mirtazapine if this is successful.
- Discussed options of oral rehydration

Follow up visit in 2 weeks - 15 Sept 2020

- After her second stricture dilation.
- “**Limited PO intake due to severe pain following eating”**
- She states **she is "starving"**
- Her husband wants to **consider TPN as they are afraid she is just starving to death**.
- Weight down to **105 lbs.**
- **Did not tolerate the methadone** and did not think this helped the pain
- Feels the **Dilaudid helped her pain, but not enough where she can eat**.
- Otherwise she overall just feels like **“she is ready to go”** She was quite tearful.

ESAS

Pain: 7
Fatigue: 8
Nausea: 0
Depression:4
Anxiety: 6
Drowsiness: 0
Shortness of breath: 6
Appetite: 0
Sleep: 6

VCU Health

Recommendations

- **Neoplasia related pain and postoperative pain** - uncontrolled.
  Did not tolerate the Methadone ; Hydromorphone has been helpful and will continue
- **Opiate induced constipation**- also underlying bowel dysfunction related to her surgery would continue MiraLax
- **Weight loss**-due to inability to take in p.o. Stricture post repeat dilation
  Patients and her husband interested in TPN
- **Appendiceal carcinoma with peritoneal carcinomatosis** -
  Unclear plan, admits she is feeling tired, but hopeful to see what further scans show

ADMISSION : September 22, 2020

- **Worsening weight loss and abdominal pain.**
- Patient was admitted to the hospital for **re-staging imaging and evaluation by surgical oncology.**
- Severe intermittent gnawing and crampy abdominal pain especially when eating. She has been unable to tolerate food more than a few small bites. Solid food causes severe upper abdominal pain and cramping and fluids as well but to a lesser degree of severity.
- Persistent nausea, passes flatus and has thin caliber loose stools every other day and fecal urgency.
- She has lost almost **100 lb since diagnosed** with cancer and **around 60 lbs since the CRS/HIPEC** in April 2020.
- Patient is worried she is starving. Wants to discuss starting TPN for nutrition.
- She was tearful and she was unsure if she wants to continue living this way and has no quality of life.
- Code status at the time of admission was DNAR / DNI.

Initial Physical Examination and Labs

Temp : 36.3 BP 128/ 83 mm Hg HR 78/min RR 16 / min SpO2 100% on RA

BMI - 17.2 Height 164 cm Weight 46.3 kg → 102 lbs

Physical Examination

Unremarkable except mild tenderness to palpation on left lower quadrant of abdomen.

Lab Studies

Hb/ Hct 10.0 / 29.6 RBC 3.43 WBC 5.3 Platelets 214

Glucose 69 Sodium 138 Potassium 3.0 Chloride 102 Bicarb 24 AGAP 12

BUN 9 Creatinine 1.09 ---- Baseline creatinine around 0.8 eGFR 63

Calcium 8.2 Albumin 2.9 Magnesium 1.5 Phosphorus 3.6

Total Bilirubin 0.9 AST / ALT 20 / < 6 Alk Phos 65

Total Protein 6.0 Albumin 2.9 Globulin 3.1 Prealbumin 8

PT / INR 15.1 / 1.2

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CT Abd and Pelvis with IV and enteric contrast

- Marked narrowing of the rectosigmoid anastomosis redemonstrated, with edematous appearance of the bowel in the region of the anastomosis. Contrast is noted inferior to the level of the anastomosis. **No frank gastrointestinal obstruction.**
- Interval development of **mild left hydroureteronephrosis** with abrupt tapering of the distal left ureter immediately adjacent to the postsurgical region/adjacent to the rectosigmoid anastomosis. **The left ureter may be narrowed by postsurgical scar tissue**, however, underlying mass cannot be entirely excluded.
- Mildly dilated, contrast-filled **small bowel loops in the anterior abdomen, without evidence of frank obstruction.** Likely adhesive disease involving bowel loops in the anterior abdomen/right hemiabdomen.
- Minimal amount of complex fluid within the abdomen and pelvis.

Consults

Surgical Oncology

Patient states that she **would not consent** to an ostomy in any circumstance.

Recommend :

- **No indication for acute surgical intervention.**
- Diet as tolerated for comfort.
- Can consider feeding tube placement if able to tolerate feeds via enteral tube
- **Start PICC line and TPN for nutrition**

Gastroenterology Consult

Recommend :

- **Patient undergo barium enema to visualize the area**
- Based on barium enema findings, we will decide if patient would benefit from flex sigmoidoscopy and dilation.
- **Will approve TPN for now** to accelerate improving her nutritional status

Consult

Inpatient Palliative Consult

- Pain controlled on PO PRN Dilaudid
- Nausea controlled on PRN Zofran
- Does not want to try Mirtazapine - as increasing appetite would be more distressing
- Does not want to live with poor quality of life.
- Anxiety - coping with family support and PRN Ativan

ESAS

- Pain: 5/10
- Nausea: 0/10
- Depression: 5/10
- Anxiety: 6/10
- Drowsiness: 0/10
- Shortness of breath: 0/10
- Appetite: 0/10
- Has a good appetite, feels hungry all the time. She feels distressed because she want to eat but cannot because of the pain and discomfort she gets after eating.
- Sleep/Rest: 4/10

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Hospital course

Sept 24,2020

- PICC line placement done to start TPN.

Sept 25, 2020

- Patient started on TPN.

Sept 26, 2020

- Patient starts to complain of nausea , vomiting emesis after eating.
- Worsening abdominal cramping pain associated with eating and attempted bowel movements.
- PO Dilaudid for moderate and added IV Dilaudid for severe pain.

Sept 27, 2020

- Patient complains of increased bloating, nausea and vomiting.
- Simethicone added for bloating and pain.
- **XR Abdomen - multiple loops of bowel, may reflect ileus vs partial obstruction**
- **TPN stopped per patient request until she can undergo barium enema.**

Hospital course

Sept 28, 2020

- Terrible night with symptoms.
- Dilaudid doses increased.
- Patient reports **“worsening of her symptoms are due to TPN.”**
- Patient is worried **“that her cancer is back and would not want any further treatment for is and would prefer Hospice.”**
- **Barium Enema** is completed which shows **worsened stricture at the colorectal anastomosis, with associated partial obstruction**. Suspect lesser degree of narrowing of the descending colocolic anastomosis, though evaluation is slightly limited by suboptimal contrast opacification and significant debris within the bowel at this level.
- GI plan to do Flexible sigmoidoscopy on Sept 29, 2020.
- GI also recommend full bowel preparation. Since patient can't tolerate anything p.o., **they recommended NG placement and bowel prep through the NG tube.**

Hospital course

Sept 29, 2020

- Patient anxious to have the flex sig with dilation and possible stent placement.
- Patient discussed with "**surgical oncology - reassured her that her cancer is not back as per imaging, however it is impossible to know without a biopsy."**
- She has multiple questions about the **possible benefits of a G-tube**.
- It was explained that G-tube will be a palliative measure, and would not offer any appreciable nutritional benefit.
- She would likely have to get TPN in the immediate future for nutrition.
- Surgical Oncology - " The patient is mainly focused now on quality of life and **would like to avoid major surgical intervention.** Please continue TPN. **Surgical oncology will follow as she may require venting G tube placement in the future if persistent obstructive symptoms.**

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Hospital course

Sept 30, 2020

- Uneventful post procedure night.
- Nausea was reported as improved
- No episode of vomiting in the past 24 hours.
- Pain and distention was also reported by patient as improved.
- Only complain was of multiple watery non bloody bowel movements, which were similar to bowel movements prior to her hospital admission.
- Patient was **disappointed GI team was unable to dilate her stricture and requested a family meeting on 10/01/2020 to discuss what her remaining options were.**

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Hospital course

Oct 01, 2020

- After discussion of GI and Surgical oncology, GI planned to to take the patient again for flexible sigmoidoscopy to attempt to place a colonic stent.
- During this attempt the wire and balloon were passed through the stricture and into a proximal location within the colon and this was confirmed with intraluminal injection via fluoroscopy. The **stenosis was then stented** with a 22 mm x 6 cm WallFlex stent under fluoroscopic guidance.

Oct 02, 2020

- Patient tolerated the procedure well.
- Was tolerating diet.
- Was recommended buy GI and Surgical Oncology to continue diet and resume TPN.

Hospital course

Oct 04, 2020

- Patient complained of **pressure while voiding** past few days.
- Her previous CT scan did show hydronephrosis.
- Urology was consulted.
- As her renal function is unchanged, although she did have mild elevation to Creatinine to 1.14 which resolved.
- **CT urogram was done which showed bilateral hydroureteronephrosis. The ureters appeared likely obstructed at the level of colorectal anastomosis.** Compromised excretory function of the left kidney was noted.
- Her options include **monitoring** of her renal function without intervention **versus** an bilateral **ureteral stent** placement **versus** bilateral percutaneous nephrostomy **(PCNs)** tubes.
- The latter two options would decompress both of her moderately-dilated collecting systems, and the success rate is generally lower for bilateral ureteral stent placement than PCNs when there are concerns for significant peri-ureteral scar tissue.

Hospital course

Oct 05, 2020

- Patient wanted to go for the most minimally invasive method and **was leaning towards bilateral ureteral stent placement.**
- She was also **recommended to get a G tube.**
- Rationale was that she may benefit from G-tube placement for palliative management of possible bowel obstruction which might happen or her abdominal distention and pain worsens or her obstructive symptoms progress.

Hospital course

Oct 06,2020

- Patient develops **multiple but low volume watery bowel movements** and worsening abdominal pain and bloating .
- Also has an episode of **feculent emesis and increased nausea.**
- **NG tube is inserted for urgent decompression and patient made NPO.**
- Patient agrees to get bilateral ureteral stenting and also a G tube placed for palliation.
- **Her goal is to be out of the hospital by Oct 13,2020 she could go on a vacation to a cabin with her family.**
- Pain medication requirement has increased to around 16 mg of IV Dilaudid in 24 hours . (On PRN Dilaudid 2mg q2hrs)
- Patient later in afternoon after NG tube placement feels her nausea is better.
- Upset about having to get the **NG tube placed and sees this as a setback.**

Hospital course

October 07, 2020

- The patient's symptoms are little better with NG tube.
- Abdominal X-Ray suggestive of ongoing **colonic obstruction at the level of the proximal stent.**
- Scheduled for Bilateral ureteric stent placement and G tube placement on October 8, 2020.

October 08, 2020

- Patient undergoes Bilateral ureteral stent and G tube placement

Hospital course

October 09, 2020

- Patient NG and PEG tubes with gastric contents.
- She reports 10/10 post-procedural pain that improves with IV Dilaudid (16mg/24hrs).
- Patient offered performing flexible sigmoidoscopy to assess colonic stent
- But patient “wanted her body to rest and decided to delay the procedure”
- GI recommend to continue enema that may de-clog the stent.
- **Patient accepted that she may not be able to attend the cabin trip on the 13th, but says her family has it until the 19th, and she may be able to go for the last few days; however, she also said that if she does not attend at all, that is ok.**
- Patient **seemed less optimistic.**
- She mentioned that the **G tube was presented to her as an "easy fix" she did not expect such post-procedure pain or complicated management.**

Hospital course

October 11, 2020

- Patient continues to have significant pain despite the increase in Dilaudid IV doses to 2.5mg q2h.
- Patient has not passed a bowel movement in last 24 hours.
- Patient is urinating frequently but doesn't feel that she is having a complete void.
- She would **like to avoid a Foley catheter** if at all possible.
- Patient agrees for flexible sigmoidoscopy on 10/12/2020
- CT Abdomen is done with concerns of possible perforation.
    - There was a new free fluid surrounding PEG site **concerning for abscesses.**
    - Also was noted were a few scattered foci of gas within the collections as well as beneath the left hemidiaphragm. **Gastric perforation cannot be excluded.**
    - Free fluid along the left paracolic gutter with enhancing of the peritoneum **suspicious for peritonitis.**
    - Improved appearance of bilateral hydronephrosis with appropriate position of bilateral double-J ureteral stents.

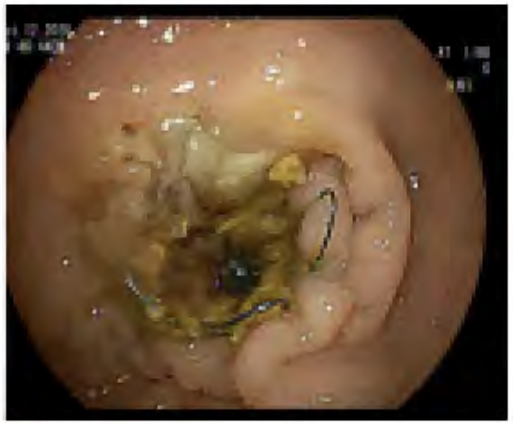
Hospital course

October 12, 2020

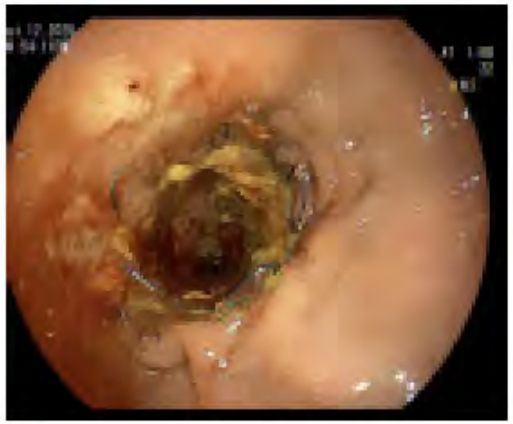
- For the suspected **abscess i**nterventional radiology was consulted for US guided drain placement - was considered to be **not indicated due to diminutive size** of perigastric abscess/fluid collection.
- No intervention per Surgical oncology.
- ID recommends to IV antibiotics Zosyn for the treatment.

The patient underwent Flexible sigmoidoscopy with GI.

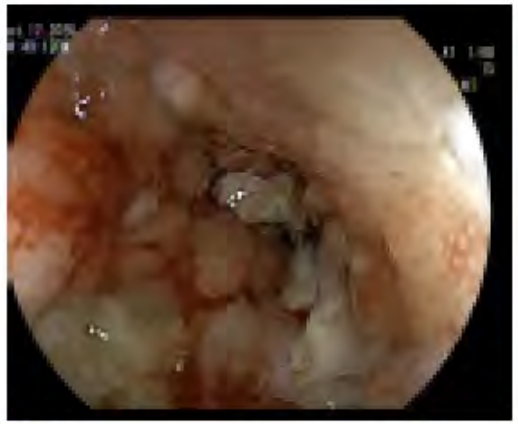
- **Revealed invasion of the stent with abnormal tissue** obstruction at level of stent; **unable to be traversed, dilated, or re-stented.**
- Intraprocedural biopsies taken.



