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Can the Principles of Oncological Surgery be Complied with in Haemorrhagic Gastric Cancer?

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Rezumat

Pot fi respectate principiile de chirurgie oncologică în cancerul gastric hemoragic?

Scop: de a descoperi dacă în cazul cancerului gastric hemoragic pot fi respectate principiile chirurgiei oncologice aplicabile cancerului gastric.
Material şi metodă: Am studiat 2 loturi de pacienţi, unul cu cancer gastric hemoragic şi al doilea cu neoplazie gastrică necomplicată. Am luat în calcul sexul, vârsta, numărul de zile de la internare la intervenţia chirurgicală, localizarea tumorii, tipul intervenţiei, valoarea hemoglobinei la internare, modalitatea de exteriorizare a hemoragiei, comorbidităţile, tipul intervenţiei, amploarea limfadenectomiei, stadiul, tipul tumorii/ gradul de diferenţiere al acesteia, numărul ganglionilor extirpaţi, invazia perineurală şi vasculară, transfuzia preoperatorie, complicaţiile post-operatorii şi decesele.
Rezultate: Rata complicaţiilor postoperatorii este mai mare pentru pacienţii din lotul 1 care au prezentat hemoragie digestivă superioară, cu o creştere a numărului de zile de spitalizare şi îngrijire, cu risc mai mare de reintervenţie chirurgicală şi cu o mortalitate mai mare pentru aceşti pacienţi.
Concluzii: în chirurgia cancerului gastric hemoragic pot fi respectate principiile chirurgiei oncologice, dar cu o rată mai mare de complicaţii postoperatorii, zile mai multe de spitalizare şi o mortalitate mai mare.

Cuvinte cheie: cancer gastric hemoragic, principii chirurgie oncologică

Abstract

Aim: To discover if in the case of bleeding gastric cancer the principles of oncological surgery could be applied to gastric cancer.
Methods: We studied two groups of patients, one with haemorrhagic gastric cancer and the second with uncomplicated gastric cancer. We took into account gender, age, number of days from admission to surgery, tumour location, type of intervention, haemoglobin on admission, haemorrhage externalization pathway, comorbidities, intervention type, extension of lymphadenectomy, stage, tumour type / degree of differentiation thereof, number of excised lymph nodes, perineural and vascular invasion, preoperative transfusion, postoperative complications, deaths.
Results: The rate of postoperative complications is higher for patients in group 1 who presented upper gastrointestinal bleeding, an increase in the number of days of hospitalization and care, with a higher risk of surgical re-intervention and a higher mortality for these patients.
Conclusions: in the case of haemorrhagic gastric cancer surgery, we can apply the principles of malignant stomach cancer surgery, but with a higher rate of postoperative complications, more hospitalization days and higher mortality.

Key words: haemorrhagic gastric cancer, principles of oncological surgery

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Introduction

Gastric cancer in Romania represents the second cause of death after colorectal cancer, with an average of 650,000 deaths worldwide each year (1,3). The highest incidence is reported in Japan, China and Korea. (2)

In Romania gastric cancer incidence has decreased from 73.3 % in men and 73.4 % in women in 1960 to 56.2 % and 48.4 % respectively in 1980. (2)

Hospital admission of a patient with a gastric cancer complication seems to determine a decrease in the 6 month survival rate, comparing to the 12 month survival rate of a patient with no complications. (4)

Unfortunately, the presence of a gastric cancer complication is associated with a more advanced stage of disease. (5)

The diagnosis of gastric malignant tumour is set by upper gastrointestinal endoscopy, which provides real time data, for tumours both early and advanced (9). But difficult patient access to proton pump or histamine receptor inhibiting agents and the lack of screening programs for gastric cancer are the possible reasons for the delay in diagnosis.

Staging is done according to AJCC and Japanese authors' criteria (Japanese Classification of Gastric Carcinoma). (7,8)

Gastric adenocarcinoma, representing 90% of gastric treatment, benefits primarily from surgical treatment. (6,9) In order to consider a curative intent of the surgery the gastric resection must be associated with D2 type lymphadenectomy. (9,10,11,14,15)

Chimio- and radiotherapy treatment obtain low results in malignant gastric tumours, with the exception of GIST.

When a gastric tumour associates a complication such as haemorrhage, perforation or stenosis, the situation requires an emergency surgery solution and a much more careful follow-up of the patient, who most of the time finds oneself in a biologically frail condition.

