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# Clinical-practice recommendations for the management of bowel obstruction in patients with end-stage cancer

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**Abstract** The paper highlights a series of questions that doctors need to consider when faced with end-stage cancer patients with bowel obstruction: Is the patient fit for surgery? Is there a place for stenting? Is it necessary to use a venting nasogastric tube (NGT) in inoperable patients? What drugs are indicated for symptom control, what is the proper route for their administration and which can be administered in association? When should a venting gastrostomy be considered? What is the role of total parenteral nutrition (TPN) and parenteral hydration (PH)? A working group was established to review issues relating to bowel obstruction in end-stage cancer and to make recommendations for management. A steering group was established by the (multidisciplinary) Board of Directors of the European Association for Palliative Care (EAPC) to select members of the expert panel, who were required to have specific clinical and research interests relating to the topic and to have published significant papers on advanced cancer patients in the last 5 years, or to have particular clinical expertise that is recognised internationally. The final constitution of this group was approved by the Board of the EAPC. This Working Group was made up of English, French and Italian physicians involved in the field of palliative care for advanced and terminal cancer patients; and of English, American and Italian surgeons who also specialized in artificial nutrition (Dr. Bozzetti) and a professor of health economics. We applied a systematic review methodology that showed the relative lack of RCTs in this area and the importance of retrospective and clinical reports from different authors in different countries. The brief was to review published data but also to provide clinical opinion where data were lacking. The recommendations reflect specialist clinical practice in the countries represented. Each member of the group was allocated a specific question and briefed to review the literature and produce a position paper on the indications, advantages and disadvantages of each symptomatic treatment. The position papers were circulated and then debated at a meeting held in Athens and attended by all panel members. The group reviewed all the available data, discussed the evidence and discussed what practical recommendations could be derived from it. An initial outline of the results of the review and recommendations was produced. Where there were gaps in the evidence, consensus was achieved by debate. Only unanimous conclusions have been incorporated. Subsequently the recommendations

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were drawn together by Carla Ripamonti (Chairperson) and Robert Twycross (Co-Chair) and refined with input from all panel members. The recommendations have been endorsed by the Board of Directors of the EAPC. It was concluded that surgery should not be undertaken routinely in patients with poor prognostic criteria, such as intra-abdominal carcinomatosis, poor performance status and massive ascites. A nasogastric tube should be used only as a temporary measure. Medical measures such as analgesics, anti-secretory drugs and anti-emetics should be used alone or in combination to relieve symptoms. A venting gastrostomy should be considered if drugs fail to reduce vomiting to an acceptable level. TPN should be considered only for patients who may die of starvation rather than from tumour spread. PH is sometimes indicated to correct nausea, whereas regular mouth care is the treatment of choice for dry mouth. A collaborative approach involving both surgeons and physicians can offer patients an individualized and appropriate symptom management plan.

**Keywords** Bowel obstruction · End-stage cancer · Palliative treatments

## Introduction

Bowel obstruction is a common complication in patients with end-stage cancer, particularly in those with an abdominal or pelvic primary. The reported frequency of bowel obstruction ranges from 5% to 42% in advanced ovarian cancer and from 4% to 24% in advanced colorectal cancer [1, 2, 3, 4, 5, 6, 7, 8, 9]. Bowel obstruction may be partial or complete and at single or multiple sites; the small bowel is more commonly involved than the large bowel (61% vs 33%), and in over 20% of the patients both are involved [10, 11, 12]. Several pathological mechanisms may be involved in the development of bowel obstruction [13, 14, 15, 16] (Table 1). Even in advanced cancer, the obstruction may be due to benign causes such as adhesions, post-irradiation bowel damage, inflammatory bowel disease, and hernia. Indeed, some reports suggest a benign cause is responsible in nearly half of the patients with colorectal cancer [17] and only in 6% of patients with gynaecological cancers [1, 10, 18].

**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, post-irradiation fibrosis

Intraluminal occlusion of the lumen: polypoid lesions due to primary cancer or metastases, annular tumoural dissemination

Intramural occlusion of the lumen: intestinal linitis plastica

Adynamic ileus or functional obstruction

Intestinal motility disorders: tumour infiltration of the mesentery or bowel muscle and nerves, malignant involvement of the coeliac plexus [13]

Intestinal motility disorders: paraneoplastic neuropathy particularly in patients with lung cancer [14], chronic intestinal pseudo-obstruction (CIP) [15], paraneoplastic pseudo-obstruction [15, 16]

## Clinical features

In cancer patients, compression of the bowel lumen develops slowly and often remains partial. Gastrointestinal (GI) symptoms caused by the sequence of distension-secretion-motor activity of the obstructed bowel (Fig. 1) occur in different combinations and intensity, depending on the site of obstruction and tend to worsen [8, 19, 20]. Continuous abdominal pain caused by intra-abdominal tumour is the most constant feature and is present in about 90% of the patients [8, 20]. Superimposed intestinal segmental activity to surmount the obstacle in the small or large bowel causes intermittent colic in about 75% of the patients [8, 20]. When the large bowel is affected, the pain is generally less severe and deeper, and occurs at longer intervals [21]. Abdominal distension may be absent in high obstruction, i.e. of the duodenum or proximal jejunum, and when the bowel is 'plastered' down by extensive mesenteric and omental spread. Vomiting develops early and in large amounts in gastric, duodenal and small bowel obstruction and later in large bowel obstruction.