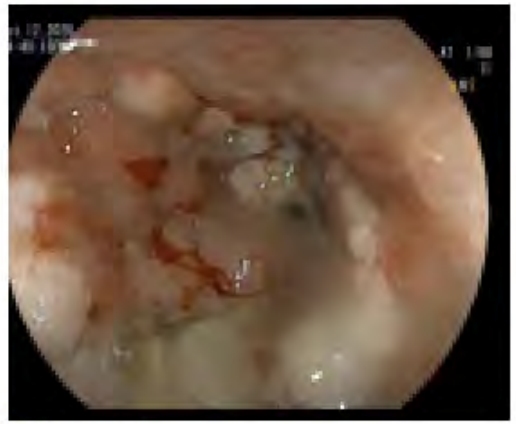
1 Colorectal Anastomosis : Evidence of previous surgery



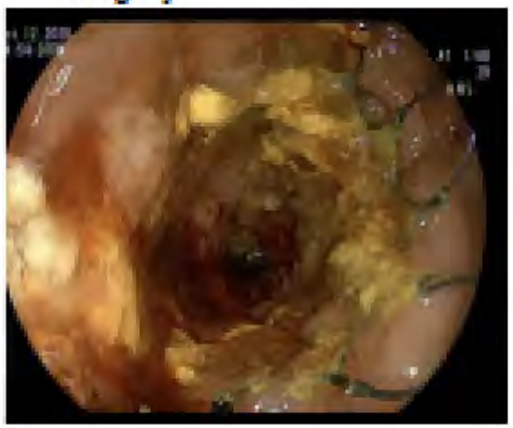
2 Colorectal Anastomosis : Evidence of previous surgery



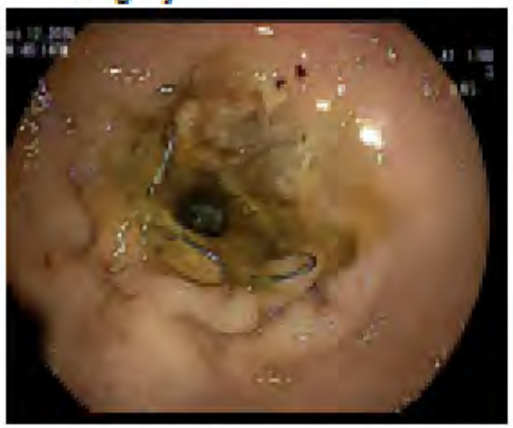
3 Colorectal Anastomosis : Evidence of previous surgery



4 Colorectal Anastomosis : Evidence of previous surgery



5 Colorectal Anastomosis : Evidence of previous surgery



6 Colorectal Anastomosis : Evidence of previous surgery

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GI recommendations

- The **tissue was soft, therefore the uncovered stent was unable to hold it back.**
- The **tissue has thus cut through the stent and filled it in completely.**
- Unable to place a covered stent due to concerns for migration.
- **Three options** would be to consider an end colostomy vs end ileostomy vs placement of a second stent inside the first
- Surgical options are up to her surgical team. **“Benefit would be that she could eat.”**
- Explained to the patient that the chance of placing another stent will most likely not open up the lumen very wide and the benefit may be minimal to none.

Hospital course

October 13 - 17 , 2020

- Patient was tearful and **expressed her frustration with her quality of life.**
- Uncomfortable taking PO meds
- **Wanted to eat.**
- Pain abdomen well controlled after starting her **on Dilaudid PCA.**
- **Patient expressed her goal is to preserve quality of life outside the hospital, which means being able to eat by mouth sometimes and spending time with her children and friends.**
- Still thinking about proceeding with barium enema and repeat flexible sigmoidoscopy with possible stent replacement.
- **Also has anxiety surrounding the pending biopsies - Results came back Reactive/regenerative colonic mucosa; no evidence of malignancy.**
- **Plan** was to clamp NG tube, allow her to eat and vent through G tube. If this is successful, then pull NG tube out.

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Hospital course

October 18 - 21 , 2020

- **NG tube was pulled out** after successful trial.
- Reports dry heaves but no nausea.
- **On pureed diet and recommended to advance diet as tolerated**
- Patient is planned for discharge and PCA Dilaudid is transitioned to Fentanyl patch PO morphine and oxycodone concentrate trialled both enterically and sublingually without relief of pain
- Planned to start on Dilaudid concentrate 4mg q4hrs PRN
- **Does not tolerate clamped G tube, needs for venting and has distention when clamped**
- **Patients Creatinine starts to gradually increase**

Symptoms worsen

October 31, 2020

- Patient complains of **severe abdominal pain including bladder spasms**
- Fentanyl PCA increased 40 mcg/hr to 60 mcg/hr continuous rate + 100mcg clinician boluses.
- Also received Dilaudid 2.5mg IV x 3 doses
- Patient reports that Dilaudid is what really works best for her

- **Patient at risk for increased sedation and neurotoxicity**
- Plan going forward - to consider **IV Methadone**
- Recommend starting Octreotide 100 mcg q8hr to help reduce secretions with bowel obstruction which may aid with nausea
- Recommend starting Haldol 2 mg q8hrs scheduled to help with both nausea and for anxiety

Family meeting

November 01, 2020

- **Her renal function has rapidly deteriorated and also developed hyperkalemia.**
- The patient has **not produced a urine** sample to evaluate for microscopy.
- Interventions offered to patient - consideration of stent exchange , nephrostomy placement, or hemodialysis.
- Patient does not want any imaging or procedures for further investigation for her cancer.
- Patient does not want any interventions that would prolong her suffering, does not want any more tubes or invasive procedures.
- She agrees with stopping lab draws and discontinue telemetry monitoring.
- She understands TPN will be discontinued in order to prevent any additional hyperkalemia.
- **Goals of care changed to comfort care only.**

Points for discussion

- Pathophysiology of malignant bowel obstruction.
- Surgical interventions for MBO.
- Shared decision making regarding possible treatments.
- Role of TPN in critically ill patients with advanced malignancies.
- Pharmacologic management of MBO.

Obstructions

- Gastrointestinal obstructions are relatively rare in palliative care patients, with an incidence of about 3% to 5%.
- These obstructions can occur anywhere along the gastrointestinal tract, from the esophagus to the rectum, but are most common in the small bowel.
- Bowel obstructions are more frequent in patients with colon cancer (4% to 24% of patients) and gynecologic cancers (5% to 42% of patients), although melanoma and lung, breast, gastric, biliary, and pancreatic cancers can also be sources of obstructions.
- Up to 10% to 48% of bowel obstructions in cancer patients are due to benign causes, such as adhesions (after surgery), fibrosis from radiation enteritis or intra-abdominal chemotherapy, volvulus, and intussusception.
- Malignant causes are secondary to intraluminal, intramural, or extrinsic tumors causing mechanical occlusion of the bowel lumen.
- There can also be functional obstructions, in which the mesentery, celiac, or enteric plexus might be infiltrated by tumors, causing the peristalsis of the bowel to malfunction.

Tradounsky G. Palliation of gastrointestinal obstruction. Can Fam Physician. 2012 Jun;58(6):648-52, e317-21. PMID: 22859627; PMCID: PMC3374686.

Pathophysiology

Table 1 – Pathophysiology of bowel obstruction
Mechanical obstruction
Extrinsic occlusion of the lumen: enlargement of the primary tumour or recurrence, mesenteric and omental masses, abdominal or pelvic adhesions, postirradiation fibrosis that cause bowel compression
Intra-luminal occlusion of the lumen: results from tumour growth from within the bowel
Intramural occlusion of the lumen: intestinal linitis plastica, tumour within the wall of the bowel resulting in poor motility
Adynamic ileus or functional obstruction
Intestinal motility disorders: tumour infiltration of the mesentery or bowel wall muscle and nerves, or malignant involvement of the coeliac plexus
Intestinal motility disorders: paraneoplastic neuropathy particularly in patients with lung cancer, chronic intestinal pseudo-obstruction (CIP), paraneoplastic pseudo-obstruction.

Ripamonti CI, Easson AM, Gerdes H. Management of malignant bowel obstruction. Eur J Cancer. 2008 May;44(8):1105-15. doi: 10.1016/j.ejca.2008.02.028. Epub 2008 Mar 21. PMID: 18359221.

Pathophysiology

- “Vicious cycle of distension due to gas and non-absorbed secretions, followed by more fluid secretion, causing more distension in the bowel.”
- Bowel mucosa, damaged by the hypertensive state of distension, produces even more secretions via an inflammatory response and release of vasoactive intestinal polypeptide. This cycle results in bloating, pain, cramping, nausea, and vomiting.
- The symptoms vary in severity and rapidity of onset, depending on the level of the obstruction.

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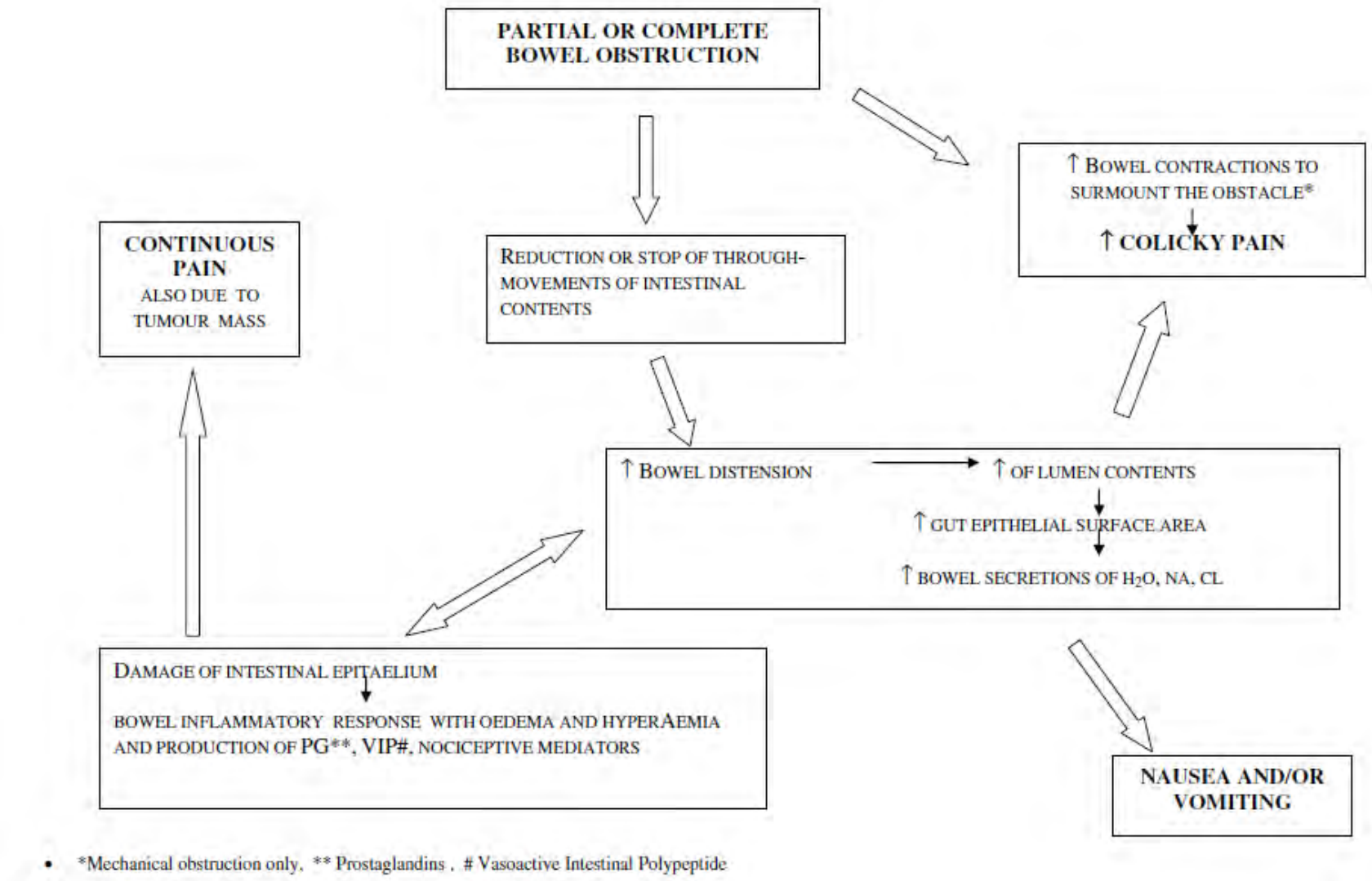

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- There are few prospective studies and no randomized trials that compare the success of palliation and the effects of treatment on the patient's quality of life with different management plans, such as surgery, stenting or medical management.
- The lack of a consistent definition of MBO has meant that most series in the literature combine patients at different points along their disease trajectory, making the interpretation of outcomes difficult.
- Another problem is the lack of consensus as to what constitutes a successful palliative outcome. Survival (30 or 60 days) after intervention, the rate of hospital discharge, and the ability to tolerate oral supplementation for a given length of time (30 or 60 days) have all been used as outcome measures**.**
- **These outcomes DO NOT address meaningfully the important patient-centered outcomes in palliation such as symptom relief, improvements in quality of life and ultimately the quality of death.**

Ripamonti CI, Easson AM, Gerdes H. Management of malignant bowel obstruction. Eur J Cancer. 2008 May;44(8):1105-15. doi: 10.1016/j.ejca.2008.02.028. Epub 2008 Mar 21. PMID: 18359221.

- Clinical resolution varies from 26.7% to over 68%, though it is often unclear how this is defined.
- Despite being an inadequate proxy for symptom resolution or quality of life, the ability to feed orally was a popular outcome measure, with success rates ranging from 30% to 100%.
- Rates of re-obstruction varied, ranging from 0% to 63%, though time to re-obstruction was often not included.
- Postoperative morbidity and mortality also varied widely, although again the definition of both of these surgical outcomes differed between many of the papers.
- There were no data available for quality of life.
- The reporting of adverse effects was variable and this has been described where available.
- Where discussed, surgical procedures varied considerably and outcomes were not reported by specific intervention.

Cousins SE, Tempest E, Feuer DJ. Surgery for the resolution of symptoms in malignant bowel obstruction in advanced gynaecological and gastrointestinal cancer. Cochrane Database Syst Rev. 2016 Jan 4;2016(1):CD002764. doi: 10.1002/14651858.CD002764.pub2. PMID: 26727399; PMCID: PMC7101053.