Material and Methods

We included 2 groups of gastric cancer patients in our study, who were operated on at the Bucharest Clinical Emergency Hospital between the years 2005 and 2009. We included in the 2 groups patients submitted to curative intent resections, and excluded cases in which palliative resection was performed, gastro-entero-anastomosis, exploratory laparoscopy/ laparotomy, cases presenting metastases with localizations other than the lymph nodes (we did include however 2 cases, one with splenic and the other with single hepatic metastasis, which were removed together with the operative piece), or cases admitted for perforation due to gastric tumour.

The 2 groups were formed thusly: group 1 (with superior digestive haemorrhage), consisting in 58 cases with haemorrhagic gastric cancer (superior digestive haemorrhage exteriorized by hematemesis, melena, haematochezia or occult haemorrhage), and group 2 (non-SDH) consisting of 51 cases who did not present superior digestive haemorrhage (SDH). *(Fig. 1)*

Criteria for inclusion of cases in Group 1 (with digestive haemorrhage on admission) were: upper gastrointestinal bleeding externalized through hematemesis, melena, haematochezia or their associations, and chronic bleeding with anaemic syndrome.

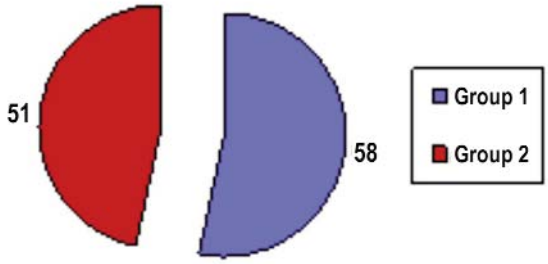

Figure 1. *Number of cases in the 2 study groups*

The degree of severity of such cases, under Orfanidi classification it is presented in the *Table 1*.

Patient age was between 33 and 85 years old in Group 1, with an average of 65.2 years, and between 37 and 82 years in Group 2, with an average of 64.88 years.

Distribution according to age groups is presented in the *Table 2*.

The groups are similar in terms of gender as well, as follows in the *Fig. 2, Table 3*.

In terms of preoperative diagnosis all cases benefited from diagnostic endoscopy, with endoscopic haemostasis in selected cases. Of Group 1 cases, 4 were not submitted to diagnostic biopsy. The biopsy was positive for adenocarcinoma in all cases of both groups. Regarding preoperative CT or MRI, they were performed as follows - *Table 4*.

In Group 2 there were 2 cases who underwent barium swallow exam, revealing upper gastric pole stenosing tumour, with overlying dilated and dyskinetic oesophagus.

Table 1. *Case distribution in Group 1 according to Orfanidi*

Severity of the bleed	No. of cases
Mild	17
Moderate	18
Severe	19
Very severe	4

Table 2. *Case distribution according to age*

	Group 1	Group 2
Under 40	3	2
41 – 50	2	4
51 – 60	11	9
61 – 70	23	18
71 – 80	15	14
Under 80	4	3
Total	58	51

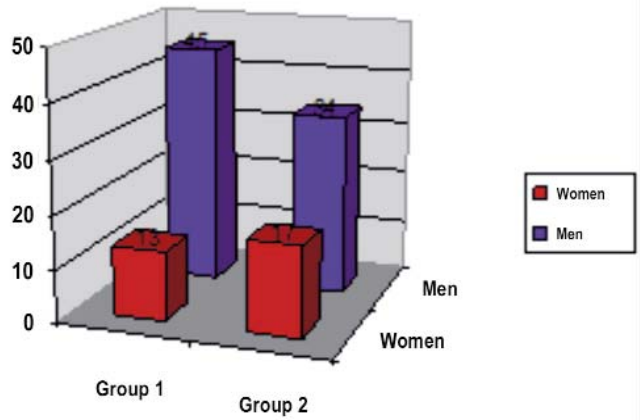

Figure 2. Distribution of cases in the 2 groups according to gender

Table 3. Case distribution according to age and gender

	Group 1		Group 2	
	Women	Men	Women	Men
< 40	1	2	1	1
41-50	0	2	2	2
51-60	3	8	3	7
61-70	6	17	3	15
71-80	3	12	6	8
> 80	0	4	1	2
Total	13	45	16	35

