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PhD THESIS

The diagnosis and therapeutic problems in the small bowel tumors

abstract

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Contents

THE GENERAL PART

The general part is a theoretical one and consists of the following chapters:

- Introduction
- The elements of the small bowel anatomy and physiology, comprising notions of the descriptive anatomy, inner configuration, histology and physiology of the small bowel
- The small bowel tumors wit date regarding to the epidemiology, pathogenesis, pathology, classification, staging, diagnosis, treatment, prognostic, monitoring and survival rate

THE SPECIAL PART (PERSONAL CONTRIBUTION)

The small bowel tumors are rare, despite of the fact that the small bowel represents about 75% of the total length of digestive tract and more than 90% of the gastrointestinal mucosa, and it is located between two segments (stomach and colon) with major risk of cancer.

Having a large variety of histopathological types, the small bowel tumors are, however, some common features characteristic:

– Controversial and not fully elucidated pathogenesis, due to both of their wide variety of histological types and their rarity. There is no an uniform pathogenic concept and nor can there be one, given to the wide variety of the tumors and their origin in all of the small bowel structures, so there are actually multiple tumor types, each of them with its own origin and thus the pathogenic mechanisms; it is generally spoken about the pathogenesis of the adenocarcinomas and separately about the pathogenesis of the carcinoid tumors, lymphomas and GIST.

– Difficult diagnosis, often established by chance, during the imaging tests performed for other suffering, during the surgery required by an acute complications (obstruction, bleeding) or even at necropsy. The difficulties of the diagnostic are the result of the following factors:

  - polymorphic and uncharacteristic clinical picture, most often with signs loan or belonging to the evolutionary complications
  - Their development in a very permissive space (intestinal lumen and/or peritoneal cavity), which allows a long asymptomatic evolution until the onset of an evolutionary complication (obstruction, bleeding)
  - relative inaccessibility of the small bowel to the endoscopic investigations, the examination of the entire small intestine being still a problem

– Complex treatment, medical and surgical, having a wide range of therapeutic means. Given to the wide variety of clinical and anatomical forms their treatment is impossible to be standardized, so that there are a multitude of therapeutic algorithms, if not for each tumor type in part, at least for certain classes or subgroups of tumors.

Their rarity and the large variety of the anatomical and clinical forms (over 35 histological types) makes difficult to assess the true incidence of the small bowel tumors, varying according to the author; however, the small bowel tumors are assessed as representing 1-2% of all malignancies of the digestive tract and only 0.3% of all digestive cancers. The SEER data (Surveillance, Epidemiology and End Results program) assessed the age-adjusted incidence at 0.4/100,000/year. In my personal study the incidence of small bowel tumors was of 1.8%, which is within the limits of the literature data and the distribution of cases by year showed an average of 2.5 cases/year, with a tendency to rise since 2008 and a frequency peak in 2011, when there were 6 new cases/year.

Although the most authors believe that there are no significant differences between the sexes, our data clearly revealed the preponderance of males (sex ratio 2.5), confirming the findings of those authors, which showed a slightly higher incidence of malignant tumors in men

Small bowel tumors may be seen at any age, but the literature suggests that the age range between 14 and 84 years, with a mean of 59.5 years, 62.2 years for the benign tumors

and 56.8 for the malignant. Depending on the histology, adenocarcinoma is usually diagnosed in the seventh decade of life, while carcinoid tumors and leiomyosarcomas arise mainly in the sixth decade; sarcoma incidence increases significantly after the seventh decade, while lymphoma is the most common tumor of the small intestine in children. In our study, the highest incidence of the small bowel tumors was in the age group 61-70 years, with a range between 30 and 91 years. There is also a racial and geographical determinism. The incidence of bowel cancer is higher in the US and Western Europe, one of the highest age-adjusted incidence being found in US and gradually increased after age of 40 years.

Without pathogenic implications, reported in the literature, I noticed, however, that the most patients (67%) were from rural areas and according to their age, the vast majority (20 cases - 67%) of patients were retired.

We have not detected occupational pollutants or other significant environmental factors in our series.

Regarding to the risk factors, personal study showed us the following findings:

- neoplastic history were present in 5 (16.12%) patients (colon cancer 1, liver cancer with peritoneal carcinomatosis 1, lung cancer 1, malignant melanoma 1 and ovarian cancer 1). The small number of cases did not allow us relevant conclusions regarding to the pathogenic lineage of the small bowel tumors and other cancers. However we notify the increased probability of developing a colorectal carcinoma following a small bowel carcinoma and an increased risk of occurrence of an intestinal carcinoma after a colorectal one, as the literature mentioned, and the place of the secondary tumors of the small intestine, the metastases at this level being more frequent than at any other level of the digestive tract and secondary carcinomas being almost as common as primary tumors. Virtually every primitive cancer can occasionally metastasize to the small bowel and as primary tumors at this level are rare, many of the small intestine cancers are metastatic cancers. In our series we registered in the personal history of 3 patients with small bowel tumors who had malignancies with other location that preceded the appearance of the small bowel tumor: malignant melanoma, lung cancer and colorectal cancer one case each
- Familial Adenomatous Polyposis (FAP) was present in one case, who suffered a rectocolectomie for this condition.
- We did not particularly noticed the presence of dietary factors (high caloric intake, fats, red meat, canned foods, salted or smoked), which according to the literature, increase the incidence of the small bowel cancer by 2-3 times]
- smoking and alcohol consumption, although have not been associated with an increased risk of small bowel cancer in the literature we, however, noted them in 6 (19.35%) cases.
- although without pathogenic connotations, we included the co-morbidities among the general risk factors, given that 13 (41.93%) patients were operated on as emergency, imposed by evolutionary complications of intestinal tumors, which usually did not leave the time to rebalance their preoperative comorbidities, increasing the operative risk and significantly influencing postoperative morbidity and mortality

The diagnosis of the small bowel tumors is a very difficult one, often established by chance, during the imaging tests performed for other suffering, during surgery required by an acute complications (obstruction, bleeding) or even at necropsy.

The clinical picture is polymorphic and uncharacteristic, largely depending on the topography of the lesion, anatomic and clinical form, benign or malignant nature of the tumor, the way of growth and development (exo- or endolumenal), the presence or absence of complications, so that the preoperative diagnosis becomes a real challenge for the clinician.

Except the cases that begin with an acute complication (bleeding, obstruction), the onset is an insidious one and the diagnosis is charged by notable delay, the mean period between the onset of the disease (first clinical signs) and the establishing of the diagnosis being assessed in the literature at 6-7 month on average, with limits ranging between several month to several years. In our study, the onset was insidious one in 18 (58.6%) cases and by acute complications in 13 (41.9%) cases, and the delay between the onset and admission ranged between several hours and over 1 year.

The benign tumors are generally asymptomatic, while the malign tumors are symptomatic before the establishing of the diagnosis.

Regardless of the onset form, the colicky pain was the main clinical signs met in 74.1% of cases (81% in the literature), followed by vomiting, intestinal transit disorders, neoplasic

syndrome and impaired general condition. Regarding to the intestinal transit disorders, we met transit arrest in 7 (22%) cases, diarrhea in 2 cases and alternating diarrhea/constipation in 3 cases, while the literature mentions only the diarrhea in 26% of cases.

Among the general objective signs we noticed anemia in 77.4% (24) of cases and weight loss in 35.4% (11) of cases, and as a local objective signs obstructive jaundice 4 (12.9%) cases, abdominal muscle defense 8 (25.8%) cases, palpable abdominal mass in 3 (9.6%) cases and local pulping 1 case.

In cases commenced by complications, the main onset syndromes were peritonitis syndrome in 8 (16.6%) cases, obstructive syndrome in 8 (26.6%) cases, upper/lower gastrointestinal bleeding 6 (19.35%) and haemoperitoneum in 1 case (3.3%). 8 (26.6%) patients presented signs of shock on admission, hemorrhagic shock in 2 cases, peritoneal in 1 case and occlusive in 5 cases.

The laboratory findings are generally not helpful in the diagnosis of small bowel tumors, except: iron deficiency anemia secondary to the occult bleeding, increased levels of liver enzymes due to the liver metastases or ampullary lesions and increased urinary 5-hydroxy-indoleacetic met in over 50% of carcinoid tumors. In our series, without having any special significance for etiologic diagnosis, the laboratory findings were rather investigations of biological balance, showing humoral changes induced by the presence of small bowel tumors and are useful for the biological rebalancing of patients pre-, intra- and postoperatively. Thus, the anemia (mild 4 cases, moderate 10 cases and severe 12 cases) was the expression of occult or manifest gastrointestinal bleeding, the hyperleukocytosis (15 cases) was present in cases commenced by peritonitis or occlusive syndrome, but also in cases with inflammatory tumors or tumoral suppuration, increased blood level of the urea (19 cases) and hyperglycemia (18 cases) were present in all complicated cases and increased level of the bilirubinemia and hepatic enzymes (4 cases) were present in the ampullary tumors with obstructive jaundice.

Biological markers (CEA and CA-19-9) were performed only in a limited number of cases (3) and were within normal limits in all cases.

Although the endoscopy diminished considerably the importance of the classic radiology in the diagnosis of gastroduodenal and colonic disease, the radiologic examination is still the method of first choice for the diagnosis of the small bowel tumors and modern imaging tests (ultrasound, CT, MRI, etc.) complete the classic radiologic examination, providing particularly valuable diagnostic information.