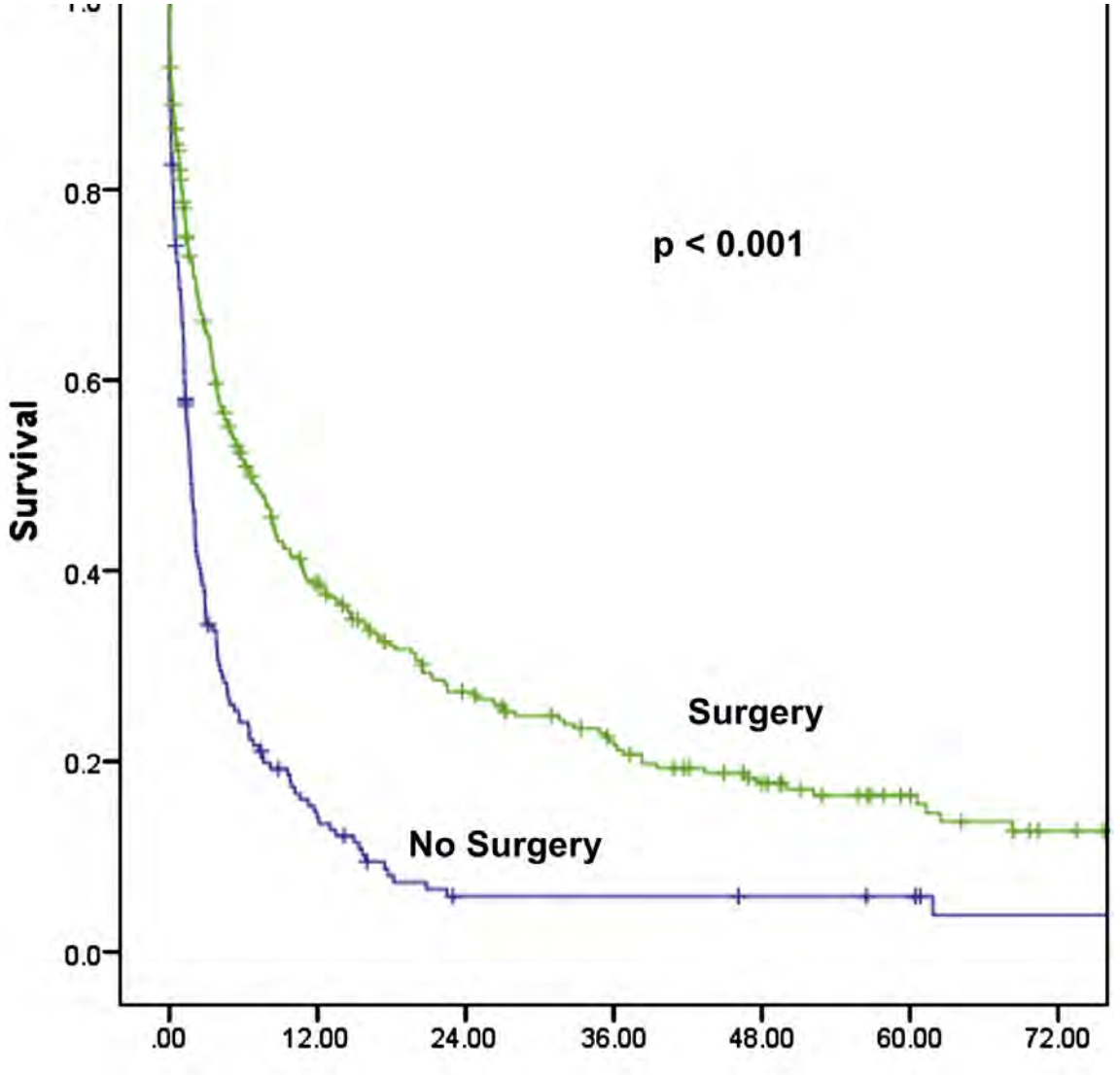
Absolute and relative contraindications to surgery in patients with malignant bowel obstruction

Absolute	Relative
Recurrent ascites after paracentesis	Multiple sites of intraabdominal tumor
Diffuse palpable abdominal masses	Low serum albumin
Multiple levels of bowel obstruction	Previous radiation therapy
Recent abdominal surgery demonstrating that corrective surgery is technically impossible	Poor nutritional status
Previous surgery showing diffuse metastatic cancer	Liver or extraabdominal metastases, including pleural or pulmonary metastases producing dyspnea
Involvement of proximal stomach	Major renal or hepatic dysfunction
	ECOG PS ≥2

Absolute and relative contraindications to proceeding with palliative surgery have been identified from retrospective case series examining characteristics associated with high rates of mortality and morbidity and translated into prognostic criteria.

Prognosis

- Poor prognostic factors for 30 day survival after surgery include carcinomatosis, ascites, complete small bowel obstruction, hypoalbuminemia, and leukocytosis



Henry JC, Pouly S, Sullivan R, Sharif S, Klemanski D, Abdel-Misih S, Arradaza N, Jarjoura D, Schmidt C, Bloomston M. A scoring system for the prognosis and treatment of malignant bowel obstruction. Surgery. 2012 Oct 1;152(4):747-57.

- An MBO from generalized carcinomatosis is a distinct entity that responds poorly, or not at all, to surgical intervention. These obstructions are usually partial, intermittent and do not involve strangulated or twisted bowel at risk of perforation.
- They are caused by blockage of the bowel at multiple levels of the small and/or large bowel, possibly complicated by motility disorders secondary to bowel wall infiltration by tumor and/or compromise of the parasympathetic and sympathetic nerves responsible for peristalsis.
- Symptoms may resolve temporarily with nasogastric decompression but will recur.
- When such patients are taken to the operating room, the results are generally poor, with a high 30-day mortality (21-40%) and a high complication rate (20-40%) and, even more discouraging, most will re-obstruct within a short period of time.

Ripamonti CI, Easson AM, Gerdes H. Management of malignant bowel obstruction. Eur J Cancer. 2008 May;44(8):1105-15. doi: 10.1016/j.ejca.2008.02.028. Epub 2008 Mar 21. PMID: 18359221.

Palliative Surgery for MBO Systematic Review 2014

- 17 studies, 868 patients, 1977-2008, peritoneal carcinomatosis
- Relief of symptoms or resumption of diet in 32-100%
- 30 D mortality 6-32%
- Serious complications 7-44% (ECF, wound infection, wound dehiscence, early obstruction, high out-put ostomy, MI, HF, DVT/PE, pneumonia, leak, infection)
- 32-71% symptom free or tolerating a diet 60D post-op
- Median survival after diagnosis 26- 273D, related to prognostic features (154-192 vs 26-36D)
  Prognostic features include ascites, palpable mass, relief of obstruction
- Hospitalization consumed 11-61% of patient's remaining life

Olson TJ, Pinkerton C, Brasel KJ, Schwarze ML. Palliative surgery for malignant bowel obstruction from carcinomatosis: a systematic review. JAMA surgery. 2014 Apr 1;149(4):383-92.

•Lilley EJ, Cauley CE, Cooper Z. Using a Palliative Care Framework for Seriously Ill Surgical Patients: The Example of Malignant Bowel Obstruction. JAMA Surg. 2016 Aug 1;151(8):695-6. doi: 10.1001/jamasurg.2016.0057. PMID: 27096440.

Opinion

VIEWPOINT

Using a Palliative Care Framework for Seriously Ill Surgical Patients

The Example of Malignant Bowel Obstruction

Elizabeth J. Lilley, MD, MPH
Department of Surgery, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey; and Center for Surgery and Public Health, Brigham and Women's Hospital, Boston, Massachusetts.

Christy E. Cauley, MD, MPH
Department of Surgery, Massachusetts General Hospital, Boston; and Ariadne Labs, Boston, Massachusetts.

Zara Cooper, MD, MSc
Center for Surgery and Public Health, Brigham and Women's Hospital, Boston, Massachusetts; and Department of Surgery, Brigham and

In the recent report *Dying in America: Addressing Key End of Life Issues*,[1] the Institute of Medicine declared improving access to palliative care for seriously ill patients a national priority to address the crisis of low-value health care for patients near the end of life. Patients report comfort, symptom control, and dignity as central to achieving a "good death," yet increasing numbers experience pain, unwanted health care transitions, and intensive care near the end of life. Surgeons play a critical role as providers of end-of-life care. Among Medicare decedents, almost one-third have surgery in the year before death, many in the last week of life,[2] and up to 25% of patients diagnosed as having stage IV cancer undergo a surgical procedure. Palliative care, an approach to care focused on improving quality of life for patients with life-threatening illness and their families, is associated with improved symptom management, improved communication, and fewer care transitions for seriously ill patients. Although surgeons routinely care for seriously ill patients, the role of palliative care in surgery remains poorly defined.[3] Herein, we use malignant bowel obstruction (MBO) as an example of how surgeons can integrate principles of palliative care to support surgical patient, family, and clinicians are aligned. Many surgeons struggle to balance the need for candid discussions about prognosis with the desire to maintain hope. As such, decision making about palliative procedures poses a challenge. Studies have shown that patients want accurate prognostic information, even when uncertainty exists, and that improved understanding of the illness trajectory influences treatment preferences at the end of life. Patients who are nearing the end of life and have an accurate prognostic understanding are more likely to prioritize comfort over potentially life-prolonging but highly burdensome treatments. Miner et al[6] reported higher rates of symptom resolution, lower morbidity, and longer survival using a shared decision-making approach, termed the *palliative triangle*, for patient selection and decision making about palliative procedures. In this model, the patient, family, and surgeon explore the achievable goals of palliative treatments and weigh the burdens and benefits of treatment. Interactions guided by this approach can moderate unrealistic expectations on the part of the patient and family and redirect their focus to goals that can be reasonably achieved.

Treatment Options

- Surgery- resection, bypass, ostomy
- Endoscopic- stents, PEG
  - “In combination with other medical techniques, both open and percutaneous gastrostomy offers the possibility of intermittent oral liquid intake.”
- Medical- NGT, IVF, TPN
  (1) anti-secretory/anti-motility agents (eg, somatostatin analog, scopolamine, glycopyrrolate)
  (2) anti-inflammatory (steroids)
  (3) pain medications (eg, morphine)
  (4) antiemetic therapy (eg, haloperidol, prochlorperazine, olanzapine).

Krouse RS. Malignant bowel obstruction. J Surg Oncol. 2019 Jul;120(1):74-77. doi: 10.1002/jso.25451. Epub 2019 Mar 25. PMID: 30908650.
Franke AJ, Iqbal A, Starr JS, Nair RM, George TJ Jr. Management of Malignant Bowel Obstruction Associated With GI Cancers. J Oncol Pract. 2017 Jul;13(7):426-434. doi: 10.1200/JOP.2017.022210. PMID: 28697317.

Comparative Study Surgery, Venting Gastrostomy or Medical Management for Malignant Bowel Obstruction

- National Cancer Institute Surveillance, Epidemiology and End Results (SEER) registry linked with Medicare claims data for patients ≥ 65 yoa w stage IV ovarian or pancreatic cancer
- Overall median survival after 1st MBO admission < 3 months
- 7% had PEG as initial treatment
- < 5% had PC consultation
- Patients with PEG had lowest readmission rate, higher hospice referral, less ICU care and less deaths in hospital although survival also lower, likely reflecting patient selection

Lilley EJ, Scott JW, Goldberg JE, Cauley CE, Temel JS, Epstein AS, Lipsitz SR, Smalls BL, Haider AH, Bader AM, Weissman JS. Survival, Healthcare Utilization, and End-of-life Care Among Older Adults With Malignancy-associated Bowel Obstruction: Comparative Study of Surgery, Venting Gastrostomy, or Medical Management. Annals of Surgery. 2017 Mar 23.