Table 4. Number of patients submitted to imaging investigations prior to the intervention

	CT	MRI
Group 1	43 cases	1 case
Group 2	39 cases	0 cases

Results

Given the fact that the cases included in Group 1 were admitted under emergency status we evaluated the number of days from admission to surgery. We found that only a small number of cases are operated immediately after admission, which means that superior digestive haemorrhage can be contained through endoscopic means, providing time for balancing the patient and preparing him for surgery under safe conditions. (*Table 5*)

In terms of tumour localization we found that a great part of tumours are located in the medium and inferior segment, as specified in the medical literature as well. (*Fig. 3, 4*)

Haemorrhage exteriorization pathway was hematemesis, melena, haematochezia or combinations of the previous in 21 cases in Group 1. (*Table 6*)

The remaining 38 cases were occult bleedings (63.79 %), patients being admitted with anaemic syndrome.

In Group 2 the haemoglobin value at admission was over 12 g/dl in all cases. In Group 1 the value of haemoglobin at admission was between 2.3 g/dl and over 12 g/dl, even in cases with acute or occult haemorrhage. (*Table 7*)

Table 5. Number of days from admission to surgery

	Groups 1	Groups 2
0	11	6
1	6	7
2	22	10
3	9	11
4	10	6
5	2	7
6	3	1
7	1	2
8	3	-
9	1	-
13	1	-

In terms of staging of cases, from the 2 groups one can easily observe that unfortunately an overwhelming number of cases present in stages III and IV, which in turn results in extremely high morbidity and mortality through gastric cancer in our country. (*Table 8*)

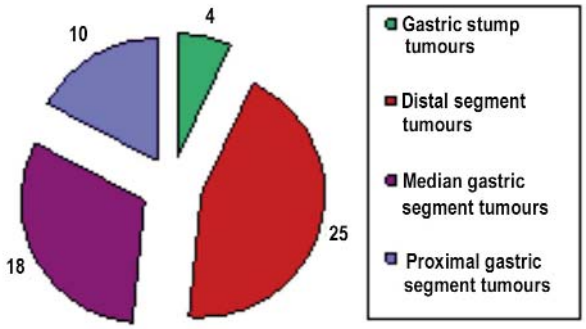

Figure 3. Tumour location in Group 1 cases

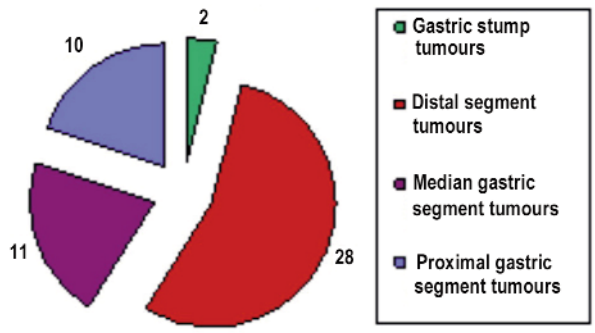

Figure 4. Tumour localization for Group 2 cases

Table 6. *Number of cases with SDH and exteriorization pathway*

Exteriorization pathway	No. of cases (21)
Hematemesis and melena	9
Hematemesis and haematochezia	2
Melena	3
Haematochezia	1
Hematemesis	6

Table 7. *Number of cases according to haemoglobin value group*

Haemoglobin value in g/dl	No. of cases
Under 7	12
7.1 – 8.9	18
9 – 12	23
Over 12	5

Table 8. *Number of cases according to stage of disease*

Stage	Group 1	Group 2
IB	5	1
II	8	5
IIIA	8	8
IIIB	11	10
IV	26	27

Table 9. *Intervention types for Group 1 patients*

Intervention	No. cases
Superior pole gastrectomy	3
Gastrotomy/gastroraphy	1
Subtotal gastrectomy	26
Total gastrectomy	28

Previous to the intervention 42 patients from Group 1 received blood and blood products (72.41 %)

In accordance to tumour localization, the patients in the 2 groups were submitted to superior pole gastric resection (some extending towards the oesophagus), subtotal gastrectomies and total gastrectomies respectively (including here totalizing gastric stump gastrectomies). There was a case in Group 1 presenting a pedunculated haemorrhagic polyp for which gastrotomy was performed, polyp resection (histopathology exam revealed a hyperplastic polyp) and gastroraphy. In the medical literature there are studies that advocate subtotal gastrectomy as opposed to total gastrectomy, in compliance with oncological criteria, given the better quality of life reported by patients. (13) (*Tables 9, 10*)