Table 2 reports the possible radiological investigations that might be performed in patients with symptoms and signs of bowel obstruction. However, there is no point in proceeding with any of these if the patient is too ill or has declined surgery.

## Management

Clinical practice recommendations are offered for the management of malignant bowel obstruction in patients with far-advanced cancer, i.e. in patients who have progressive disease despite the appropriate use of surgery or other appropriate anticancer treatments.

**Fig. 1** Distension-secretion-motor activity causing gastrointestinal symptoms (*PG* prostaglandins, *VIP* vasoactive intestinal polypeptide)
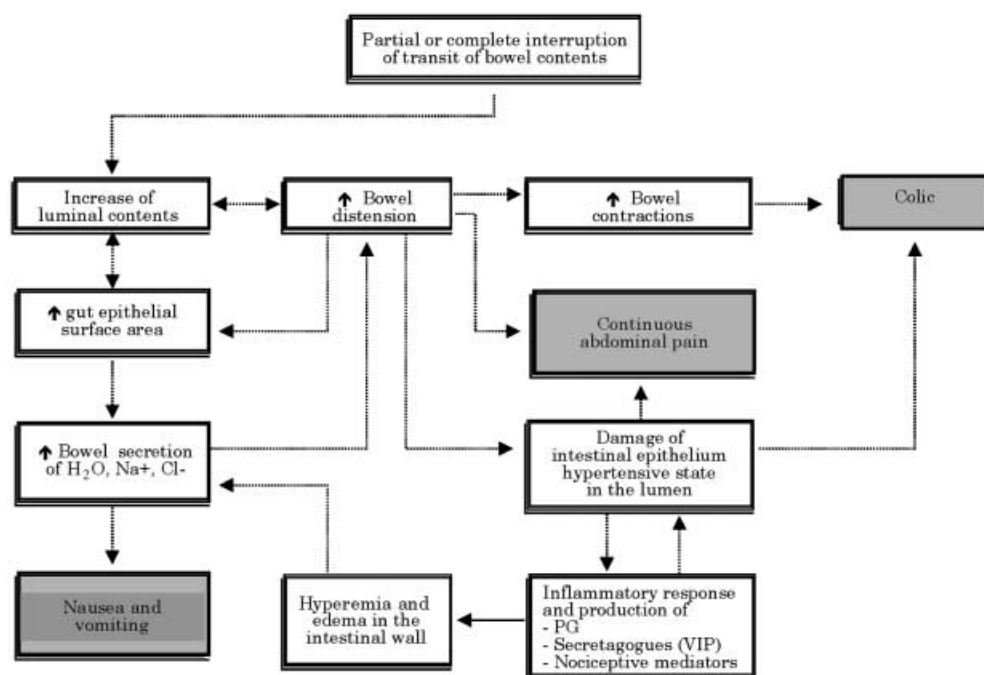


**Table 2** Radiological investigations

| Plain radiography | Abdominal radiography taken in supine and standing positions when small bowel obstruction is suspected |
|---|---|
| Contrast radiography | Help to evaluate dysmotility, partial obstruction and to define site and extent of obstruction<br>Barium provides excellent radiological definition (in particular when the obstruction is in the distal small bowel), but as it is not absorbed it can interfere with subsequent endoscopic studies or cause severe impaction, especially in patients with a complete and inoperable bowel obstruction. Gastrografin is useful in such cases; moreover, it often provides excellent visualization of proximal obstructions and can reduce luminal oedema and help in resolving partial obstructions<br>Retrograde, transrectal contrast studies serve to rule out and diagnose isolated or concomitant obstruction of the large bowel |
| CT | Abdominal CT is useful to evaluate the global extent of disease, to perform a staging and to assist in the choice of surgical, endoscopic or simple pharmacological palliative intervention for relief of the obstruction |

