

## Intestinal Obstruction Management in Patients with Advanced Abdominal Neoplasia\*

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### Rezumat

#### **Managementul ocluziei intestinale la pacienţii cu neoplazii abdominale avansate**

**Introducere:** Studiul de faţă prezintă dificultăţile întâmpinate în diagnosticul şi tratamentul ocluziei intestinale survenite la pacienţii cu neoplazii abdominale avansate.

**Metode:** Studiul unicentric şi retrospectiv evaluează pacienţii cu ocluzie intestinală operaţi în Clinica de Chirurgie I a Institutului Oncologic Bucureşti, pe o perioadă de 4 ani (2010 – 2013). Dintre aceştia, au fost selectate 61 de cazuri la care ocluzia a survenit în cadrul unei neoplazii abdominale avansate. Am considerat avansate acele neoplazii abdominale în care, datorită stadiului evolutiv, tratamentul oncologic cu viză curativă nu mai este posibil.

**Rezultate:** Alegerea aleatorie a perioadei de studiu, introducerea tuturor pacienţilor identificaţi cu acest tip de patologie, precum şi concentrarea cazurilor cu neoplazii abdominale avansate în Institutul Oncologic Bucureşti sunt elementele care ne permit să afirmăm ca rezultatele acestui studiu sunt reprezentative. Au

fost identificate particularităţi legate de aspectul clinic al ocluziei intestinale la aceşti pacienţi, precum şi dificultăţi în stabilirea corectă a diagnosticului. Rezolvarea chirurgicală a ocluziei, evident cu viză paleativă, a fost posibilă doar în 47 de cazuri (reprezentând 77,05%).

**Concluzii:** Pentru acest tip de pacienţi nu putem face o standardizare a tratamentului. Îngrijirea paleativă, indispensabilă în cazul neoplaziilor avansate, rămâne unică modalitate terapeutică în cazul pacienţilor fără soluţie chirurgicală a ocluziei. Obiectivul principal, pentru întreg lotul studiat, este asigurarea unei calităţi a vieţii cât mai bune, factor de care trebuie ținut seama, ori de câte ori este posibil, în alegerea soluţiei chirurgicale. Desigur, atunci când tratamentul chirurgical este fezabil, depăşirea episodului ocluziv prelungeşte viaţa acestor pacienţi şi permite, eventual, alte modalităţi terapeutice complementare.

**Cuvinte cheie:** ocluzie intestinală, neoplazie abdominală avansată, tratament, paleaţie

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### Abstract

**Background:** The present study describes the difficulties encountered in the diagnostic process and treatment of intestinal obstruction developed by patients with advanced abdominal neoplasia.

**Methods:** This unicentric and retrospective study evaluates patients suffering from intestinal occlusion operated on at the First Surgical Clinic of the Oncology Institute in Bucharest,

over a period of 4 years (2010 – 2013). Of these, 61 cases in which the occlusion occurred on the background of an advanced abdominal neoplasia were selected. We considered as advanced those cases of abdominal cancer where curative oncologic treatment is no longer possible due to the evolution stage.

**Results:** The random selection of the study period, the introduction of all the patients identified with this type of pathology, as well as the concentration of advanced abdominal neoplasia at the Oncology Institute in Bucharest are the elements that allow us to state that the results of this study are representative. Particularities related to the clinical aspects of the intestinal occlusion in these patients, as well as difficulties in establishing the correct diagnosis were encountered. Surgical cure of the occlusion, with palliative aim of course, was possible in only 47 cases (representing 77.05%).

**Conclusions:** A standard treatment course cannot be devised for this type of patients. Palliative care, indispensable in cases of advanced neoplastic disease, remains the sole therapeutic method available for patients with no surgical cure for the obstruction. The main objective, for the entire study lot, was to ensure an as high as possible quality of life, a factor we must bear in mind as often as possible when choosing a surgical solution. Of course, when surgical treatment can be applied, overcoming the occlusive episode prolongs these patients' life and can even allow for other courses of complementary treatment to be undertaken.

**Key words:** intestinal obstruction, advanced abdominal neoplasia, treatment, palliation

## Introduction

Intestinal obstruction is a quite frequently encountered complication in the progression of advanced neoplastic diseases located in the abdomen. Whether the localization of the tumour is primary or secondary, by advanced form we understand those cases in which oncological treatment with the aim to cure is no longer possible. According to the TNM classification, this means a tumour of at least stage T4, but most of the times the cases involve metastases (M1). Since curative medicine can no longer offer a solution for these patients, palliative care becomes more and more important to them.