Table 10. *Intervention types for Group 2 patients*

Intervention	No. cases
Superior pole gastrectomy	2
Subtotal gastrectomy	27
Total gastrectomy	22

Together with the gastric tumour the resection of other organs, and lymphadenectomy were performed as well, in order to meet the curative intent of the intervention. (*Tables 11, 12*)

Table 11. *Associated resections in Group 1 patients*

Resected organ	No. cases
Transverse colon	1
Small intestine	1
Spleen	18
Spleen and part of the diaphragm	1
Spleen and caudal pancreas	1
No associated resections	36

The extension of lymphadenectomy was as follows - *Table 13.*

In terms of tumour type, we encountered gastric adenocarcinomas (papillary, tubular, mucinous, with signet ring cells), with various degrees of involvement of the gastric wall, lymph node involvement and different degrees of differentiation. (*Table 14*)

Table 12. *Associated resections in Group 2 patients*

Resected organ	No. cases
Transverse colon	2
Small bowel	1
Spleen	11
Spleen, gallbladder and left ovary	1
Spleen and transverse colon	1
Spleen and small bowel	1
Liver	1
No associated resections	33

The number of lymph nodes excised together with the piece was 12 to 15 for patients in Group 1 (maximum of 20) and 13 to 16 for patients in Group 2 (maximum of 21). In 28 cases pertaining to Group 1 tumour invasion of the lymph nodes was encountered, from 1 out of 20 nodes excised up to 15 out of 15. In Group 2 histopathology exam revealed nodal invasion in 17 cases, from 1 out of 7 nodes excised and up to 11 out of 13 lymph nodes.

Table 13. *Type of lymphodissection*

	Group 1	Group 2
D1	25	28
D2	32	23

Perineural and venous invasion was histopathologically described as - *Table 15*.

Resection margins: histopathological reports detected positive margins in 5 cases in Group 1, and in 4 cases in Group 2.

Comorbidities - *Table 16*.

Table 14. *Tumour differentiation grading (G) in the 2 groups*

G	Group 1	Group 2
G1	4	7
G1 and G2	2	-
G2	31	26
G2 and G3	-	1
G3	17	12
G4	4	5

In terms of weight loss we found that in Group 1 there were 20 patients who reported a weight loss of 5 to 16 kg 1-2 months prior to surgery, while in Group 2 13 patients described a weight loss of 5 and up to 20 kg.

Postoperative care. Both groups received antibiotics 5-7 days after surgery, antithrombotic prophylaxis, analgesia. Parenteral nutrition with protein or complex protein-lipid-sugars solutions was administered in 43 cases in Group 1 and 31 cases of those in Group 2. Parenteral nutrition was associated with enteral nutrition via a nasoenteric tube in 51 patients in Group 1 and 42 of those in Group 2. There were no feeding jejunostomies.

If up until now the groups could be considered homogenous, in terms of postoperative complications matters are significantly different. While there are 2 cases presenting complications in Group 2 (3.92%), the number of complications in Group 1 is as high as 14 (24.13%). (*Tables 17, 18, 19*)

We synchronised the complications in Group 1 with the haemoglobin value and the tumour stage as follows - *Table 20*.

Group 1 presented with 3 in-hospital deaths: one in a patient with pancreatitis (9 days after the operation) and the other 2 in 2 patients with anastomosis fistula (10 and 56 days respectively after the operation). Haemoglobin value at admission was 7.9 g/dl, 7.2 g/dl, and 8.5 g/dl respectively.

There were no deaths in Group 2.

Discussions

The two groups included in our study are similar in number of patients, age and gender.

The major difference is that Group 1 consisted in patients with superior digestive haemorrhage exteriorized by haematemesis, melena, haematochezia, or occult bleeding with anaemic syndrome, globally modifying the biological status of the patient. This determines these patients to require additional care from doctors from several specialties (surgery, anaesthesiology and intensive care, endoscopy-gastroenterology, and internal medicine or cardiology depending on the case, etc.).

On the whole, gastric bleeding can be contained and the intervention can be postponed until the patient is haemodynamically and biologically balanced, offering the doctor time for additional investigations (such as abdominal CT for staging).