## Surgery

In published reports on advanced cancer patients, there is no consensus on the indications for conservative versus surgical treatment [1, 2, 11, 12, 18, 22, 23, 24, 25, 26, 27, 28, 29]. Surgery should not be routinely undertaken in patients with end-stage cancer and will only benefit selected patients with mechanical obstruction. It is important to consider whether palliative surgery is technically feasible and whether the patient is likely to benefit from surgery. Published data show that, in advanced cancer, the operative mortality (defined as death within 30 days of the operation) is 9–40%; complication rates vary from 9% to 90% (Table 3) [1, 2, 3, 5, 10, 11, 12, 18, 22, 24, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40]. The literature lacks uniformity on the outcome assessment of quality of life; symptom control and patient comfort are not described in most publications [40]. Recently published results are no better than those published in the past, suggesting that improvements in surgical techniques and perioperative care do not influence the outcome. However, the lack of improved outcomes can be attributed to changes over time in the severity of the conditions of the patients coming in, as opposed to how they are managed.

In the non-randomized study of Woolfson et al. [39] there was no difference in survival after hospital discharge between the operative and nonoperative patients. The type of obstruction (partial vs complete) and the method of surgical treatment (bypass vs resection and re-anastomosis) have no significant effect on the outcome [1, 23].

Benefit from surgery was defined as survival for at least 60 days after operation [2, 41]. This definition, however, does not take into account the well-being of the patient, the presence or absence of symptoms, postoperative complications, or the length of hospitalization. This measure cannot be applied to end-stage cancer patients, for whom symptom control and comfort must be considered the goals of any treatment. In pa-

**Table 3** Complications and survival time after surgery for bowel obstruction from 1979 to 1997. Most of the patients died with signs and symptoms of persistent or recurrent obstruction (– not reported)

| References | No. of patients % | Primary cancer % | 30-day mortality % | Operative complications % | Median survival (months) |
|---|---|---|---|---|---|
| [24] | 34 | Various | 18 | 44.0 | 4.0 (mean) |
| [27] | 32 | Various | – | – | 3.0 |
| [3] | 23 | Ovary | 13 | 43.0 | 12.0 (17%) |
| [1] | 127 | Ovary | 14 | – | 7.0 (mean) |
| [30] | 26 | Various | 46 | 15.0 | 4.5 (mean) |
| [23] | 60 | Ovary | 17 | 7.0 | 2.5 |
| [12] | 98 | Ovary | 12 | 12.0 | 3.1 |
| [31] | 36 | Various | 19 | – | 11.0 |
| [32] | 41 | Various | 24.4 | – | 4.5 |
| [10] | 49 | Ovary | 14 | 49.0 | 4.5 |
| [18] | 64 | Gynaecological | 17 | 15.5 | 2.5 |
| [33] | 60 | Ovary | 16.5 | 31.0 | 2.5 |
| [2] | 25 | Ovary | 32 | 32.0 | 2.0 |
| [11] | 43 | Ovary | 16 | 11.5 | 6.8 mean |
| [5] | 11 | Ovary | 9 | 9.0 | 7.0 mean |
| [22] | 89 | Abdominal | 13 | 44.0 | 4.5 mean |
| [34] | 25 | Various | 24 | 50.0 | 2.5 |
| [35] | 10 | Various | 40 | 80.0 | 2.0 |
| [29] | 30 | Colorectal | 37 | 27.0 | 6.1 |
| [28] | 20 | Ovary | 30 | 90.0 | 1.0 |
| [36] | 53 | Ovary | – | 42.0 | 3.0 |
| [37] | 43 | Abdominal | 12 | – | – |
| [38] | 17 | Various | 41 | – | – |
| [39] | 32 | Abdominal | 22 | 48.0 | 7.0 mean |

**Table 4** Contraindications to surgery

| Absolute[a] | A recent laparotomy which demonstrated that further corrective surgery was not possible<br>Previous abdominal surgery which showed diffuse metastatic cancer<br>Involvement of proximal stomach<br>Intra-abdominal carcinomatosis demonstrated radiologically with a contrast study revealing a severe motility problem [12, 22, 28, 32, 41, 43, 44, 46]<br>Diffuse palpable intra-abdominal masses [28, 46]<br>Massive ascites which rapidly recur after drainage [12, 28, 38, 41, 43, 44, 46] |
|---|---|
| Relative | Extra-abdominal metastases producing symptoms which are difficult to control (e.g. dyspnoea)<br>Nonsymptomatic extensive extra-abdominal malignant disease (e.g. widespread metastases, pleural effusion) [1, 12, 43, 44]<br>Poor general performance status [47]<br>Poor nutritional status (e.g. marked weight loss/cachexia, marked hypo-albuminaemia, low lymphocyte count) [42, 45, 46]<br>Advanced age [12] in association with cachexia [32, 46]<br>Previous radiotherapy of the abdomen or pelvis [3, 12] |

[a] Each is a "stand-alone" contraindication

tients with known intra-abdominal recurrence of disease, a decision to operate must take into account the limited survival, the need for hospitalization, high morbidity and mortality, and potential failure to relieve the obstruction.