The purpose of palliative care is to ensure an as good as possible quality of life for these patients and their families; prolonging the patient's life is not the main objective in this case, as it is in curative medicine. However, especially when neoplasia is concerned, setting a boundary between curative and palliative medicine is neither possible, nor to the advantage of the persons involved. As the neoplastic disease progresses, the resources of curative medicine diminish, and a need for palliative care increases.

Surgical treatment of intestinal obstruction in advanced

abdominal neoplasia also has a palliative aim. As a cure is no longer attainable, the surgical method chosen must seek to ensure the best possible quality of life of the patient. (1,2)

In these cases, the occlusions occur as a complication of an advanced illness, most frequently on the background of multiple intraabdominal neoplastic masses, as well as extra-abdominal ones. Often, the patients are undergoing different forms of oncological treatment (chemotherapy, radiotherapy, hormone therapy etc) or develop adverse reactions, side-effects or sequelae of an already performed treatment (including consequences of one or more surgical interventions in his/her personal history). We cannot oversee associated pathologies neither, be them non-oncological or age related. All the above-mentioned factors determine particularities related to clinical manifestations, diagnosis and treatment of intestinal obstruction in these patients. (3,4,5)

## Material and Method

Our objective was to analyse cases of intestinal obstruction in patients with advanced abdominal cancer from the point of view of the particularities encountered in terms of diagnosis and treatment. We conducted an observational retrospective study, on a group of 61 patients with intestinal obstruction, operated on at the First Surgical Clinic of the Bucharest Oncological Institute, over a period of 4 years (2010 – 2013).

All patients included in the study group were selected from cases of intestinal obstruction operated at the First Surgical Clinic of the Bucharest Oncological Institute, during the above-mentioned period, if they met the following criteria:

- Neoplastic disease confirmed by histology exam;
- Abdominal localization of the neoplasia, be it primary or secondary;
- In cases of primary abdominal localization, advanced stage of the disease, not allowing curative oncological treatment.

It must be mentioned that under these circumstances the localization of the initial cancer, when known or identifiable, was of no interest to this study, dedicated solely to advanced stages.

Case analysis revealed a series of particular aspects in connection with the progression of the disease, of difficulties in establishing the diagnosis of intestinal obstruction and the indication for surgical treatment, as well as in choosing an appropriate surgical solution for the disease.

These particularities, along with the descriptive nature of the study, determined us not to resort to a statistical analysis, considering the descriptive method as a more appropriate one for the objective set in mind.

In the group of 61 patients with intestinal occlusion we can observe a slight predominance of the female gender (Fig. 1), which is, at least partly, justifiable by the increased frequency of cancers originating in the uterus or the ovaries.

With regards to patients' age, this was between 31 and 84 years old, with an average of 61 years.

The analysis of the type of advanced neoplastic diseases allowed for the highlighting of less frequent causes generating

intestinal obstruction (*Table 1*), with a special note on the fact that an association of factors determining the occlusion can be encountered in the same patient, without it being possible to precisely pinpoint the main one.

After having established the diagnosis of intestinal obstruction, all 61 patients were submitted to surgery, after a rapid preoperative preparation, which included the standard measures (basic laboratory tests, hydroelectrolytic rebalance, positioning of urinary catheter and nasogastric aspiration tube etc.). The surgical intervention was performed in less than 24 hours after the diagnosis was set.

In 14 cases the surgical act was limited to laparotomy and peritoneal drainage, without it being possible to find a surgical solution. In the other 47 patients, bearing in mind the presence of at least 2 aggravating factors, intestinal occlusion and advanced neoplastic disease, an objective was set out of limiting the number of digestive anastomoses, a stoma being preferred as a means of overcoming the occlusive episode (*Table 2*).

In the 47 cases that were operable, postoperative evolution was marked by severe complications in 9 patients (19.14%, *Table 3*), registering a postoperative mortality of 4.25%. If we were to add the 14 inoperable patients the mortality for the entire study group (61 patients) reaches 26.22%, comparable to those reported in the literature (6,7).