Bearing in mind that vomiting blood can have a great impact on the patient and the family, the time to addressing the doctor is very short in these cases, so that the haemo-

Table 15. *Perineural and venous invasion in the 2 groups*

	Perineural	Venous	Both
Group 1	5	8	6
Group 2	4	6	1

Table 16. *Comorbidities*

	Group 1	Group 2
Cardiological history	20	15
Diabetes mellitus	2	2
Bronchial asthma	1	-
Chronic renal failure	1	-
Viral hepatitis	-	5

Table 17. *Group 2 complications related to patient age*

Complication	No. of cases	Age
Fistula	1	81
Suppuration of the wound, blocked evisceration	1	81

Table 18. *Correlation between complications, haemoglobin level, comorbidity and stage*

Group 2 complications	Haemoglobin value	Comorbidity	Stage
Fistula	13	Yes - cardiac	IV
Suppuration of the wound	14	Yes - cardiac	IV

Table 19. *Group 1 complications related to age*

Complication	No. of cases	Age
Fistula	7	47 -78
Suppuration of the wound	2	66, 75
Pleurisy	2	45, 67
Pancreatitis	1	71
Acute pulmonary oedema	1	82
Subphrenic abscess	1	33

Table 20. *Correlation between complication, haemoglobin value, presence of comorbidities, and tumour stage*

Complications in Group 1	Haemoglobin value	Comorbidity	Stage
Fistula	4.9	No	IB
Fistula	12	No	II
Fistula	11.5	No	IV
Fistula	7.2	Yes - cardiac	II
Fistula	9.8	No	IV
Fistula	8.4	No	IV
Fistula	8.5	Yes - cardiac	IIIB
Suppuration	5	No	IV
Suppuration	8.6	No	IV
Pleurisy	5	No	IV
Pleurisy	12	No	II
Pancreatitis	7.9	Yes - cardiac	II
Acute pulmonary oedema	10.6	No	IV
Subphrenic oedema	9.8	No	IV

globin level does not drop significantly.

The stage of gastric tumours complicated with haemorrhaging seems to be slightly smaller compared to nonhaemorrhaging tumours, precisely based on the idea that patients present themselves faster to emergency medical services.

Resection of the tumoral stomach and lymphadenectomy were performed similarly in the 2 groups. It would have been highly significant to draw peritoneal or peritoneal lavage fluid in order to create a correct image of the degree of malignant involvement in each case.

Differences between the two groups are significant in terms of postoperative complications. In Group 1 approximately a quarter of patients had more or less severe postoperative complications, of which most significant are anastomosis fistulas. There was a number of 7 anastomosis fistulas (12.06%) in patients in whom superior pole gastrectomy was performed, with ages between 47 and 78 years old (average 68.42%), with a haemoglobin value between 4.9 and 12 g/dl (average 8.9 g/dl). The number of hospital stay days in patients with fistula was between 10 and 56 days, with an average of 24 days.

Conclusions

1. cancer in general, and gastric cancer moreover, represent a challenge for surgeons;
2. a patient with bleeding gastric neoplasia admitted under emergency status benefits from diagnostic and therapeutic upper gastrointestinal endoscopy, stopping the bleed offering time to rebalance the patient, and also to perform further investigations;
3. in the case of a patient in whom peritoneal cavity exploration offers the information needed for a curative intent operation (negative intraperitoneal liquid or peritoneal lavage liquid cytology), this must consist in subtotal or total gastrectomy with type D lymphadenectomy, even if the patient presented haemorrhagic complication of the neoplastic disease, according to recommendations found in the national and international medical literature (8-12, 14-15) for uncomplicated cases;
4. if at least one case of haemorrhaging gastric cancer presents a survival of over 5 years and an at least satisfying quality of life then the work of the doctor was not in vain.
5. obeying oncological surgery rules in haemorrhagic gastric cancer is necessary and feasible even if the risk of postoperative morbidity and mortality is higher than in cases without superior digestive haemorrhage.

Note

This article and included cases are part of a larger group of patients with haemorrhagic gastric cancer operated at Bucharest Emergency Hospital, and are part of a doctoral thesis with the title - Current Therapeutic Approach in Hemorrhagic Gastric Epithelial Neoplasm (*Atitudine terapeutică actuală în neoplasmul gastric hemoragic de origine epitelială*).

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