Prognostic criteria to help doctors select patients who are likely to benefit from surgical intervention have been identified. From the poor outcome of patients with adverse prognostic factors, it may be concluded that patients with end-stage cancer who have exhausted available oncological therapies should not undergo surgery for relief of the obstruction if one or more of the signs described in Table 4 are present [1, 3, 12, 22, 28, 30, 32, 38, 41, 42, 43, 44, 45, 46, 47]. According to Krebs and Gloperud [12], the operative mortality was 44% in the group of patients with ovarian carcinoma and two or more of the poor prognostic factors: widespread tumour, advanced age, massive ascites and previous radiotherapy of the abdomen and pelvis. Moreover, the operative mortality was significantly higher than the 13% operative mortality among the patients who had only one risk factor. In the study of Jong et al. [36] successful palliation (defined as patient survival for over 60 days after surgery, ability to return home and relief of obstruction lasting over 60 days postoperatively) was significantly associated with the

following prognostic factors: absence of palpable abdominal or pelvic masses, volume of ascites less than 3 l, unifocal obstruction and preoperative weight loss less than 9 kg.

In cancer patients bowel obstruction is rarely an emergency and strangulation is uncommon [27, 46, 48, 49]. There is time to monitor the clinical situation, undertake appropriate radiological investigations, check the findings of previous surgery, and consider the possibility of a benign cause and the implications of the site of the primary tumour before deciding for or against surgery. For example, surgery is more likely to be helpful for colorectal cancer than for ovarian cancer. Consent to surgery should include discussion of the surgical risks, complications and alternatives. The possibility of a stoma should be discussed. Surgery must be justified on the basis of more benefit than burden to the patient, like any other medical intervention. Supportive and palliative care treatments are available for patients who are unfit for surgery or inoperable, or do not want a further operation.

Self-expanding metallic stents

In recent years expandable metallic stents have been used increasingly in the management of obstructions in the gastric outlet, proximal small bowel and colon. A stent may be useful in patients who have advanced metastatic disease and a poor surgical risk or in those with large bowel obstruction in whom decompression by a

stent allows surgery to be carried out later after staging of the disease and optimal colonic preparation [50, 51].

Contraindications for the stent placement are the presence of multiple stenoses and peritoneal carcinomatosis. Complications and failure have been described [52, 53, 54] and, as for surgery, these should be borne in mind in patients with end-stage cancer. Further studies are necessary to identify those patients who may have some benefit in terms of symptom relief, complications and quality of life.

## Nasogastric suction

The use of a nasogastric tube (NGT) cannot be justified except as a temporary measure in cancer patients with inoperable obstruction if their symptoms can be controlled by drug management alone. Nasogastric drainage is intrusive and distressing for the patient. Furthermore, complications may arise, such as nasal or pharyngeal irritation, nasal cartilage erosion, occlusion necessitating flushing or replacement and spontaneous expulsion [33]. A NGT can be used temporarily to reduce a large amount of secretions before the start of pharmacological treatment and during the first few days of such treatment. Long-term use of a NGT should only e considered when drug therapy is ineffective and a gastrostomy cannot be performed.

## Pharmacological treatment

The pharmacological management of bowel obstruction in end-stage cancer focuses on the relief of nausea, vomiting and pain.

Drug therapy, comprising analgesics, anti-secretory drugs and anti-emetics, without the use of a NGT was first described in 1985 [8]. Several authors have confirmed the efficacy of this approach, and it is successfully used by palliative care centres throughout the world in both in-patients and out-patients [8, 19, 20, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64]. The drugs of choice vary to a certain extent between countries and different centres, based on clinical experience, drug availability, cost and fashion. Medication should be tailored to each patient with regard to both the drugs to be administered and the route of administration.

To evaluate the efficacy of the drug therapy and to adjust it promptly as necessary, symptoms should be monitored daily. Vomiting can be evaluated in terms of both quantity and frequency. Other symptoms, such as nausea, continuous abdominal pain, intestinal colic, dry mouth, drowsiness, dyspnoea, hunger, thirst, and abdominal distension can all be assessed by physician-nurse-patient dialogue with or without the use of formal scales.