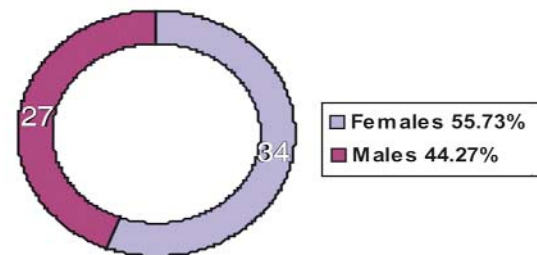
Long-term survival is difficult to evaluate, as a systematic follow-up of all cases could not be accomplished. Of the 45 operable patients discharged 18 cases could be followed up to 3 and 6 months postoperatively, when they presented for chemotherapy, without any deaths being recorded over this period. 3 cases developed a new occlusive episode, between 2 and 8 months postoperatively, a new surgical intervention being necessary. One of these 3 patients presented a third occlusive episode 5 months later, solved by surgery.

## Results

Analysing the group of 61 patients with advanced abdominal cancer, we observed that from the point of view of cancer progression, in connection with the stage of treatment, they could each be included in one of the following categories (*Fig. 2*):

- Cases that were not operated on, in which curative radical approach treatment was not possible;
- Recurrences after surgical treatment with radical intent, followed or not by chemo- or radiotherapy;
- Cases with no initial surgical indication, undergoing chemo- or radiotherapy (as part of a complex oncological treatment strategy);
- Disease progression after palliative surgery.

In the patients from the study group the clinical picture was significantly modified in comparison to what one would normally encounter when dealing with an intestinal occlusion (*Table 4*). Abdominal pains, most frequently moderate and with no colicative characteristics, were all the more difficult to interpret seeing how most of the patients were receiving major painkillers. In some cases with intense algic syndrome this was



**Figure 1.** Gender distribution of patients in the study group

**Table 1.** Factors involved in intestinal obstruction

No.	Factor	No. of cases
1.	Frozen pelvis	27
2.	Mesenteric tumour block	18
3.	Peritoneal carcinomatosis	13
4.	Multiple enteral metastases	9
5.	Non-oncological causes	4
6.	Other causes	3

N.B.: in some patients the occlusion was due to a combination of factors!

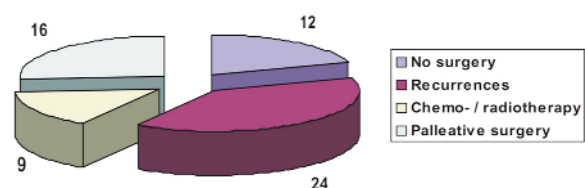
**Table 2.** Types of interventions performed

No.	Surgical procedure	No. of cases
1.	enterectomy	18
2.	ileostomy	14
3.	jejunostomy	3
4.	colostomy	14
5.	enteral by-pass	8
6.	ileo-colic by-pass	9
7.	other procedures	6

N.B.: some patients required at least two surgical procedures!

**Table 3.** Severe postoperative complications in the 47 operable patients

No.	Type of complication	No. of cases	Therapeutic solution	Death
1.	Necrosis of the colostoma	2	Reintervention with reformed colostoma	no
2.	Postoperative evisceration	3	Reintervention with secondary suture	no
3.	Enteral anastomosis fistula	2	Conservative treatment	no
4.	Enteral anastomosis fistula with secondary peritonitis	2	Reintervention with jejunostomy	yes



**Figure 2.** Distribution of cases according to progression and therapeutic stage

**Table 4.** *Diagnostic difficulties*

No.	Clinical / imaging element	Variation from typical aspect in intestinal occlusion
1.	Abdominal pain	Diminished, uncharacteristic. Seldom intense.
2.	Abdominal distension	Moderate or absent.
3.	Vomiting	Influenced by chemotherapy and antiemetics.
4.	Bowel sounds	Diminished by neoplastic ascites.
5.	Air-water levels	Reduced or absent.

due to nerve plexus involvement or to vertebral metastases. Abdominal distension was usually moderate, even absent in some instances (patients with advanced peritoneal carcinomatosis). Vomiting, especially repeatedly and in low quantities, in patients undergoing chemotherapy led to a need for differential diagnosis with cytostatic adverse reactions. On the other hand, in patients receiving antiemetic treatment when undergoing chemotherapy to counteract its side effects, the absence of vomiting does not exclude the diagnosis of intestinal occlusion. Another particular clinical situation was encountered in patients with high intestinal occlusion, in whom bowel movement can still be present (by evacuating from the portions of the digestive tract lower than the occlusion level), and abdominal distension and bowel sounds are absent. Last but not least, a less frequently encountered clinical picture was observed in underfed, dehydrated patients, receiving rank III analgesics and antiemetics, who usually manifested a poor general state, with no clearly defined troubles.