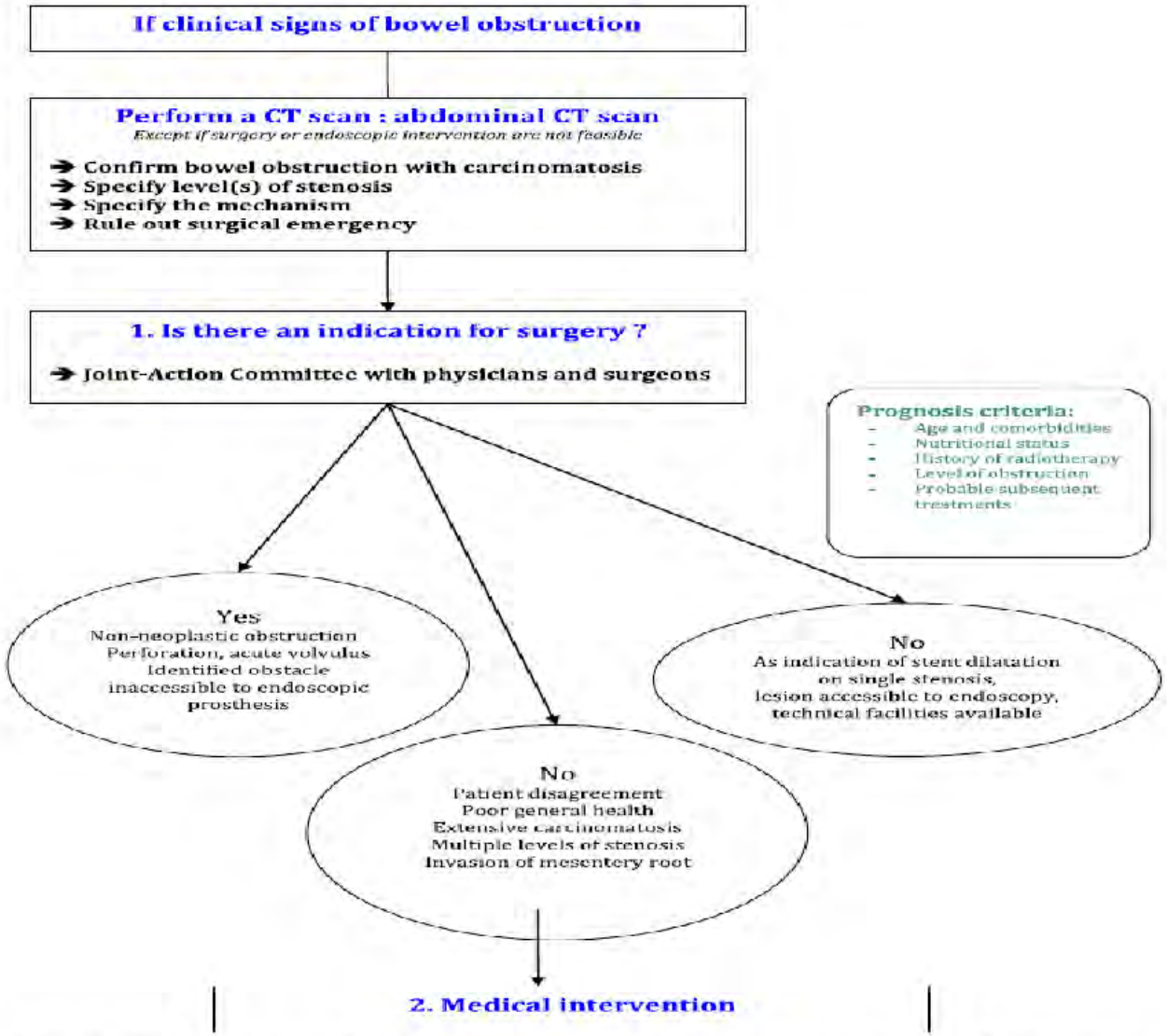


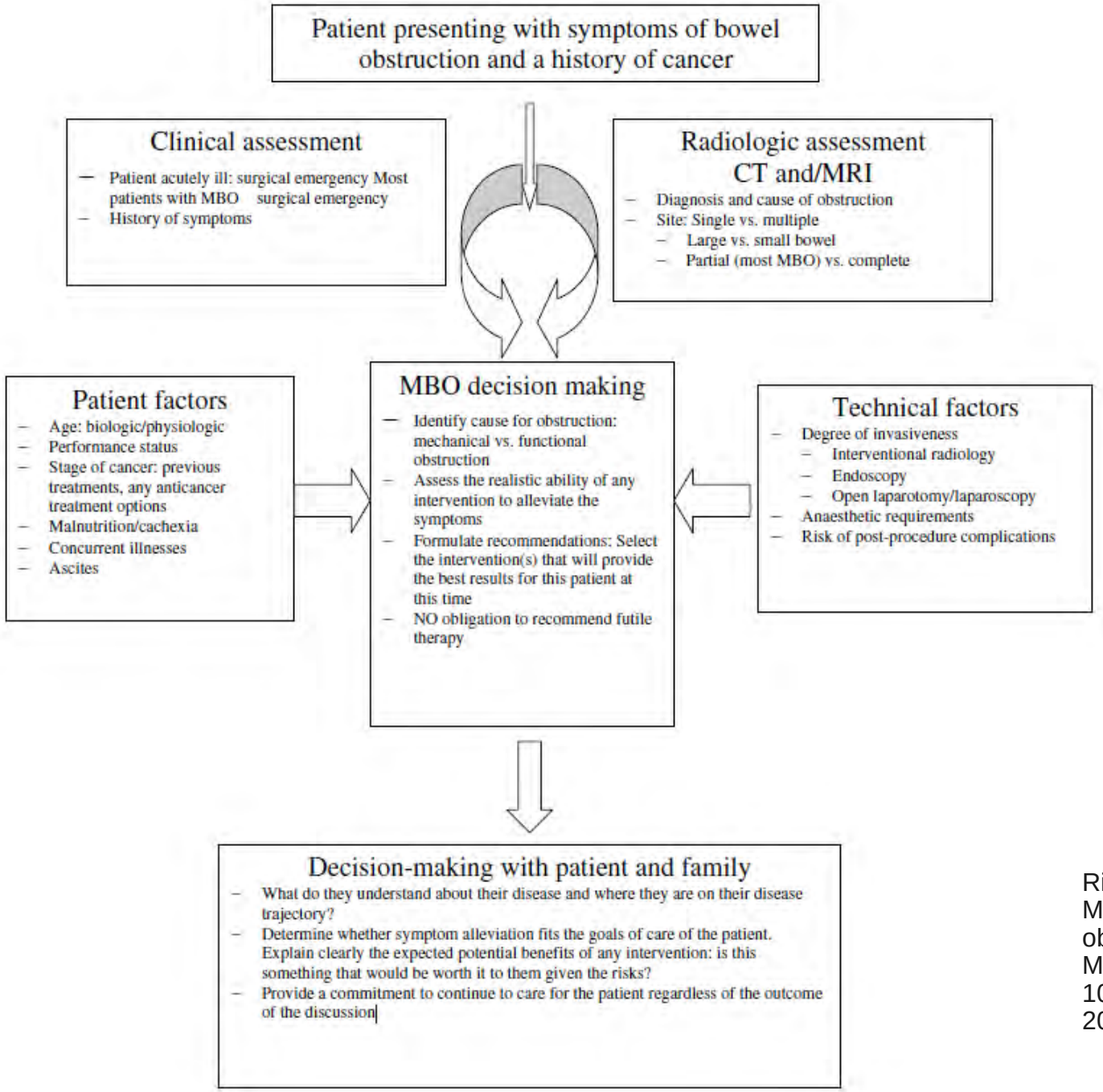
Fig. 1. Decision tree before symptomatic treatments of bowel obstruction.

Laval G, Marcelin-Benazech B, Guirimand F, Chauvenet L, Copel L, Durand A, Francois E, Gabolde M, Mariani P, Rebischung C, Servois V, Terrebonne E, Arvieux C; French Society for Palliative Care; French Society for Digestive Surgery; French Society for Gastroenterology; French Association for Supportive Care in Oncology; French Society for Digestive Cancer. Recommendations for bowel obstruction with peritoneal carcinomatosis. J Pain Symptom Manage. 2014 Jul;48(1):75-91. doi: 10.1016/j.jpainsymman.2013.08.022. Epub 2014 May 4. PMID: 24798105.

Venting PEG

- Studies suggest may be performed too late- mean PPD survival 13 days
  - Poor prognosis
  - Difficulty in health-care decision-making
- “Careful explanations must be given about the technique and its potential complications.”
  - Enables some patients to eat small amount of food for pleasure
  - Venting role must be emphasized
- May reduce nausea (81%) and vomiting (96%) at the risk of minor complications (75%). May not reduce deaths in hospital (61%)

Laval G, Marcelin-Benazech B, Guirimand F, Chauvenet L, Copel L, Durand A, Francois E, Gabolde M, Mariani P, Rebischung C, Servois V, Terrebonne E, Arvieux C; French Society for Palliative Care; French Society for Digestive Surgery; French Society for Gastroenterology; French Association for Supportive Care in Oncology; French Society for Digestive Cancer. Recommendations for bowel obstruction with peritoneal carcinomatosis. J Pain Symptom Manage. 2014 Jul;48(1):75-91. doi: 10.1016/j.jpainsymman.2013.08.022. Epub 2014 May 4. PMID: 24798105.
Dittrich A, Schubert B, Kramer M, Lenz F, Kast K, Schuler U, Schuler MK. Benefits and risks of a percutaneous endoscopic gastrostomy (PEG) for decompression in patients with malignant gastrointestinal obstruction. Support Care Cancer. 2017 Sep;25(9):2849-2856. doi: 10.1007/s00520-017-3700-1. Epub 2017 Apr 22. PMID: 28434096.



Ripamonti CI, Easson AM, Gerdes H. Management of malignant bowel obstruction. Eur J Cancer. 2008 May;44(8):1105-15. doi: 10.1016/j.ejca.2008.02.028. Epub 2008 Mar 21. PMID: 18359221.

Summary of statements: Non-surgical Oncology

Subject	Recommendations	Grade	Number
Nutritional status	Nutritional assessment of all cancer patients should begin with tumor diagnosis and be repeated at every visit in order to initiate nutritional intervention early, before the general status is severely compromised and chances to restore a normal condition are few	C	1.1
	Total daily energy expenditure in cancer patients may be assumed to be similar to healthy subjects, or 20–25 kcal/kg/day for bedridden and 25–30 kcal/kg/day for ambulatory patients	C	1.4
	The majority of cancer patients requiring PN for only a short period of time do not need a special formulation. Using a higher than usual percentage of lipid (e.g. 50% of non-protein energy), may be beneficial for those with frank cachexia needing prolonged PN (Grade C)	C	1.5
Indications	Therapeutic goals for PN in cancer patients are the improvement of function and outcome by: • preventing and treating under-nutrition/cachexia, • enhancing compliance with anti-tumor treatments, • controlling some adverse effects of anti-tumor therapies, • improving quality of life	C	2.1
	PN is ineffective and probably harmful in non-aphagic oncological patients in whom there is no gastrointestinal reason for intestinal failure	A	2.1
	PN is recommended in patients with severe mucositis or severe radiation enteritis	C	2.1
Nutritional provision	Supplemental PN is recommended in patients if inadequate food and enteral intake (<60% of estimated energy expenditure) is anticipated for more than 10 days	C	2.2
	PN is not recommended if oral/enteral nutrient intake is adequate	A	2.2
	In the presence of systemic inflammation it appears to be extremely difficult to achieve whole body protein anabolism in cancer patients. In this situation, in addition to nutritional interventions, pharmacological efforts are recommended to modulate the inflammatory response	C	2.3
	Preliminary data suggest a potential positive role of insulin (Grade C). There are no data on n-3 fatty acids	C	2.4
Peri-operative care	Peri-operative PN is recommended in malnourished candidates for artificial nutrition, when EN is not possible	A	3.1
	Peri-operative PN should not be used in the well-nourished	A	3.1
During non-surgical therapy	The routine use of PN during chemotherapy, radiotherapy or combined therapy is not recommended	A	3.2
	If patients are malnourished or facing a period longer than one week of starvation and enteral nutritional support is not feasible, PN is recommended	C	3.2
Incurable patients	In intestinal failure, long-term PN should be offered, if (1) enteral nutrition is insufficient, (2) expected survival due to tumor progression is longer than 2–3 months),(3) it is expected that PN can stabilize or improve performance status and quality of life, and (4) the patient desires this mode of nutritional support	C	3.3
	There is probable benefit in supporting incurable cancer patients with weight loss and reduced nutrient intake with "supplemental" PN	B	3.4
Hematopoietic stem cell transplantation (HSCT)	In HSCT patients PN should be reserved for those with severe mucositis, ileus, or intractable vomiting	B	3.5
	No clear recommendation can be made as to the time of introduction of PN in HSCT patients. Its withdrawal should be considered when patients are able to tolerate approximately 50% of their requirements enterally	C	3.6
	HSCT patients may benefit from glutamine-supplemented PN	B	3.7
Tumor growth	Although PN supplies nutrients to the tumor, there is no evidence that this has deleterious effects on the outcome. This consideration should therefore have no influence on the decision to feed a cancer patient when PN is clinically indicated	C	4.1

Guideline Recommendations	Grade
A. Nutrition Support Therapy During Anticancer Treatment	
1. Patients with cancer are nutritionally-at-risk and should undergo nutrition screening to identify those who require formal nutrition assessment with development of a nutrition care plan.	D
2. Nutrition support therapy should not be used *routinely* in patients undergoing major cancer operations.	A
3. Perioperative nutrition support therapy may be beneficial in moderately or severely malnourished patients if administered for 7-14 days preoperatively, but the potential benefits of nutrition support must be weighed against the potential risks of the nutrition support therapy itself and of delaying the operation.	A
4. Nutrition support therapy should not be used *routinely* as an adjunct to chemotherapy.	B
5. Nutrition support therapy should not be used *routinely* in patients undergoing head and neck, abdominal, or pelvic irradiation.	B
6. Nutrition support therapy is appropriate in patients receiving active anticancer treatment who are malnourished and who are anticipated to be unable to ingest and/or absorb adequate nutrients for a prolonged period of time (see Guideline 6 Rationale for discussion of "prolonged period of time").	B
7. The palliative use of nutrition support therapy in terminally ill cancer patients is rarely indicated.	B
8. ω-3 Fatty acid supplementation may help stabilize weight in cancer patients on oral diets experiencing progressive, unintentional weight loss.	B
9. Patients should not use therapeutic diets to treat cancer.	E
10. Immune-enhancing enteral formulas containing mixtures of arginine, nucleic acids, and essential fatty acids may be beneficial in malnourished patients undergoing major cancer operations.	A
B. Nutrition Support Therapy in Hematopoietic Cell Transplantation	
1. All patients undergoing hematopoietic cell transplantation with myeloablative conditioning regimens are at nutrition risk and should undergo nutrition screening to identify those who require formal nutrition assessment with development of a nutrition care plan.	D
2. Nutrition support therapy is appropriate in patients undergoing hematopoietic cell transplantation who are malnourished and who are anticipated to be unable to ingest and/or absorb adequate nutrients for a prolonged period of time (see Guideline 6 Rationale for discussion of "prolonged period of time").When parenteral nutrition is used, it should be discontinued as soon as toxicities have resolved after stem cell engraftment.	B
3. Enteral nutrition should be used in patients with a functioning gastrointestinal tract in whom oral intake is inadequate to meet nutrition requirements.	C
4. Pharmacologic doses of parenteral glutamine *may benefit* patients undergoing hematopoietic cell transplantation.*	C
5. Patients should receive dietary counseling regarding foods which may pose infectious risks and safe food handling during the period of neutropenia.	C
6. Nutrition support therapy is appropriate for patients undergoing hematopoietic cell transplantation who develop moderate to severe graft-vs-host disease accompanied by poor oral intake and/or significant malabsorption.	C

TPN

Summary of findings for the main comparison. Parenteral nutrition (PN) for inoperable malignant bowel obstruction (MBO) **Open in table viewer**

Home parenteral nutrition for people with inoperable bowel cancer

Patient or population: people with advanced cancer with inoperable malignant bowel obstruction (MBO)
Setting: outpatient/home care
Intervention: parenteral nutrition (PN)

Outcomes	Impact	№ of participants (studies)	Certainty of the evidence (GRADE)
Length of Survival	We are uncertain whether PN improves survival for patients with MBO receiving PN. It was not possible to combine data due to heterogeneity of cancer diagnosis and differing starting points for measuring survival.There was a wide variation of survival lengths reported in the studies, with median survival periods of 15 to 155 days (range 3 to 1278 days) and mean survival intervals of 85 to 164 days (range 8 to 1004 days).	721 (13 observational studies)	⨁⊖⊖⊖ Very Low [1,2]
Quality of life	We are very uncertain if PN proves quality of life for patients with MBO receiving PN. Three studies used validated questionnaires. One of these studies found an improvement over three months for global quality of life. Two studies had a mixed picture; one measuring well-being at one month and one overall quality of life at two months. Around half of participants showed no change, a quarter to a fifth deteriorated and a quarter to a third improved.	188 (3 observational studies)	⨁⊖⊖⊖ Very Low [1,2]
Adverse events	We are very uncertain about the impact of PN on adverse events of patients in MBO as the quality of the evidence was very low. There is limited evidence about adverse events. Although nine studies reported this outcome, data for individual patients could be extracted from eight studies and 32/260 (12%) patients developed a central venous catheter infection or were hospitalised for PN complications.	280 (9 observational studies)	⨁⊖⊖⊖ Very Low [1,2]

Sowerbutts AM, Lal S, Sremanakova J, Clamp A, Todd C, Jayson GC, Teubner A, Raftery AM, Sutton EJ, Hardy L, Burden S. Home parenteral nutrition for people with inoperable malignant bowel obstruction. Cochrane Database Syst Rev. 2018 Aug 10;8(8):CD012812. doi: 10.1002/14651858.CD012812.pub2. PMID: 30095168; PMCID: PMC6513201.