## Vomiting

Vomiting should be reduced to an acceptable level for the patient (e.g. 1–2 times in 24 h). Vomiting may be controlled by either of two different pharmacological approaches: (1) drugs that reduce GI secretions, such as anticholinergics (hyoscine hydrobromide; hyoscine butylbromide, glycopyrrolate) or/and somatostatin analogues; (2) anti-emetics, alone or in association with drugs to reduce GI secretions. There are no comparative studies on the efficacy of these different approaches. Generally, clinicians are guided by drug availability and costs. Figure 2 describes the drugs used to control nausea and vomiting, their possible association and the doses reported to be effective [8, 19, 55, 57, 58, 59, 60, 61, 63, 64, 65, 66]. Hyoscine butylbromide may reduce vomiting by virtue of its antisecretory effect [19, 20, 63, 66, 67] and may be indicated even if there is no colic. In some countries where hyoscine butylbromide is not available, glycopyrrolate (a quaternary ammonium anticholinergic) can be used instead [65].

Octreotide, a synthetic analogue of somatostatin with a duration of action of about 8 h is also used to manage the symptoms of bowel obstruction [57, 58, 59, 60, 64, 66, 67]. Octreotide inhibits the release of several gastrointestinal hormones, thereby modulating gastrointestinal function by reducing gastric and intestinal secretions, slowing down intestinal motility, decreasing bile flow, decreasing splanchnic blood flow, and increasing the absorption of water and electrolytes thereby reducing vomiting [68]. Two randomized controlled studies have been carried out comparing the antisecretory effects of octreotide and hyoscine butylbromide in patients with inoperable bowel obstruction who have NGTs [66] and in such patients without NGTs [67]. Octreotide was significantly more effective and faster than hyoscine butylbromide in reducing the amount of GI secretions in patients having NGTs [66]. In the other study, octreotide proved to be significantly more effective than hyoscine butylbromide in reducing the intensity of nausea and the number of vomiting episodes in patients without a NGT [67].

Octreotide may also be effective in patients with upper abdominal obstruction in whom hyoscine butylbromide has failed [57, 58]. However, in some countries its use is limited by the high cost. Vapreotide (available only in few countries) is a long-acting somatostatin analogue with similar properties to octreotide [61] and is administered i.m. weekly.

Among the anti-emetics, parenteral metoclopramide is the drug of choice in patients with mainly functional bowel obstruction. Its use is not recommended in complete mechanical bowel obstruction as it may increase colic, nausea and vomiting [8, 19]. Other anti-emetics are the butyrophenones, antihistaminic-anti-emetic and
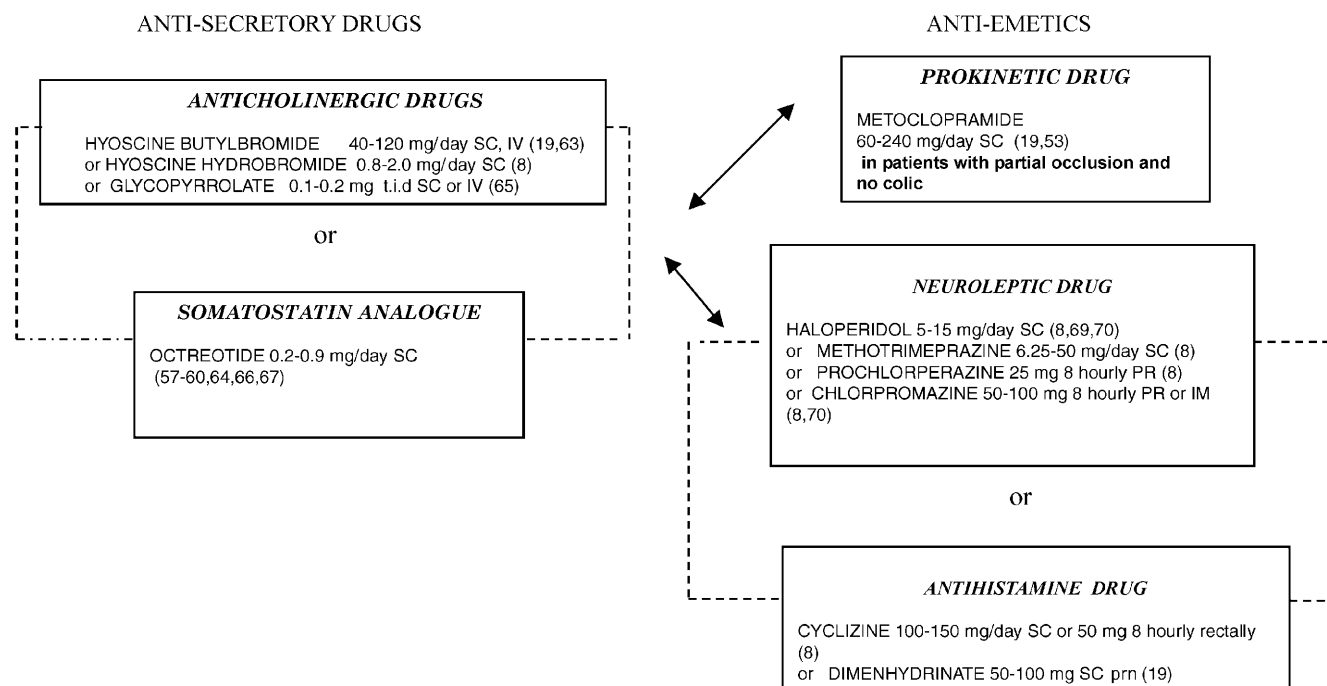
ANTI-SECRETORY DRUGS