In patients undergoing chemotherapy the clinical aspects of the occlusion can be significantly modified, so that we were often in the position of deciding whether we were dealing with an intestinal occlusion or with the side-effects of chemotherapy.

In the case of radiotherapy the side-effects on the digestive tract (radic rectitis, radic enteritis, fistulae after radiotherapy) can generate a symptomatology that dictates the need for a differential diagnosis with an occlusive syndrome: rectal tenesmi, intermittent rectorrhagia accompanied by "pencilled" stools, colicative abdominal pains, vomiting, Koenig syndrome etc.

Peritoneal carcinomatosis also renders the diagnosis of intestinal occlusion difficult, as the abdominal wall often becomes a tumoral hauberk, clinical exam is influenced by the presence of numerous abdominal tumours, bowel sound are not easily evaluated and abdominal distension is limited. Ascites due to neoplastic disease is also a factor that can complicate diagnosis, as it masks distension and bowel sounds. In case of unnoticed intestinal occlusion, performing a paracentesis in a patient with neoplastic ascites can be risky.

Among current imaging methods, simple abdominal radiography is a necessary exam in intestinal occlusion, but its utility was often limited, especially in levelled occlusions, where air-water levels are reduced or even absent. Transparietal abdominal-pelvic ultrasound is also a useful

imaging exam, being able to highlight tumours, ascites or peritoneal carcinomatosis with large nodules.

There is no typical intestinal occlusion case recorded among patients with advanced abdominal neoplastic disease, but after careful analysis of the study group a series of more frequently encountered clinical situations can be described:

- Intestinal occlusion through invagination of the small bowel on intestinal parietal metastases: the occlusive clinical picture is relatively typical; multiple areas of invagination can be detected; the surgical cure involves at least one pretty risky enterotomy with entero-enteral anastomosis (performed in the presence of ascites and carcinomatosis); there is a possibility of a new occlusion, due to the same factors and mechanism, but at a different level.
- Levelled occlusions: are hard to diagnose; the grade of stenosis of each affected intestinal area must be correctly assessed intraoperatively, so that the minimum number possible of anastomoses be performed; the presence of tumoral blocks in which the intestinal loops involved cannot be correctly identified sometimes makes the case be considered above surgical resources.
- Intestinal occlusion through non-neoplastic mechanism (through brindle or volvulus for example), in a patient with advanced abdominal cancer, can determine serious diagnostic problems, especially if the patient is undergoing chemo- or radiotherapy; surgical cure implies intestinal resection and an anastomosis performed in usually difficult circumstances, or performing a stoma (if useful and possible).
- Intestinal occlusion secondary to an entero-mesenteric infarction generated by vascular tumour invasion; if the area of intestine involved is not limited, allowing for resection, the case is considered inoperable.
- Intestinal occlusion in which, due to retraction of loop peritoneum (through tumour invasion) intestinal mobilization is insufficient for performing a by-pass or a stoma, the case being considered inoperable.

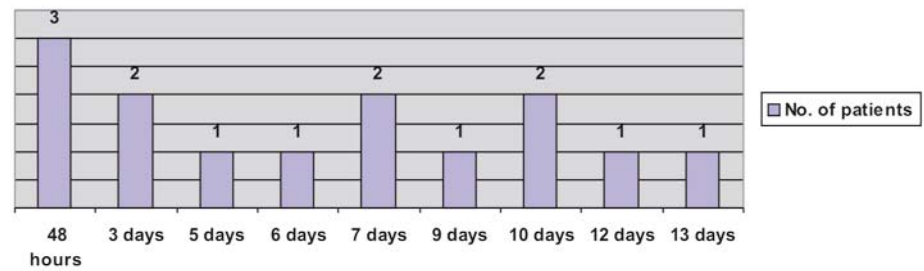
Bearing in mind the progression particularities of each case, we did not consider a statistical analysis of the study group useful. We due however draw attention to 14 cases (22.95%) which had no surgical cure. These patients were cared for in the postoperative period initially in the ICU and then, according to each case, on the surgery ward, as there is no specialized palliative care ward.