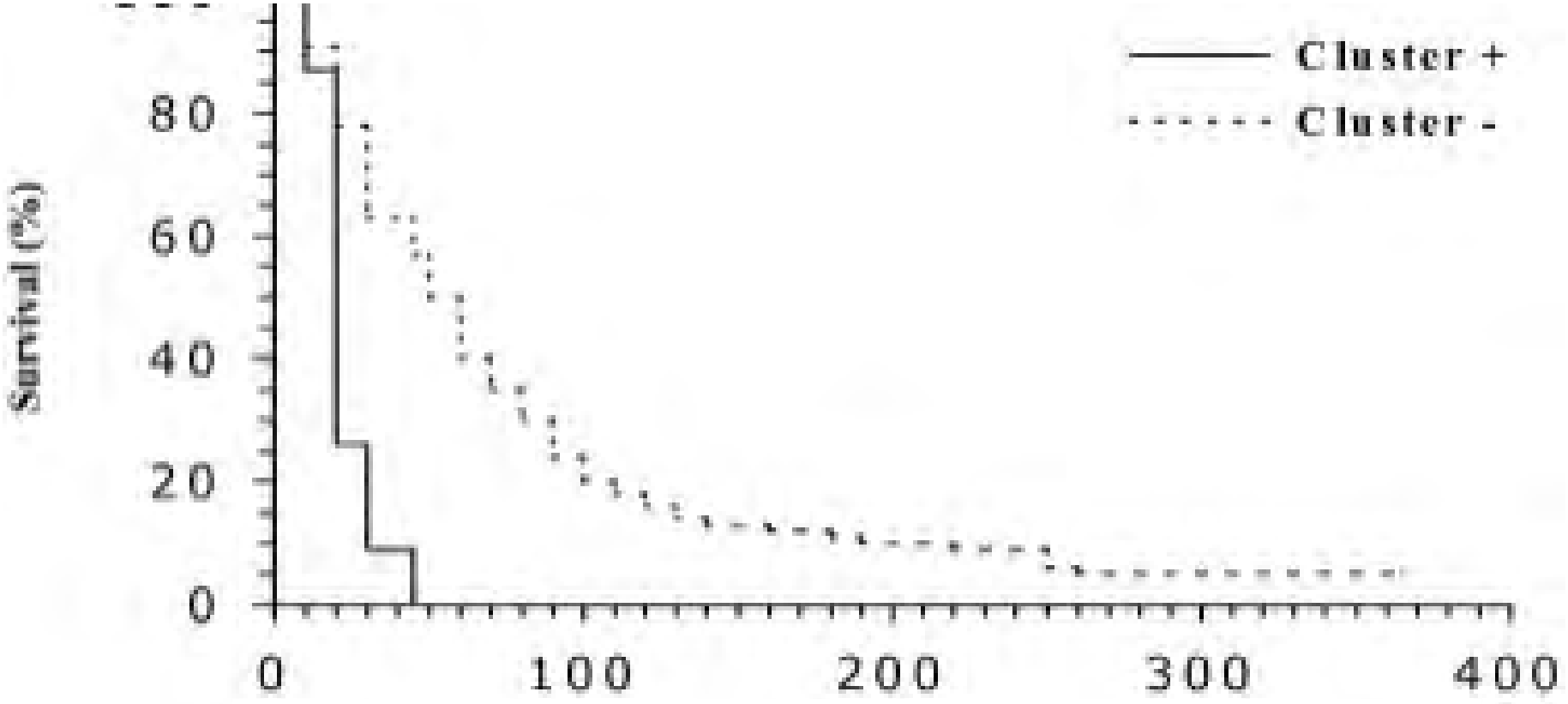


Fig. 1. Survival of patients with carcinosis on home parenteral nutrition. Cluster +, KPS score of 40 or lower, serum albumin level lower than 3.0 g/dL, and presence of pain and vomiting; Cluster -, KPS score higher than 50, serum albumin level higher than 3.0 g/dL, and absence of pain and vomiting. KPS, Karnofsky Performance Status.

Santarpia L, Alfonsi L, Pasanisi F, De Caprio C, Scalfi L, Contaldo F. Predictive factors of survival in patients with peritoneal carcinomatosis on home parenteral nutrition. Nutrition. 2006 Apr 1;22(4):355-60.

Table 5. Estimated 3-month and 6-month survival probability

Karnofsky Performance Status	Glasgow Prognostic Score	3-month probability	6-month probability		
			Tumour spread		
			Locoregional	Metastatic	Both
Up to 50	0	0.599	0.274	0.155	0.139
	1	0.356	0.156	0.083	0.074
	2	0.333	0.109	0.056	0.050
>50	0	0.790	0.613	0.435	0.404
	1	0.583	0.437	0.274	0.250
	2	0.558	0.338	0.199	0.180

Per Bozetti et. Al. Glasgow prognostic score (GPS) of zero, Karnofsky performance status (KPS) >50, and tumor spread (local-locoregional disease) were significant prognostic factors of survival beyond 3 months following TPN. Combining these three clinical variables may distinguish a patient subgroup whose survival at 6 months was 43.7% compared to 5%. A nomogram based on these parameters was developed enabling estimation of expected survival (3- and 6-month survivable probability) and needs further validation.

Bozzetti F, Santarpia L, Pironi L, Thul P, Klek S, Gavazzi C, Tinivella M, Joly F, Jonkers C, Baxter J, Gramlich L, Chicharro L, Staun M, Van Gossum A, Lo Vullo S, Mariani L. The prognosis of incurable cachectic cancer patients on home parenteral nutrition: a multi-centre observational study with prospective follow-up of 414 patients. Ann Oncol. 2014 Feb;25(2):487-93. doi: 10.1093/annonc/mdt549. Epub 2014 Jan 9. PMID: 24406425.

C-Reactive protein ≥10 mg/l and albumin ≥35 g/l	0
C-Reactive protein >10 mg/l	1
Albumin <35 g/l	1
C-Reactive protein >10 mg/l and albumin <35 g/l	2
The modified Glasgow Prognostic Score (mGPS)	
C-Reactive protein ≤ 10 mg/l and albumin ≥35 g/l	0
C-Reactive protein >10 mg/l	1
C-Reactive protein >10 mg/l and albumin <35 g/l	2

Type of cancer	mGPS	Median Survival
Gastric	0	5 year Overall Survival: 74.6%
	1	5 year Overall Survival: 61.4%
	2	5 year Overall Survival: 34.6%
Renal	0	1 year RFS: 90.9%
	1	1 year RFS: 61.1%
	2	1 year RFS: 10.1%
Lung (Small Cell)	0	3 Month Survival: 99%
	2	3 Month Survival: 71%

KARNOFSKY PERFORMANCE STATUS SCALE DEFINITIONS RATING (%) CRITERIA

Able to carry on normal activity and to work; no special care needed.	100	Normal no complaints; no evidence of disease.
	90	Able to carry on normal activity; minor signs or symptoms of disease.
	80	Normal activity with effort; some signs or symptoms of disease.
Unable to work; able to live at home and care for most personal needs; varying amount of assistance needed.	70	Cares for self; unable to carry on normal activity or to do active work.
	60	Requires occasional assistance, but is able to care for most of his personal needs.
	50	Requires considerable assistance and frequent medical care.
Unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly.	40	Disable; requires special care and assistance.
	30	Severely disabled; hospital admission is indicated although death not imminent.
	20	Very sick; hospital admission necessary; active supportive treatment necessary.
	10	Moribund; fatal processes progressing rapidly.
	0	Dead

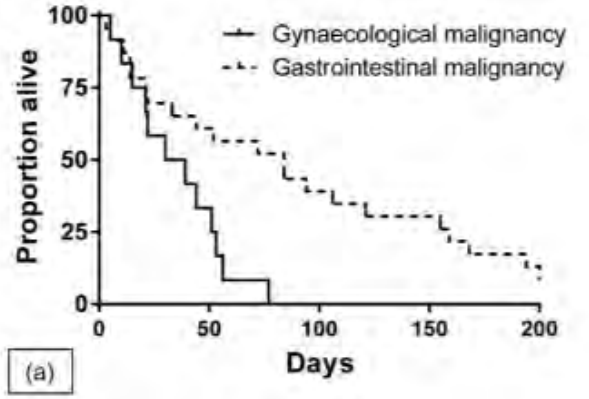
A systematic review with meta-analysis of survival, quality of life and cost-effectiveness of home parenteral nutrition in patients with inoperable malignant bowel obstruction

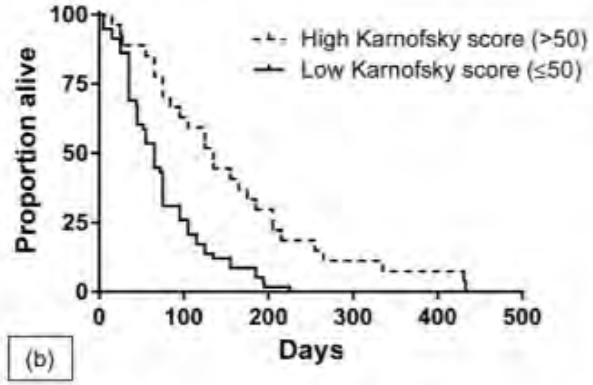
Background : Inoperable bowel obstruction is the most common and judicious indication for long term parenteral nutrition in patients with palliative malignancy. Considerable uncertainty exists about the survival length, quality of life (QOL) and associated health economics of home parenteral nutrition (HPN) for this patient group.

Results: Twelve studies involving 437 patients, met the inclusion criteria. Meta-analyses of extracted survival length data, representing the largest published cohort of HPN patients with palliative malignancy and inoperable bowel obstruction (n = 244 patients), revealed a mean survival of 116 days, median 83 days, with 45% and 24% still alive at 3 and 6 months, and only 2% survival at one year. Limited evidence suggests QOL deteriorated before death in a highly symptomatic group. The ICER is £176,587 per quality adjusted life year.

Conclusions: This is the first health economic evaluation and systematic review of survival and QOL for patients with inoperable bowel obstruction receiving HPN during the palliative phase of malignancy. Meta-analyses reveal a short survival and health economic analysis demonstrates high associated costs. This information can be used by clinicians to inform and guide selection of patients in this cohort for HPN treatment.

Naghibi M, Smith TR, Elia M. A systematic review with meta-analysis of survival, quality of life and cost-effectiveness of home parenteral nutrition in patients with inoperable malignant bowel obstruction. Clin Nutr. 2015 Oct;34(5):825-37. doi: 10.1016/j.clnu.2014.09.010. Epub 2014 Sep 27. PMID: 25288565.





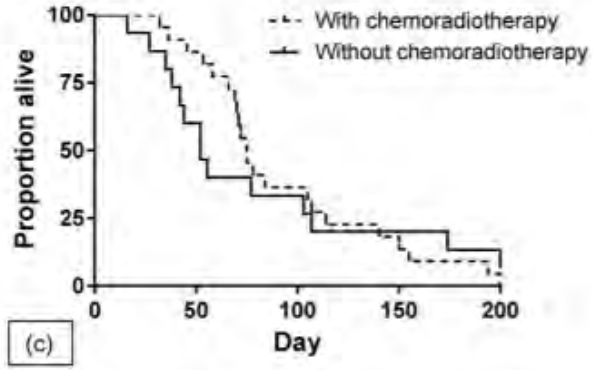


Fig. 4. (a), (b) and (c) – Kaplan Meier survival curves, based on extracted data, by patient characteristics demonstrating statistically significant difference in survival depending on (a) type of malignancy ($p = 0.012$) and (b) performance status (measured by Karnofsky performance score) ($p = 0.01$) and lack of a difference for patients who underwent (c) concurrent palliative chemoradiotherapy during parenteral nutrition treatment (not significant).

TPN in gynecologic cancers

- Studies examining the use of TPN in patients with advanced gynecologic cancer and MBO reported short median overall survival of 40–93 days. In these studies, the rate of complications was highly variable, ranging from 4 to 54%, and they included predominantly catheter-related infections and less commonly deep venous thrombosis and TPN-related liver disease.
- Embedded within these reported studies, there is invariably a subgroup of patients who survive for an extended period (24% survival at 6 months and 8% survival beyond 1 year), presumably as a result of TPN and relative disease stability based on biology.
- It is reasonable to postulate that certain disease histology/biology (such as low-grade serous ovarian cancer) and the absence of cancer spread to visceral organs may correlate with better survival. There is however limited information to identify the characteristics that may predict such a sustained benefit from TPN.

Lee, Yeh Chen et al. “Malignant Bowel Obstruction in Advanced Gynecologic Cancers: An Updated Review from a Multidisciplinary Perspective.” *Obstetrics and gynecology international* vol. 2018 1867238. 17 May. 2018, doi:10.1155/2018/1867238

A longitudinal study investigating quality of life and nutritional outcomes in advanced cancer patients receiving home parenteral nutrition

Background: In cancer patients where gastrointestinal function is marginal and malnutrition significant enough to result in the requirement for intensive nutrition support, parenteral nutrition (PN) is indicated. This longitudinal study examined the quality of life (QoL) and nutritional outcomes in advanced cancer patients receiving home PN (HPN).

Methods: Fifty-two adult cancer patients (21 males, 31 females, average age 53 years) treated at a specialized cancer facility between April 2009 and November 2011 met criteria. QoL and nutritional status were measured at baseline and every month while on HPN using EORTC-QLQ-C30, Karnofsky Performance Status (KPS), and Subjective Global Assessment (SGA). Repeated measures ANOVA and Generalized Estimating Equations (GEE) were used to evaluate longitudinal changes in QoL and SGA.

Conclusions: HPN is associated with an improvement in QoL, KPS and nutritional status in advanced cancer patients, irrespective of their tumor type, who have compromised enteral intake and malnutrition. The greatest benefit was seen in patients with 3 months of HPN, although patients receiving HPN for 1 or 2 months also demonstrated significant improvements.