ANTI-EMETICS

**ANTICHOLINERGIC DRUGS**

HYOSCINE BUTYLBROMIDE    40-120 mg/day SC, IV (19,63)
or HYOSCINE HYDROBROMIDE  0.8-2.0 mg/day SC (8)
or GLYCOPYRROLATE   0.1-0.2 mg  t.i.d SC or IV (65)

or

**SOMATOSTATIN ANALOGUE**

OCTREOTIDE 0.2-0.9 mg/day SC
(57-60,64,66,67)

**PROKINETIC DRUG**

METOCLOPRAMIDE
60-240 mg/day SC  (19,53)
 **in patients with partial occlusion and
no colic**

**NEUROLEPTIC DRUG**

HALOPERIDOL 5-15 mg/day SC (8,69,70)
or  METHOTRIMEPRAZINE 6.25-50 mg/day SC (8)
or  PROCHLORPERAZINE 25 mg 8 hourly PR (8)
or CHLORPROMAZINE 50-100 mg 8 hourly PR or IM
(8,70)

or

**ANTIHISTAMINE  DRUG**

CYCLIZINE 100-150 mg/day SC or 50 mg 8 hourly rectally
(8)
or  DIMENHYDRINATE 50-100 mg SC prn (19)

**Fig. 2** Drugs to control nausea and vomiting in the presence of bowel obstruction. *Numbers* in *round brackets* refer to literature references (*CSCI* continuous s.c. infusion, *IM* intramuscular, *IV* intravenous, *PR* rectal, *SC* subcutaneous)

phenothiazines [8, 19]. There are no studies comparing these anti-emetics in patients with inoperable bowel obstruction. The drugs indicated in Fig. 2 refer to clinical practice at palliative care centres in different countries. Haloperidol, a dopamine antagonist, is a potent suppressor of the chemoreceptor trigger zone and is often used successfully in these circumstances [8, 20, 57]. It causes less sedation and has less anticholinergic effects than phenothiazines. It can be administered s.c. as a bolus or as a continuous infusion. In some countries, antihistaminic anti-emetics are used as the first-line drug for obstructive vomiting (e.g. cyclizine, dimenhydrinate, diphenhydramine, meclozine). Among the phenothiazines, methotrimeprazine (levomepromazine) [8], chlorpromazine [8] and prochlorperazine [8] are all used and effective. Chlorpromazine and prochlorperazine are not recommended for continuous s.c. infusions because they cause skin irritation [8, 69]. A combination of anti-emetics with different sites of action may be more effective than a single agent [70].

Corticosteroids are potentially of benefit in bowel obstruction, acting primarily as anti-emetics and secondarily by reducing peri-tumour and peri-neural oedema. Dexamethasone is used in some centres for patients with bowel obstruction in association with other

anti-emetics [19, 56, 62, 71]. Its role, however, in obstructive vomiting is still debatable [72].

*Pain*

To relieve continuous abdominal pain, most patients need a strong opioid, commonly morphine (or diamorphine in the UK), which may also relieve colic. The administration of analgesics according to the WHO guidelines [73] allows adequate pain relief in most patients. The dose of the analgesic has to be titrated for each patient until pain relief is achieved. If colic persists despite the use of an opioid, hyoscine butylbromide or hyoscine hydrobromide [8, 62] should also be administered in association [19, 20, 21, 63]. Hyoscine butylbromide has a low lipid solubility and, unlike atropine and hyoscine hydrobromide, does not cross the blood–brain barrier. It therefore does not cause such adverse central effects as somnolence and hallucinations.

*Routes of drug administration*

The route of drug administration depends on the clinical circumstances. In most obstructed patients oral administration is unreliable because of frequent vomiting. Rectal and sublingual medication are useful alternatives, particularly for patients being cared for at home [74]. The transdermal route is available for administration of scopolamine and fentanyl. Where a pre-existing

**Table 5** Drug combinations in syringe drivers : compatibility and stability of opioids with anti-emetics tested in 5% dextro

| Opioids | Concentration | Anti-emetics | Concentration (mg/ml) | Notes |
|---|---|---|---|---|
| Fentanyl citrate | 25 µg/ml | Atropine sulfate | 0.4 undiluted | All the opioid solutions were compatible for at least 48 h with all the anti-emetics tested (see [78]) |
| Hydromorphone HCl | 0.5 mg/ml | Diphenidramine HCl | 2.0 | |
| Methadone HCl | 1.0 mg/ml | Haloperidol lactate | 0.2 | |
| Morphine sulfate | 1.0 mg/ml | Hydroxyzine HCl | 4.0 | |
| | | Methotrimeprazine | 0.2 | |
| | | Metoclopramide HCl | 5.0 undiluted | |
| | | Scopolamine hydrobromide | 0.05 | |