These patients with advanced abdominal cancer with no surgical cure could not be spared, all 14 deceasing in the hospital, their postoperative survival period being between 48 hours and 13 days, with an average of 6.5 days/patient (Fig. 3). Caring for these patients in the postoperative period determined a series of problems related to organization, logistics, resources, personnel etc.

Symptoms' control in patients with no surgical cure was greatly facilitated by the postoperative status, continuing the measures and procedures initiated pre- and intraoperatively. The attitude in the case of patients that had been submitted to a laparotomy was for the great part proactive, in the sense



**Figure 3.** Survival periods of the 14 patients with no surgical cure of the obstruction



that a series of specific therapeutic measures were taken, without expecting the development of symptoms postoperatively, being extended, diminished or completed according to the evolution of each case. Thus, all 14 inoperable patients benefited from:

- Assisted ventilation (by oro-tracheal intubation), which was maintained postoperatively up until the patient was stabilized, afterwards oxygen therapy being administered according to each case.
- Diuresis monitoring, the preoperatively mounted catheter being maintained.
- Peritoneal cavity drainage, installed intraoperatively and maintained for controlled evacuation of ascites; given the extremely short life expectancy of these patients, symptom control is more important than protein loss through external drainage of the ascites.
- Digestive secretions control, mainly by maintaining the nasogastric tube inserted pre- or intraoperatively; anti-secretory agents such as butylscopolamine (scobutil) were used in 9 out of the 14 inoperable patients; octreotide (sandostatin), recommended by recent studies (8,9), was not used due to high cost.
- The venous line, peripheral or central, used intraoperatively was maintained postoperatively in order to administer fluids and medication.
- Pain management with rank 3 opioids, in individualized and variable doses; in order to alleviate both postoperative and background disease generated pain, all patients received morphine, administered by injection.
- Steroid anti-inflammatories (dexamethasone), used to diminish peritumoral inflammation, in 7 patients only, in the hope of a minimal reinstating of bowel movement through the tumour stenosed area, with no notable clinical effect.
- Antiemetics from the serotonin antagonists class (ondasetron), to all patients; these are practically part of the usual postoperative medication scheme, at least until bowel movement is restarted (which did not happen to these 14 patients).
- Parenteral nutrition was used in only 3 cases, in patients surviving more than 7 days postoperatively; the reason behind this was the relatively low high cost-benefits ratio in these cases (10) and the limited availability of the products.

One last aspect that needs to be mentioned is that

connected to communicating the diagnosis and, especially, the prognosis. This is what is known in palliative medicine as “the silence conspiracy”, referring to the fact that the truth regarding the diagnosis and prognosis is kept secret. Usually this conspiracy of silence involves correctly informing the family about the situation, who in turn wish to protect the patient by hiding, at least partially, the diagnosis and prognosis. In some rare cases the patient is the one correctly informed and decides to protect his/her family by hiding the truth, but we did not encounter this type of situation in our study group.

Practically all patients in the study lot were aware of the diagnosis of neoplastic disease, even if they were not correctly or completely informed with regards to stage and prognosis, because at the moment of occurrence of the obstruction the majority of patients had been already submitted to some form of oncological treatment. For many of them the surgical intervention represented a great hope of overcoming yet another complication and being able to continue their fight with the cancer.

In the case of patients successfully operated the communication of a favourable result of the surgical intervention makes the doctor’s mission easier, even under the circumstances of an uncertain prognosis on the medium and long term. The family has always been completely informed about the long term prognosis, while a level of hope was maintained in discussing with the patient, obtained when the situation allowed it through as little distortion of the truth as possible.

In the case of patients with no possible surgical cure the family was immediately informed and most of the times required that the truth be kept from the patients. These situations proved extremely difficult, a very frail balance being necessary to be established between the wish and legal right of the patient to be informed of his/her situation and the family’s request to protect him. The absence of postoperative amelioration makes the mission of presenting the patient with a situation as close as possible to the truth, without denying any room for hope, even more delicate.