Vashi, Pankaj G et al. “A longitudinal study investigating quality of life and nutritional outcomes in advanced cancer patients receiving home parenteral nutrition.” *BMC cancer* vol. 14 593. 15 Aug. 2014, doi:10.1186/1471-2407-14-593

Table 1 Baseline patient characteristics (N = 52)

Characteristic	Categories	Number (%)
Gender	•Males	21 (40.4)
	•Females	31 (59.6)
Class of Case	•Analytic	24 (46.2)
	•Non-analytic	28 (53.8)
Cancer Site	•Pancreas	14 (26.9)
	•Colorectal	11 (21.2)
	•Ovarian	6 (11.5)
	•Appendix	5 (9.6)
	•Stomach	4 (7.7)
	•Others	12 (23.1)
Stage at Diagnosis	•1	3 (5.8)
	•2	11 (21.2)
	•3	12 (23.1)
	•4	21 (40.4)
	•Unknown	5 (9.6)
SGA	•Moderately Malnourished	19 (36.5)
	•Severely Malnourished	33 (63.5)

Characteristic	Mean (standard deviation)
Age at HPN Start (years)	53.2 (9.4)
HPN duration (months)	3.4 (2.5)
Actual weight (Kg)	62.2 (14.6)
Percent weight loss 6-months prior to HPN start (percent)	16.9 (9.3)
Albumin (g/DL)	2.9 (0.62)
Karnofsky Performance Status (KPS)	60.1 (10.8)

Table 2 Comparison of baseline characteristics of HPN patients available for 3-month follow-up versus those available for less than 3-month follow-up

Characteristic	Categories	Patients with less than 3 months of follow-up (N = 37)	Patients with 3 or months of follow-up (N = 15)	P
Gender	•Males	15 (40.5)	6 (40.0)	0.97
	•Females	22 (59.5)	9 (60.0)	
Class of Case	•Analytic	17 (45.9)	7 (46.7)	0.96
	•Non-analytic	20 (54.1)	8 (53.3)	
Cancer Site	•Pancreas	9 (24.3)	5 (33.3)	0.29
	•Colorectal	9 (24.3)	2 (13.3)	
	•Ovarian	4 (10.8)	2 (13.3)	
	•Appendix	4 (10.8)	1 (6.7)	
	•Stomach	1 (2.7)	3 (20.0)	
	•Others	10 (27.0)	2 (13.3)	
Stage at Diagnosis	•1	2 (5.9)	1 (7.7)	0.94
	•2	8 (23.5)	3 (23.1)	
	•3	8 (23.5)	4 (30.8)	
	•4	16 (47.1)	5 (38.5)	
SGA	•Moderately Malnourished	15 (40.5)	4 (26.7)	0.35
	•Severely Malnourished	22 (59.5)	11 (73.3)	
Age at HPN Start (years)	•Mean	54.1	51.0	0.30

Values in table are numbers.
Values in parentheses are column percentages.
*P < = 0.05.
2-sample t test or chi-square test used to analyze the data.

Table 4 Changes in nutritional and QoL parameters during HPN

Characteristic	Baseline	Month 1	P	Baseline	Month 1	Month 2	P	Baseline	Month 1	Month 2	Month 3	P
		N = 39				N = 22				N = 15		
Nutritional Status												
Weight (Kg)	61.5 (13.4)	63.1 (12.7)	**0.03***	57.6 (14.1)	59.9 (13.8)	60.0 (12.4)	**0.04***	61.1 (15.4)	63.4 (15.0)	63.6 (12.8)	65.9 (13.6)	**0.04***
Albumin (g/DL)	2.8 (0.61)	3.1 (0.65)	**0.03***	2.9 (0.66)	3.1 (0.59)	4.3 (5.1)	0.26	2.9 (0.69)	3.1 (0.65)	3.3 (0.44)	3.0 (0.57)	0.28
Performance Status												
KPS	61.6 (11.2)	67.3 (10.7)	**0.01***	63.2 (9.9)	70.0 (11.1)	73.2 (12.9)	**0.01***	64.0 (11.2)	67.3 (11.0)	75.3 (14.6)	78.7 (11.2)	**0.002***
QLQ-C30												
General QoL												
Global	38.6 (20.6)	46.3 (23.1)	0.98	37.1 (18.1)	51.5 (25.7)	49.2 (21.0)	**0.02***	30.6 (15.9)	45.6 (27.1)	47.8 (23.4)	54.4 (24.8)	**0.02***
General Function												
Physical	59.6 (20.9)	62.4 (16.0)	0.39	56.4 (22.2)	66.1 (17.4)	70.1 (22.1)	**0.02***	55.6 (25.6)	65.8 (20.1)	75.6 (23.2)	72.0 (21.8)	**0.04***
Role	26.4 (25.3)	46.7 (33.1)	**0.001***	29.5 (29.1)	49.2 (37.3)	55.3 (32.7)	**0.01***	33.3 (32.7)	36.7 (36.3)	58.9 (31.1)	58.9 (39.8)	**0.03***
Emotional	61.3 (22.8)	64.6 (26.3)	0.50	58.7 (22.9)	72.0 (24.5)	72.3 (25.9)	**0.03***	59.4 (21.8)	67.2 (27.0)	67.2 (28.4)	72.8 (24.5)	0.19
Cognitive	65.7 (25.5)	68.1 (30.4)	0.57	66.7 (26.7)	73.5 (30.7)	77.3 (27.0)	0.10	64.4 (28.8)	67.8 (29.8)	78.9 (23.1)	64.4 (29.4)	0.09
Social	37.0 (27.6)	46.3 (29.6)	0.79	41.7 (32.8)	54.5 (30.9)	58.3 (27.1)	0.09	37.8 (33.0)	43.3 (27.3)	55.6 (30.6)	51.1 (34.2)	0.30
General Symptom												
Fatigue	71.0 (20.8)	59.2 (26.8)	**0.03***	73.2 (21.6)	54.0 (30.3)	50.5 (26.9)	**0.002***	71.8 (23.3)	58.5 (34.2)	45.2 (28.3)	43.7 (30.1)	**0.01***
Nausea/ Vomiting	52.3 (29.3)	37.0 (31.9)	**0.03***	47.7 (26.7)	43.9 (34.7)	36.4 (32.3)	0.30	45.5 (31.1)	48.9 (34.8)	31.1 (30.1)	34.4 (30.5)	0.20
Pain	51.4 (35.5)	44.0 (29.6)	0.16	46.2 (37.8)	36.4 (31.1)	28.0 (29.3)	0.06	48.9 (38.0)	35.5 (35.6)	27.8 (31.9)	32.2 (31.5)	0.12
Dyspnea	25.9 (27.7)	19.4 (23.0)	0.21	21.2 (28.2)	16.7 (22.4)	16.7 (26.7)	0.74	31.1 (29.4)	17.8 (21.3)	17.8 (27.8)	20.0 (30.3)	0.41
Insomnia	47.2 (32.2)	45.4 (37.5)	0.77	45.4 (37.9)	40.9 (37.0)	28.8 (27.8)	0.18	51.1 (41.5)	48.9 (37.5)	26.7 (28.7)	33.3 (33.3)	0.09
Appetite Loss	67.6 (29.3)	46.3 (38.4)	**0.004***	68.2 (28.1)	39.4 (38.0)	33.3 (39.8)	**0.001***	64.4 (32.0)	48.9 (39.6)	31.1 (36.6)	33.3 (37.8)	**0.02***
Constipation	37.0 (38.3)	22.2 (31.9)	**0.03***	33.3 (38.5)	25.7 (29.0)	24.2 (34.4)	0.43	40.0 (42.2)	33.3 (30.9)	22.2 (32.5)	8.9 (26.6)	**0.05***
Diarrhea	33.3 (37.4)	25.9 (31.0)	0.25	31.8 (39.1)	21.2 (26.3)	24.2 (37.3)	0.51	24.4 (36.6)	13.3 (16.9)	24.4 (36.6)	26.7 (40.2)	0.58
Financial Problems	47.2 (39.3)	38.9 (32.4)	0.07	48.5 (42.0)	36.4 (37.0)	39.4 (40.7)	0.14	53.3 (41.4)	40.0 (36.1)	37.8 (39.6)	53.3 (39.4)	0.18

Putting it all together

- May be an option for patients with a good performance status (KPS>50), with a reasonable probability of survival greater or equal to 3 months.
- May be an option for patients depending on type of cancer (gynecologic) and degree of spread (locoregional vs. metastatic).
- Low quality evidence in terms of length of survival, and quality of life.

Pharmacologic Management

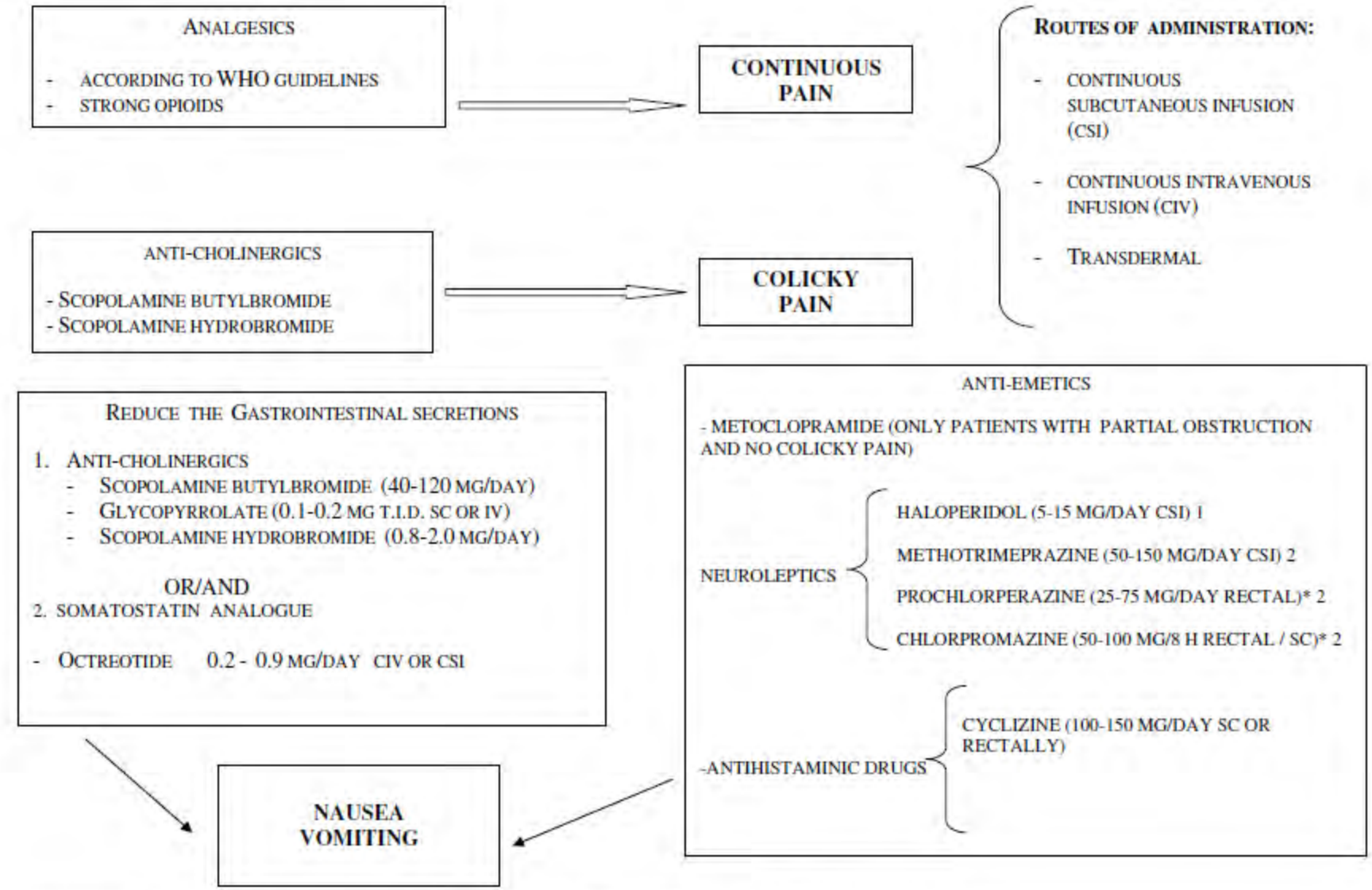
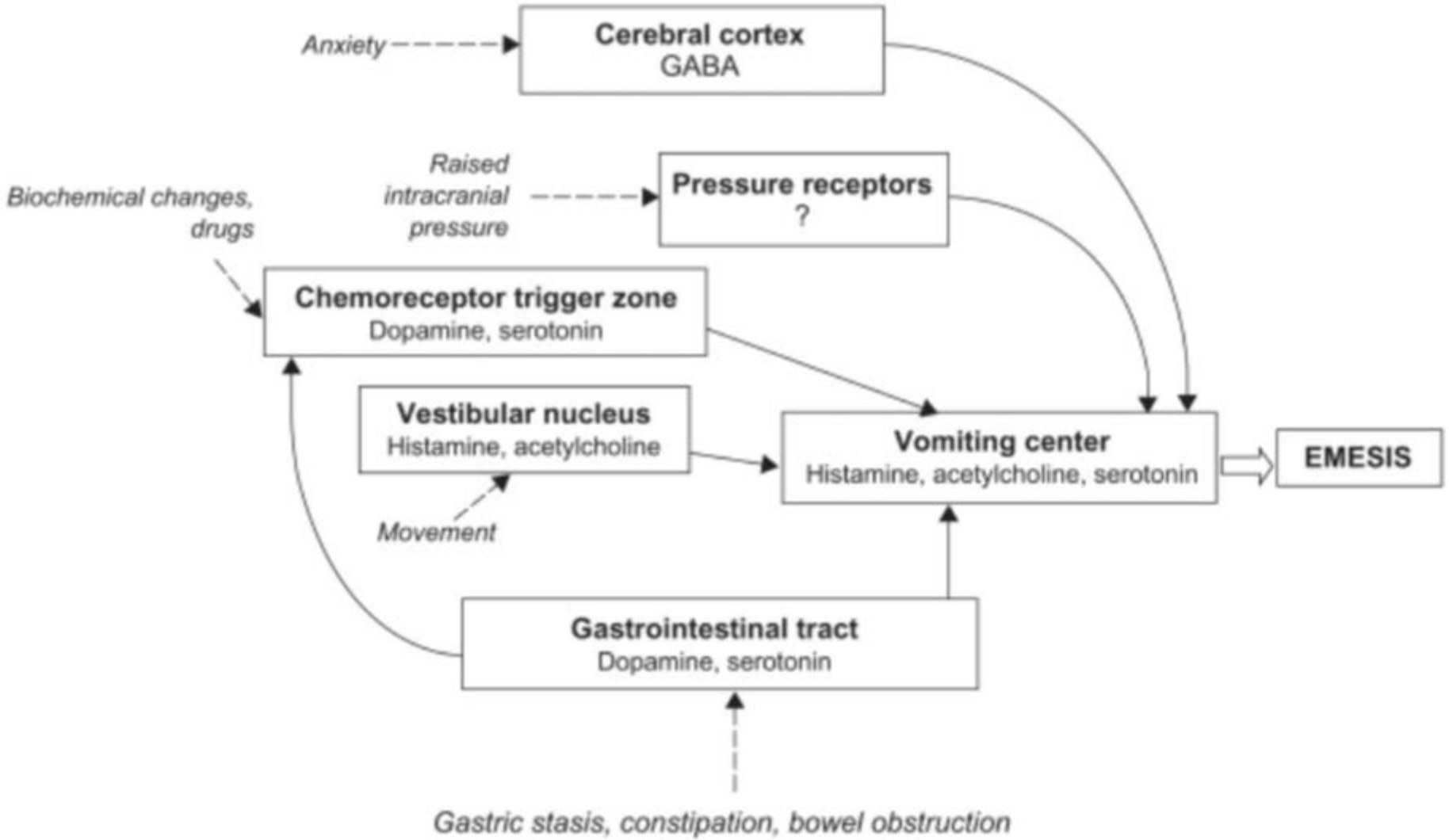


Fig. 3 – Symptomatic pharmacological approach.