**Table 6** Drug combinations in syringe drivers: compatibility and stability of opioids tested in distilled water with anti-emetics

| Opioids | Concentration (mg/ml) | Anti-emetics | Concentration (mg/ml) | Notes |
|---|---|---|---|---|
| Morphine sulfate | 25 | + Metoclopramide | 25 | Stable and compatible for 7 days |
| Hydromorphone HCl | 10–20 | + Metoclopramide | 15 | |
| Hydromorphone HCl | 10 | + Methotrimeprazine | 10 | |
| Morphine sulfate | 20 | + Haloperidol | 2.0 | Precipitable formulation (see [77]) |
| Hydromorphone HCl | 10–15 | + Haloperidol | 2.0 | |
| Morphine sulfate | 15 | + Dexamethasone | 0.02 | No significant chemical degradation after 7 days at room temperature (see [76]) |
| Morphine sulfate | 15 | + Metoclopramide | 1.0 | |
| Morphine sulfate | 15 | + Haloperidol | 0.2 | |
| Diamorphine | 20–50–100 | + Haloperidol | 2.0 | Stable and compatible after 7 days (see [79]) |
| Diamorphine | 20–50–100 | + Haloperidol | 3.0 | |
| Diamorphine | 20–50 | + Haloperidol | 4.0 | |
| Diamorphine | 50–100 | + Cyclizine | 4.0 | Stable and compatible for 7 days (see [79]) |
| Diamorphine | 20 | + Cyclizine | 10.0 | |
| Diamorphine | 9 | + Cyclizine | 30.0 | |
| Diamorphine | 10 | + Cyclizine | 40.0 | Stable and compatible for 48 h |
| Diamorphine | 10 | + Cyclizine | 30.0 | |
| Diamorphine | 12 | + Cyclizine | 50.0 | |
| Diamorphine | 20 | + Cyclizine | 26.0 | |
| Diamorphine | 20 | + Cyclizine | 18.0 | |
| Diamorphine | 50 | + Cyclizine | 10.0 | |

central venous line is not available, continuous s.c. infusions allows a constant infusion of medications over 24 h with minimum discomfort to the patient. When a syringe driver is not readily available, a needle or cannula can be inserted s.c. and drugs administered in boluses at intervals consistent with their pharmacological characteristics. Most of the recommended drugs can be administered together in a single syringe, thereby facilitating administration [75]. However, drug incompatibility may lead to drug crystallization, resulting in blockage of the cannula.

Some authors report the results of stability and/or compatibility testing for interactions between the recommended drugs [76, 77, 78, 79] (Tables 5, 6). The addition of haloperidol (2 mg/ml) has no detrimental effect on the stability of the diamorphine/ cyclizine combinations, but appears to stabilize the mixture [79]. Morphine administered in association with hyoscine butylbromide or octreotide and haloperidol (0.5–1.2 mg/ml) does not show visual precipitation when mixed in the same syringe [20].

Gastrostomy

A venting gastrostomy should be considered if drugs are not successful in reducing vomiting.

Gastrostomy is a much more acceptable method for longer term decompression of an obstructed gastrointestinal tract than a NGT [80]. Intermittent venting via the gastrostomy allows the patient to maintain oral intake and an active lifestyle without the inconvenience and discomfort of an NGT. The two options currently available are operative gastrostomy and percutaneous endoscopic gastrostomy (PEG). Tube gastrostomy at the time of surgical exploration is the traditional method of long-term gastric decompression. It adds little time or morbidity to the surgical procedure, and should be considered whenever the intraoperative impression is that complete bowel obstruction may be prolonged, permanent, or imminent [81]. Previous surgery or massive carcinomatosis may make placement of the gastrostomy difficult or dangerous, but every effort should be made to place a gastrostomy at the time of explora-

tion if the clinical situation warrants one. Subsequent to exploration, if the need arises, PEG is the treatment of choice.

PEG is a superior technique to both nasogastric suction and operative gastrostomy for palliation of small bowel obstruction, particularly in terminal ovarian cancer [82]. It avoids laparotomy, has a low morbidity, costs less, can be performed at the bedside and is easily managed at home [83].