## Discussions

Intestinal obstruction in patients with advanced abdominal cancer can be difficult to diagnose, most of the time due to a combination of factors, among which are:

- lack of abdominal distension, explained by: lack of feeding, peritoneal carcinomatosis, levelled intestinal

stenosis, tumour infiltration of the abdominal wall etc.;

- opioid painkillers, which can alter the clinical picture;
- use of new generation antiemetics, in combination with chemotherapy;
- addressing the doctor when the stage of the occlusion has become inoperable.

From a surgical standpoint the cases are frequently difficult to solve, the surgeon being often confronted with: peritoneal carcinomatosis, unresectable large tumours (intra- or retroperitoneal), retraction of intestinal loop peritoneum (by neoplastic infiltration), presence of multiple obstacles (levelled). Digestive anastomoses must be performed in these patient in unfavourable conditions (advanced cancer, denutrition, ascites, recent chemotherapy and/or radiotherapy), so it is preferable to avoid them when a stoma can be performed, ensuring an acceptable quality of life of the patient (11,12).

There is however a significant percentage of cases without surgical cure, due to advanced carcinomatosis, enteral tumour blocks, retroperitoneal and mesenteric tumour invasion etc.

For all patients suffering from advanced abdominal cancer the need for palliative care increases as the disease progresses. Unfortunately, at present the medical system tends very little to this need. In cases of intestinal obstruction without surgical cure palliative care remains the only option, these patients' survival often being of days at most. A good control of the symptoms improves the quality of life for the remaining period of time (13), and represents a right that these patients have.

Communication with the patient and the family is extremely important. An attitude giving way to a small amount of hope, especially in cases with no surgical cure, either by omission or by embellishing the truth contributes of course to the perpetuation of the conspiracy of silence. This attitude is still frequently encountered in Romania and has evidently more profound reasoning behind it, and a sudden change, following an occidental cultural model, would probably be neither possible nor beneficial for the patients.

Seeing how in any medical system the resources are limited and the need for medical services always increases faster than the level of those resources, we consider that a palliative care ward would bring a series of advantages:

- reducing hospitalization period in the ICU by transferring these patients to the palliation ward (at the appropriate moment) would allow some savings (bearing in mind the high cost of treating a patient in the ICU);
- the daily financing model used on a palliation ward, compared to that depending on solved cases used on the surgery ward, would allow the hospital to obtain an accurate refund of the sums necessary for treating such patients;
- on a palliation ward the patient could benefit from other elements of care, specific for palliative medicine: spiritual, psychological, social assistance etc.;
- formulating protocols for palliative treatment would be extremely useful in current medical practice, as

well as in managing the relationship with the patients and their families.

## Conclusions

Intestinal occlusions in patients with advanced abdominal cancer are often difficult to diagnose. The frequency with which we encounter inoperable obstructions is high due to a lack or masking of symptoms. Surgical solutions are variable and must be adapted to each case individually, no option being possible to be excluded "ab initio". There are situations where, despite slim chances (in presence of carcinomatosis, ascites etc.), surgical intervention can prove to be a success, even if only for medium or short term (14,15).

Treatment of these patients cannot be standardized. In terms of good quality of life ileostomy can be difficult to manage, but it is sometimes the only option for overcoming the obstructive episode.

The 77.05% (Fig. 4) proportion of operability in patients with advanced abdominal neoplasia and intestinal occlusion shows that, although bearing palliative purpose, surgical intervention continues to be the only hope of saving these patients with limited prognosis (16).

Cases without surgical solutions are not rare (17). There is no manner to establish this preoperatively, so that from the moment of setting an intestinal occlusion diagnosis the surgical indication becomes unquestionable.

Survival period is not the main criterion in cases of operated patients in these advanced stages of neoplastic disease. Of course, for these patients, a gain of weeks or even months of live is significant. Long-term prognosis is conditioned by the progression of the neoplastic disease and by the response to complementary oncological therapies.

From a point of view of palliative medicine, in case of a limited prognosis, care must focus on ensuring quality of life, an aspect which must be taken into account when choosing the surgical solution for these patients.

Developing the field of palliative care and creating specialized wards in hospitals with an oncological profile is a necessity, supported also by the recommendations of the World Health Organization.