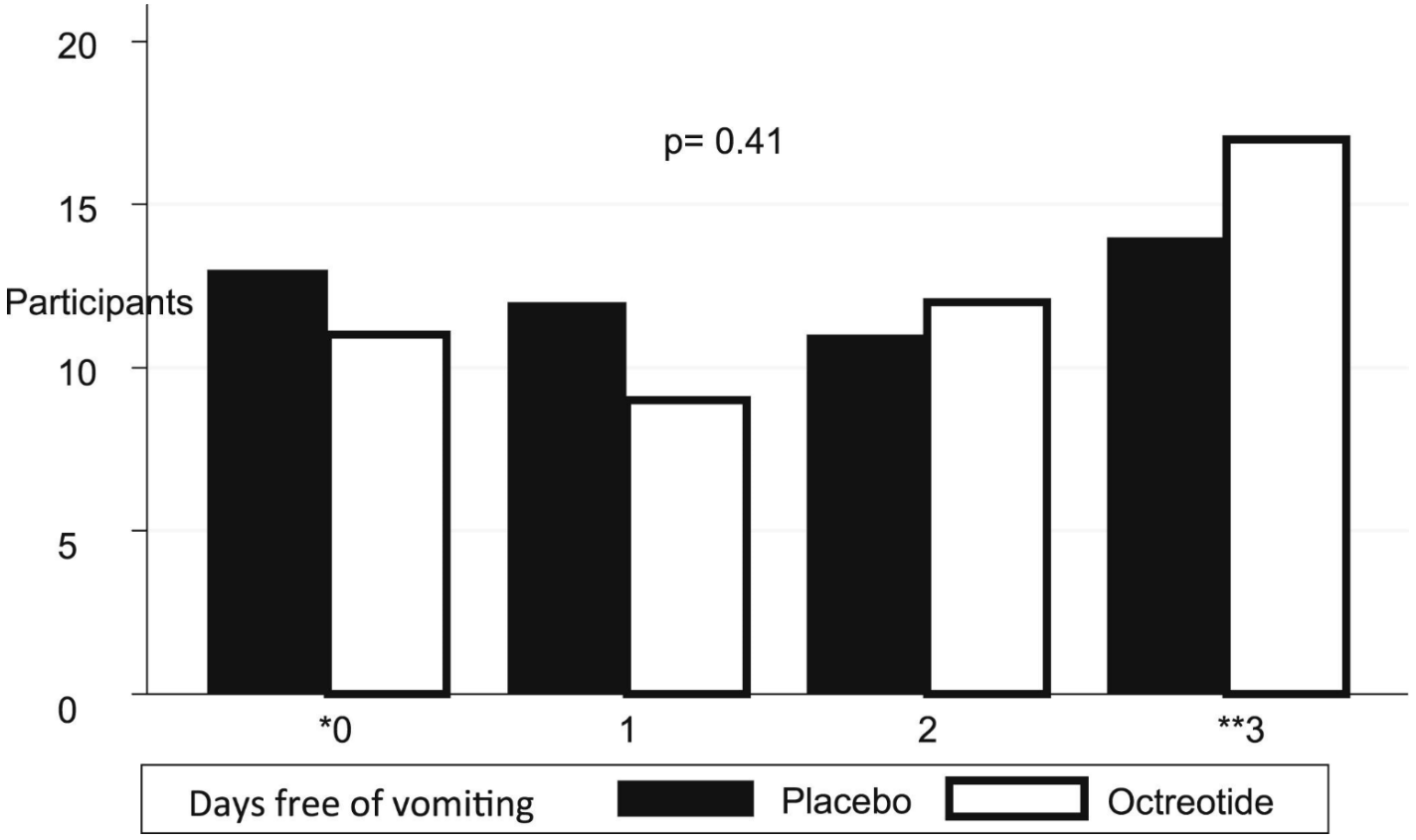
Glare P, Miller J, Nikolova T, Tickoo R. Treating nausea and vomiting in palliative care: a review. Clin Interv Aging. 2011;6:243-59. doi: 10.2147/CIA.S13109. Epub 2011 Sep 12. PMID: 21966219; PMCID: PMC3180521.

Table 6 – Role of Octreotide in Malignant Bowel Obstruction (single cases and prospective series)

Author	No. of patients	Site of Cancers / Site of Obstruction	Symptoms	Octreotide dose/ route and other drugs	Outcomes
Mercadante et al.[60]	2	Intra-abdominal/ small and/or large bowel and carcinomatosis	Abdominal pain and vomiting (1°) Colic pain and vomiting despite the use of NGT and haloperidol (2°)	0.2–0.3 mg/day + 0.9 mg buprenorphine via CSI 0.9 mg/day + 3 mg haloperidol	Pain and vomiting disappeared within 24 hours. No adverse effects were reported. NGT secretions decreased from 2,600 mL/day to 350 mL/day and vomiting disappeared within 24 hours. NGT was removed; no further need for analgesics or intravenous fluids. No adverse effects were reported.
Khoo et al.[62]	5	Various intra-abdominal sites/small bowel	Intractable vomiting, unresponsive to conventional therapy	0.1–0.5 mg/day via SCB to start, then CSI	Vomiting stopped within 1 hour of start of treatment. The only patient with a NGT presented a reduction in aspirate from 2,000 mL/day to <300 mL/day. No important toxicity was reported.
Steadman et al.[74]	1	pancreas/small bowel	Vomiting and drowsiness with diamorphine, cyclizine, and hyoscine	0.2 mg/ day + diamorphine	Switching to octreotide produced good symptom relief without causing unwanted uncomfortable drowsiness. NGT was removed.
Mercadante et al.[61]	14	Various intra-abdominal sites/ small and/or large bowel	Nausea, vomiting unresponsive to haloperidol or chlorpromazine	0.3–0.6 mg/day via SCB or CSI + haloperidol + analgesics	Vomiting was controlled in 12 patients and reduced in 2 patients. In 2 of 3 patients NGT was removed and symptoms were controlled. No important toxicity was reported.
Riley et al.[63]	24	Various intra-abdominal sites/ small and/or large bowel	Intractable vomiting not responsive to a combination of anti-emetics, steroids and/ or NGT drainage for 24 hours	0.1–1.2 mg/day via SCB or CSI	Fourteen patients had no further vomiting, and 4 pts showed some improvements on 0.1–0.6 mg/day of octreotide. Aspirate was reduced in all 5 pts with a NGT. Six patients did not respond, despite dosages of 0.6–1.2 mg/day. No adverse effects were reported, even at higher doses.
Mangili et al.[65]	13	Ovary/ small and/ or large bowel	Vomiting not responsive to metoclopramide and haloperidol	0.3–0.6 mg/day via SCB or CSI ± analgesics	Vomiting was controlled in all cases within 3 days (range, 1–6 days). In eight patients with an NGT there was a significant reduction of secretions and the NGT was removed. No adverse effects were reported.

CSI = continuous subcutaneous infusion; NGT = nasogastric tube; SCB = subcutaneous bolus.

Octreotide



Currow DC, Quinn S, Agar M, Fazekas B, Hardy J, McCaffrey N, Eckermann S, Abernethy AP, Clark K. Double-blind, placebo-controlled, randomized trial of octreotide in malignant bowel obstruction. J Pain Symptom Manage. 2015 May;49(5):814-21. doi: 10.1016/j.jpainsymman.2014.09.013. Epub 2014 Nov 14. PMID: 25462210.

Somatostatin Analogues Compared With Placebo and Other Pharmacologic Agents in the Management of Symptoms of Inoperable Malignant Bowel Obstruction: A Systematic Review

Objectives: To evaluate the evidence of effectiveness of somatostatin analogues compared with placebo and/or other pharmacologic agents in relieving vomiting in patients with inoperable MBO.

Methods: MEDLINE, EMBASE, CINAHL, and The Cochrane Controlled Trials Register databases were systematically searched; reference lists of relevant articles were hand searched. Cochrane risk of bias tool was used.

Results: The search identified 420 unique studies. Seven randomized controlled trials (RCTs) met the inclusion criteria (six octreotide studies and one lanreotide); 220 people administered somatostatin analogues and 207 placebo or hyoscine butylbromide. Three RCTs compared a somatostatin analogue with placebo and four with hyoscine butylbromide. Two adequately powered multicenter RCTs with a low Cochrane risk of bias reported no significant difference between somatostatin analogues and placebo in their primary end points. Four RCTs with a high/unclear Cochrane risk of bias reported that somatostatin analogues were more effective than hyoscine butylbromide in reducing vomiting.

Conclusion: There is low-level evidence of benefit with somatostatin analogues in the symptomatic treatment of MBO. However, high-level evidence from trials with low risk of bias found no benefit of somatostatin analogues for their primary outcome. **There is debate regarding the clinically relevant study end point for symptom control in MBO and when it should be measured. The role of somatostatin analogues in this clinical situation requires further adequately powered, well-designed trials with agreed clinically important end points and measures.**

Obita GP, Boland EG, Currow DC, Johnson MJ, Boland JW. Somatostatin Analogues Compared With Placebo and Other Pharmacologic Agents in the Management of Symptoms of Inoperable Malignant Bowel Obstruction: A Systematic Review. J Pain Symptom Manage. 2016 Dec;52(6):901-919.e1. doi: 10.1016/j.jpainsymman.2016.05.032. Epub 2016 Sep 30. PMID: 27697568.

- Two randomized prospective studies compared the anti-secretory effects of octreotide (0.3 mg/day) and scopolamine butylbromide (60 mg/day), administered by continuous subcutaneous infusion in patients with inoperable bowel obstruction.
- Octreotide was shown to reduce significantly the volume of GI secretions and the number of daily episodes of vomiting and alleviated nausea better than scopolamine butylbromide.
- When one of these drugs is ineffective by itself, combining the two may improve the GI secretions.

Ripamonti C, Mercadante S, Groff L, Zecca E, De Conno F, Casuccio A. Role of octreotide, scopolamine butylbromide and hydration in symptom control of patients with inoperable bowel obstruction having a nasogastric tube. A prospective, randomized clinical trial. J Pain Symptom Manage 2000;19:23–34.

Mercadante S, Ripamonti C, Casuccio A, Zecca E, Groff L. Comparison of octreotide and hyoscine butylbromide in controlling gastrointestinal symptoms due to malignant inoperable bowel obstruction. Supportive Care in Cancer 2000;8:188–91.

Medical Therapy of Malignant Bowel Obstruction With Octreotide, Dexamethasone, and Metoclopramide

Background: Malignant bowel obstruction is a highly symptomatic, often recurrent, and sometimes refractory condition in patients with intra-abdominal tumor burden. Gastro-intestinal symptoms and function may improve with anti-inflammatory, anti-secretory, and prokinetic/anti-nausea combination medical therapy.

Objective: To describe the effect of octreotide, metoclopramide, and dexamethasone in combination on symptom burden and bowel function in patients with malignant bowel obstruction and dysfunction.

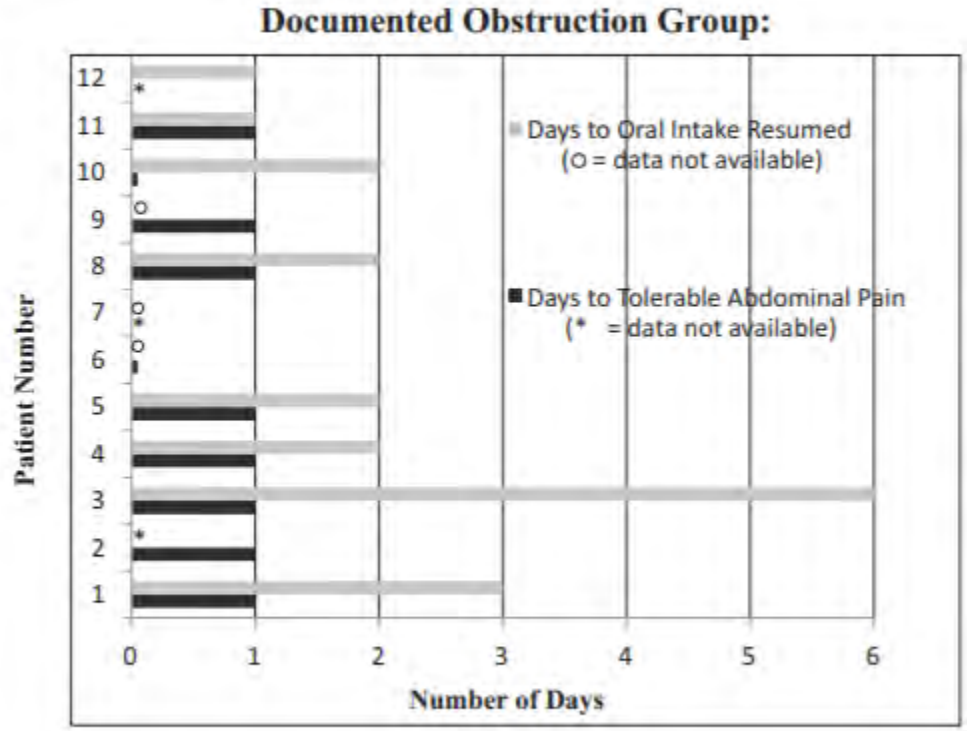
Design: A retrospective case series of patients with malignant bowel obstruction (MBO) and malignant bowel dysfunction (MBD) treated by a palliative care consultation service with octreotide, metoclopramide, and dexamethasone. Outcomes measures were nausea, pain, and time to resumption of oral intake.