There are no absolute contraindications. Relative contraindications include massive carcinomatosis, portal hypertension and ascites, previous upper abdominal surgery (including gastrectomy), active gastric ulceration and a coagulopathy [80, 84]. All these may be surmountable endoscopically if the situation warrants it, and if not, CT-guided cannulation of the gastrointestinal tract can also be performed. A percutaneous technique is generally preferable in this group of patients. The procedure may be performed under intravenous sedation and local anaesthesia. Overall, this approach has been reported to control nausea and vomiting due to bowel obstruction in over 90% of cases [85, 86, 87, 88, 89, 90]. In some patients with gastric outlet or proximal bowel obstruction, some authors describe the insertion of both a venting gastrostomy and a feeding jejunostomy [91].

## Total parenteral nutrition

Oral intake of fluid and food is generally much decreased in patients with bowel obstruction. Less than 50% of terminally ill cancer patients experience hunger or thirst even when receiving inadequate amounts of food and water [92]. The role of total parenteral nutrition (TPN) in the management of patients with inoperable bowel obstruction is controversial [28, 32]. TPN may prolong survival but can also lead to complications and make prolonged hospitalization necessary [93].

The main goal of TPN is to maintain or restore the patient's nutritional status and to correct or prevent malnutrition-related symptoms. Nutritional benefits are generally limited if TPN is delivered only for a very short time [94]. Further, if the expected length of survival is short, there is not enough time for a proper TPN plan. Patients need to be trained in hospital or by specialized supervision in the home, and such training takes 1–3 weeks.

There is, however, a small subgroup of patients – young, affected by slow-growing tumors, with involvement of the GI tract and sparing of the vital organs – who may die of starvation rather than from tumour spread [95]. Such patients may survive several months with TPN at home. A favourable criterion for selecting these patients is a Karnofsky Performance Status >50 at the beginning of treatment [95]. This pro-

gramme of home TPN may be started in these patients only in centres which have specific experience with home nutrition and when the patient's social and family conditions allow this to be done. In short, TPN should not be considered a routine part of a terminal care regimen but should be used in selected patients. TPN should not be a substitute for appropriate psychological support of the patient and family. Inoperable patients being managed by drug therapy should be encouraged to drink and eat small amounts of their favourite beverages and food. It is important for these patients to at least taste their favourite food and drinks.

## Hydratation

Artificial hydratation is indicated for correction of dehydration-related symptoms. The intensity of dry mouth and thirst are independent of the quantity of both i.v. or oral hydration [66, 67, 96]. On the other hand, the intensity of nausea was significantly lower in patients treated with more than 1 l/day of parenteral fluids [66, 67]. As a high level of i.v. hydratation may result in more bowel secretions, it is necessary to keep a balance between the efficacy of the treatment and the adverse effects [66]. Intravenous hydration can be difficult and uncomfortable for end-stage cancer patients, so it should be reserved for patients who already have a central venous catheter. Hypodermoclysis (HDC) is a valid alternative with few problems and several potential advantages over the i.v. route for patients who do not already have a central venous catheter [97, 98]. It is a simple and inexpensive way of managing patients at home in whom artificial hydration is indicated, and can be started by any staff member able to give a s.c. injection without the need for a physician. Administration of 1000–1500 ml of fluids can be carried out during the night using solutions with electrolytes, such as normal saline or two-thirds 5% dextrose and one-third normal saline to avoid a sodium overload. However, providing fluids p.r.n. and frequent mouth care is sufficient to relieve the discomfort in most patients.

Anticholinergic drugs cause dry mouth. Local measures, e.g. frequent sips of fluid, sucking ice cubes or boiled sweets, chewing fresh pineapple, lip lubrication and regular mouth care, are generally effective in relieving the symptom of dry mouth [92, 99].

## Economic evaluation

Economic evaluation of the treatment alternatives (surgery, self-expanding stents, nasogastric suction, percutaneous gastrostomy, TPN, pharmacological treatment) and evaluation of their impact on a patient's quality of life are needed. The few economic studies which have been published do not have clear statements about

cost-effectiveness ratios [95, 100]. To help the clinicians and the administrators in taking decisions, it would be useful to apprise them of the extra costs associated with different bowel obstruction management strategies to gain extra days of life or extra quality of life scores. Giving the ethical constraints and the varied approaches to care in different institutional settings, modelling studies applying decision analysis tools are recommended.

## Conclusions

These recommendations call for:

1. A collaborative approach by surgeons and physicians to the care of patients with end-stage cancer and bowel obstruction

2. The avoidance of the automatic use of surgery, nasogastric suction, and TPN

3. An individualized symptom management plan with the goals of therapy agreed on by all concerned – doctors, nurses, patient and family

4. Ongoing monitoring of the patients' symptoms and their response to therapy

5. The drafting of explicit institutional policies on the management of bowel obstruction in end-stage cancer

6. Provision for auditing the effectiveness of such strategies

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