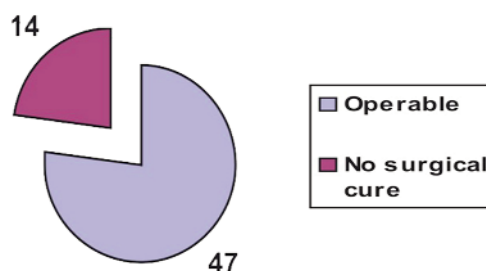


Figure 4. Distribution of operable cases

### Conflicts of interest

None declared.

### Source of funding

None declared.

### References

- DeBernardo R. Surgical management of malignant bowel obstruction: strategies toward palliation of patients with advanced cancer. *Curr Oncol Rep*. 2009;11(4):287-92.
- Law WL, Chan WF, Lee YM, Chu KW. Non-curative surgery for colorectal cancer: critical appraisal of outcomes. *Int J Colorectal Dis*. 2004;19(3):197-202. Epub 2003 Nov 15.
- Rosen SA, Buell JF, Yoshida A, Kazsuba S, Hurst R, Michelassi F, et al. Initial presentation with stage IV colorectal cancer: how aggressive should we be? *Arch Surg*. 2000;135(5):530-4; discussion 534-5.
- Tang E, Davis J, Silberman H. Bowel obstruction in cancer patients. *Arch Surg*. 1995;130(8):832-6; discussion 836-7.
- Wasserberg N, Kaufman HS. Palliation of colorectal cancer. *Surg Oncol*. 2007;16(4):299-310. Epub 2007 Oct 29.
- Runkel NS1, Schlag P, Schwarz V, Herfarth C. Outcome after emergency surgery for cancer of the large intestine. *Br J Surg*. 1991;78(2):183-8.
- Runkel NS, Hinz U, Lehnert T, Buhr HJ, Herfarth Ch. Improved outcome after emergency surgery for cancer of the large intestine. *Br J Surg*. 1998;85(9):1260-5.
- Prommer EE. Established and potential therapeutic applications of octreotide in palliative care. *Support Care Cancer*. 2008;16(10):1117-23. Epub 2008 Feb 7.
- Watari H, Hosaka M, Wakui Y, Nomura E, Hareyama H, Tanuma F, et al. A prospective study on the efficacy of octreotide in the management of malignant bowel obstruction in gynecologic cancer. *Int J Gynecol Cancer*. 2012;22(4):692-6.
- Madhok BM, Yeluri S, Haigh K, Burton A, Broadhead T, Jayne DG. Parenteral nutrition for patients with advanced ovarian malignancy. *J Hum Nutr Diet*. 2011;24(2):187-91.
- Kitani K, Yukawa M, Fujiwara Y, Tsujie M, Hara J, Ikeda M, et al. Palliative surgery for malignant bowel obstruction in patients with advanced and recurrent gastroenterological cancer. *Gan To Kagaku Ryoho*. 2013;40(12):1699-701.
- Winner M, Mooney SJ, Hershman DL, Feingold DL, Allendorf JD, Wright JD, et al. Management and outcomes of bowel obstruction in patients with stage IV colon cancer: a population-based cohort study. *Dis Colon Rectum*. 2013;56(7):834-43.
- Weber C, Zulian GB. Malignant irreversible intestinal obstruction: the powerful association of octreotide to corticosteroids, antiemetics, and analgesics. *Am J Hosp Palliat Care*. 2009;26(2):84-8.
- Pothuri B, Vaidya A, Aghajanian C, Venkatraman E, Barakat RR, Chi DS. Palliative surgery for bowel obstruction in recurrent ovarian cancer: an updated series. *Gynecol Oncol*. 2003;89(2):306-13.
- Ptok H, Gastinger I, Meyer F, Marusch F, Otto R, Lippert H. Colorectal tumor surgery in the elderly: results of quality assurance. *Chirurg*. 2013;84(4):296-304.
- Wong TH, Tan YM. Surgery for the palliation of intestinal obstruction in advanced abdominal malignancy. *Singapore Med J*. 2009;50(12):1139-44.
- Mooney SJ, Winner M, Hershman DL, Wright JD, Feingold DL, Allendorf JD, et al. Bowel obstruction in elderly ovarian cancer patients: a population-based study. *Gynecol Oncol*. 2013;129(1):107-12.