Results: 12 cases with MBO, 11 had moderate/severe nausea on presentation. 100% of these had improvement in nausea by treatment day #1. 100% of patients with moderate/severe pain improved to tolerable level by treatment day #1. The median time to resumption of oral intake was 2 days (range 1-6 days) in the 8 cases with evaluable data. For patients with malignant bowel dysfunction, of those with moderate/severe nausea, 5 of 6 had subjective improvement by day#1. Moderate/severe pain improved to tolerable levels in 5/6 by day #1. Of the 4 cases with evaluable data on resumption of PO intake, time to resume PO ranged from 1-4 days.

Conclusion: Combination medical therapy may provide rapid improvement in symptoms associated with malignant bowel obstruction and dysfunction.

Berger J, Lester P, Rodrigues L. Medical Therapy of Malignant Bowel Obstruction With Octreotide, Dexamethasone, and Metoclopramide. Am J Hosp Palliat Care. 2016 May;33(4):407-10. doi: 10.1177/1049909115569047. Epub 2015 Feb 2. PMID: 25646530.

Table 1. Number of Days of Symptom Relief and Resumption of Oral Intake.



Olanzapine for the relief of nausea in patients with advanced cancer and incomplete bowel obstruction

- Retrospective study was carried out on a palliative care unit, using an electronic medical record from 2007 to 2009.
- The intensity of the symptom was evaluated and classified from the medical records on four scales. The frequency of vomiting also was noted from the medical records.
- 20 patients met the inclusion criteria.
- The average dose of olanzapine was 4.9 -1.2 mg and treatment duration was 23.4 -16.2 days.
- Olanzapine treatment led to a significant decrease in the average intensity score of nausea from 2.4-0.7 to 0.2-0.4 ($P < 0.001$). Of the 20 patients, 18 (90%) experienced a reduction in the intensity of nausea.
- The average frequency of vomiting significantly decreased after olanzapine treatment from 1.1-1.3 times/day (median 0.5; range 0.4) before the treatment to 0.3 -0.5 times/day (median 0; range 0.1) after the treatment ($P < 0.01$).
- Before the treatment, 10 patients experienced vomiting; eight of these patients experienced a decrease in the frequency of vomiting with olanzapine treatment. Our study suggests the potential efficacy of olanzapine for relief of nausea in incomplete bowel obstruction.

Kaneishi K, Kawabata M, Morita T. Olanzapine for the relief of nausea in patients with advanced cancer and incomplete bowel obstruction. J Pain Symptom Manage. 2012 Oct;44(4):604-7. doi: 10.1016/j.jpainsymman.2011.10.023. Epub 2012 Jul 7. PMID: 22771132.

Table 2 Antiemetic guidelines in advanced cancer

Recommendation	MASCC/ESMO level of evidence
Drugs of choice	
The antiemetic drug of choice in advanced cancer is metoclopramide (titrated to effect).	MASCC level of consensus: high MASCC level of confidence: moderate ESMO level of evidence: III ESMO grade of recommendation: C
Alternative options include haloperidol, levomepromazine, or olanzapine.	MASCC level of consensus: high MASCC level of confidence: low ESMO level of evidence: V ESMO grade of recommendation: D
The use of cyclizine* or 5-HT3 receptor antagonists is poorly defined to date and may be used where dopamine antagonists are contraindicated or ineffective.	MASCC level of consensus: low MASCC level of confidence: low ESMO level of evidence: V ESMO grade of recommendation: D
Bowel obstruction	
The drug recommended in a bowel obstruction is octreotide, dosed around the clock and given alongside an antiemetic (with the committee recommending haloperidol).	MASCC level of consensus: high MASCC level of confidence: high ESMO level of evidence: II ESMO grade of recommendation: A
If Octreotide plus antiemetic is ineffective, the use of anticholinergic antisecretory agents (e.g., scopolamine butylbromide, glycopyrronium bromide) and/or corticosteroids is recommended as either adjunct or alternative interventions.	MASCC level of consensus: high (moderate for corticosteroids) MASCC level of confidence: moderate (low for corticosteroids) ESMO level of evidence: IV ESMO grade of recommendation: D
The use of cyclizine* or 5-HT3 receptor is poorly defined in this setting**. Metoclopramide should be used with caution in partial bowel obstruction and should not be used in complete bowel obstruction.	MASCC level of consensus: low MASCC level of confidence: low ESMO level of evidence: V ESMO grade of recommendation: D
Opioid-induced nausea and vomiting	
No recommendation can be made for specific antiemetics, although various antiemetics may help. Opioid rotation and route switching may be effective approaches. There is no data to support prophylactic antiemetics in this situation.	MASCC level of consensus: high MASCC level of confidence: low ESMO level of evidence: V ESMO grade of recommendation: D

*Unavailable in some countries

**Caution should be exercised because of the risk of drug interactions

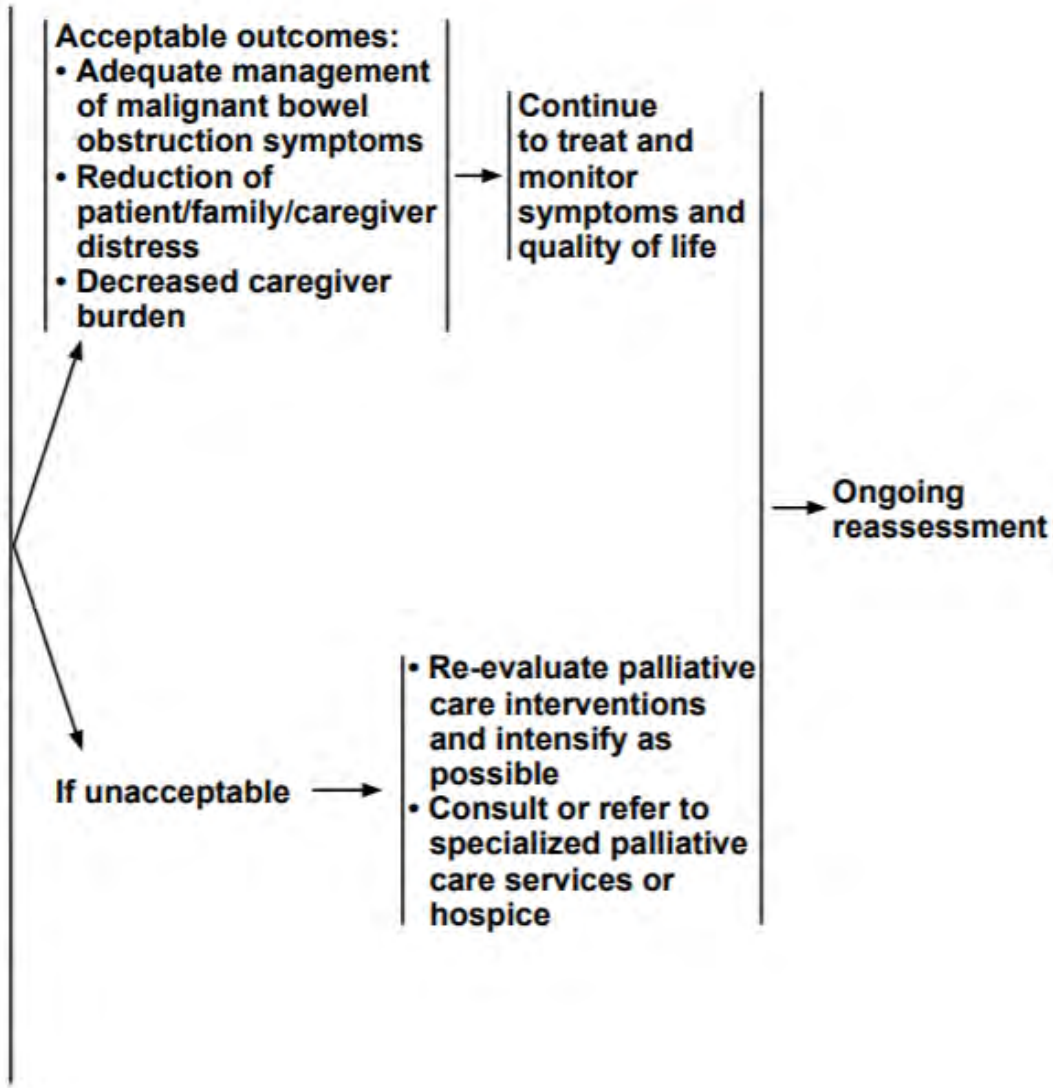
Walsh D, Davis M, Ripamonti C, Bruera E, Davies A, Molassiotis A. 2016 Updated MASCC/ESMO consensus recommendations: Management of nausea and vomiting in advanced cancer. Support Care Cancer. 2017 Jan;25(1):333-340. doi: 10.1007/s00520-016-3371-3. Epub 2016 Aug 17. PMID: 27534961.

MALIGNANT BOWEL OBSTRUCTION

PROCEDURAL INTERVENTIONS[k]

- Operative management
  - Discuss treatment options with patient/family/caregiver
    - Risk of mortality, morbidity, and re-obstruction
    - Overall prognosis
    - Invasiveness of the proposed intervention
  - Risk factors for poor surgical outcome include ascites, carcinomatosis, palpable intra-abdominal masses, multiple bowel obstructions, previous abdominal radiation, very advanced disease, and poor overall clinical status
- Endoscopic management
  - Percutaneous endoscopic gastrostomy tube for drainage
  - Endoscopic stent placement
- Interventional radiology management
  - Gastrostomy tube for drainage
- Pharmacologic management when the goal is maintaining gut function:
  - Use rectal, transdermal, subcutaneous, or intravenous routes of administration
  - Opioids
  - Antiemetics: Do not use antiemetics that increase gastrointestinal motility such as metoclopramide; however, these may be beneficial in incomplete bowel obstruction
  - Corticosteroids
- Pharmacologic management when gut function cannot be maintained:
  - Administer antisecretory agents
  - Intravenous or subcutaneous fluids
- Nasogastric or gastric tube drainage
  - Increased risk of aspiration
  - Consider a limited trial only if other measures fail to reduce vomiting
- Total parenteral nutrition (TPN)
  - Consider only if there is expected improvement of quality of life and life expectancy of months to years

REASSESSMENT



National Comprehensive Cancer Network®

NCCN Guidelines Version 1.2021
Palliative Care

VCU Health

Nausea and Vomiting (NV)-Initial Treatment (PAL-15)	**Life Expectancy: Years; Year to Months; Months to Weeks; and Weeks to Days (dying patient)** • See NCCN Guidelines for Antiemesis for chemotherapy/radiation-induced NV • Gastroparesis: Metoclopramide, 5–10 mg PO QID 30 min before meals and at bedtime • CNS involvement: Dexamethasone, 4–8 mg PO BID-TID • Gastric outlet obstructions: Dexamethasone, 4–8 mg/d PO; proton pump inhibitor; metoclopramide, 5–10 mg PO QID 30 min before meals and at bedtime • Gastritis/GERD: Proton pump inhibitor OR H2 blocker • Medication-induced gastropathy: Proton pump inhibitor OR metoclopramide, 5–10 mg PO QID 30 min before meals and at bedtime Nonspecific NV • Dopamine receptor antagonists or 5-HT3 receptor antagonists ‣ Haloperidol, 0.5 mg PO TID OR metoclopramide, 5–10 mg PO QID 30 min before meals and at bedtime OR prochlorperazine, 5–10 mg PO 3–4 times/d, maximum 40 mg/d OR olanzapine, 5–10 mg PO 2–3 times/d OR ondansetron, 4 mg PO q4h or 8 mg PO q8h • Contributing anxiety: Lorazepam, 0.5–1 mg PO q4h PRN • Vertiginous component: Anticholinergic AND/OR antihistamine
Nausea and Vomiting (NV)-Initial Treatment (PAL-16)	**Life Expectancy: Years; Year to Months; Months to Weeks; and Weeks to Days (dying patient)** • Consider appropriate route of administration ‣ 1) Prescribe oral, sublingual, or rectal agent and titrate to maximum benefit ‣ 2) If NV persists, provide PRN, scheduled, or continuous parenteral infusion as necessary ‣ 3) Consider subcutaneous administration as an alternative • Titrate to maximum benefit and tolerance: olanzapine, prochlorperazine, haloperidol, or metoclopramide • For continued NV, consider additional agents: ‣ Dexamethasone, 4–8 mg/d PO; ondansetron, 4–8 mg PO every 6 h; scopolamine (patch or IV); meclizine, 25–100 mg/d PO; oral cannabinoid
Malignant Bowel Obstruction (PAL-20)	**Life Expectancy: Years; Year to Months; Months to Weeks; and Weeks to Days (dying patient)** • Reduce opioid dose or rotate opioid • Metoclopramide, 5–10 mg PO QID 30 min before meals and at bedtime; avoid in the setting of complete obstruction • Dexamethasone, 4–12 mg IV daily, discontinue if no improvement in 3–5 days • Scopolamine (patch or IV); hyoscyamine, 0.125 mg PO/ODT/SL q4h PRN; glycopyrrolate, 0.2–0.4 mg IV q4h PRN • Octreotide, 100–300 mcg SC BID-TID or 10–40 mcg/h continuous SC/IV infusion; if prognosis >8 weeks, consider long-acting release (LAR) or depot injection

Further research

Table 1: Current active clinical trials investigating malignant bowel obstruction.

Trials identifier	Trial name	Design	Intervention
NCT03260647	Risk-stratified multidisciplinary ambulatory management of malignant bowel obstruction in gynecological cancers (MAMBO)	Prospective observational study	Multidisciplinary MBO care program
NCT02365584	Quality of life in Patients with inoperable malignant bowel obstruction (QOL in IMBO)	Phase II, multicentre, RCT	Lanreotide with standard care versus standard care alone
NCT02275338	Study to assess efficacy and safety of lanreotide autogel 120 mg in treatment of clinical symptoms associated with inoperable malignant intestinal obstruction (IMIO)	Phase II, multicenter open label study	Lanreotide
NCT02270450	S1316, surgery or nonsurgical management in treating patients with intra-abdominal cancer and bowel obstruction	Phase III, RCT	Surgery versus nonsurgical management
NCT03150992	EDMONd–elemental diet in bowel obstruction	Phase II, open-label study	Dietary supplement: elemental 028 extra liquid