The plain abdominal X-ray are of limited value, their benefit in the diagnosis of the uncomplicated small bowel tumors being very low; it is particularly useful in the diagnosis of the acute complications of the tumors, highlighting the presence of the fluid-air levels or/and the pneumoperitoneum, specific radiological signs for the diagnosis of the bowel obstruction or peritonitis, secondary to the tumor perforation. We performed Plain X-ray in 12 cases with peritonitic or obstructive syndrome and noticed the pneumoperitoneum in 3 cases and fluid-air levels in 9 cases.

Computed tomography (CT), often used as first-line investigation, is credited with overall accuracy of 45% and sensitivity of 0-58%; it identifies the primary tumors, but is unable to detect small tumors and have fewer possibilities to differentiate the tumor types; However, it is indispensable for the clinical staging, allowing the assessment of the local invasion, mesenteric lymph nodes and liver metastasis. In our series, CT was performed in 13 (41.93%) patients and revealed the presence of a tissular tumor with or without necrosis in 5 cases, without being able to specify their belonging to the small bowel, the presence of a vegetant lacunar tumor of the ileum in 1 case, mesenteric lymph nods in 2 cases and peritoneal carcinomatosis in 1 case. In the cases with ampular tumors and obstructive jaundice CT revealed the common bile duct dilatation (3 cases), D2 dilatation (1 case), tumoral hepatomegaly (2 cases) and gallstone (1 case).

Ultrasound has now become a commonly used method in the study of gastrointestinal pathology, its main advantage being that it is non-invasive, easy to perform, accessible and cheap; it allows the assessment of the intestinal walls (thickness, structure), its contents and peristaltic and neighborhood structures (lymph nodes, mesentery, parenchymal viscera) and bowel relations with them, providing valuable data to established the nature of the pathologic

process. There are, from this point of view, ultrasound features that allow the differentiation between inflammatory and neoplastic processes of the small bowel6]. Transabdominal ultrasound (14 cases - 45.16%) identified the tumor only in 3 cases; in the rest of the cases, the data provided by transabdominal ultrasonography were intraperitoneal fluid (3 cases), hepatomegaly (3 cases), common and/or intrahepatic bill duct dilatation (3 cases), distended gallbladder ± gallstones (4 cases), enlargement of the head of the pancreas (2 cases) and distended intestinal loops (1 case).

Upper and/or lower digestive endoscopy (8 cases = 25.8%) cases has not brought huge benefits in the preoperative diagnosis of the small bowel tumors, except ampullary tumors; so, the lesions revealed by digestive endoscopy were ampullary tumor (1 case), ulcerous-proliferative tumor of D3 (1 case), duodenal stenosis (1 case), peptic esophagitis (1 case), esophageal varices (1 case) and was normal in 2 cases, while lower digestive endoscopy revealed a tumor of the ileo-cecal valve in 1 case without being able to specify the primary tumor location.

The small bowel is relatively inaccessible to the endoscopic examination beyond the Treitz angle, its length, tortuous anatomy, configuration and arrangement as a loops, making endoscopic examination a real challenge. Small bowel endoscopy (enteroscopy) has four technical possibilities: anterograde ("push") enteroscopy that allows the examination of the proximal jejunum up to 60-80 cm beyond the duodeno-jejunal angle, anal enteroscopy rather of historical interest, intraoperative enteroscopy and endoscopic capsule enteroscopy. We used "push enteroscopy" only in one case, in which we indentified an ulcerated polyp at 40 cm beyond duodeno-jejunal angle and a biopsy was performed.

Endoscopic ultrasonography, an endoscopy and ultrasound combination with high resolution, allows to discover the tumoral lesions, to assess the nature of the pathologic process and perform the biopsy; it also allows to determine precisely the degree of the tumor infiltration into the intestinal wall, the invasion of neighboring structures and to detect the lymph node metastases. Unfortunately, for the time being, only the duodenum is currently accessible to EUS investigation. We used it in 3 cases with insidious onset and clinical picture dominated by an obstructive jaundice in which we identified the presence of an ampullary tumors (2 with pancreas invasion), which was very useful in choosing the surgical procedure (cephalic duodenopancreatectomy or ampulectomy).

The preoperative diagnosis of the small bowel tumors is usually set in less than 50% of cases. The suspicion of the small bowel tumor should be considered whenever there is a non-specific abdominal pain or unexplained iron deficiency anemia and common methodology for the investigation of such circumstances include radiological examination, endoscopy and ultrasound; these can lead to the diagnosis especially in advanced lesions, but have a relatively low sensitivity for early diagnosis of malignant tumors in surgically curable stage. In our series the preoperative diagnosis was established only in 25.8% (8) of cases (6 small bowel tumor and 2 vaterian ampulom), especially on endoscopy and imaging tests imposed by the presence of a nonspecific abdominal pain syndrome dominated by colicky pain, transit disorders or a progressive obstructive jaundice.

The great acute abdominal syndromes (peritonitis 5, occlusive syndrome 6, gastrointestinal bleeding 2 and nontraumatic haemoperitoneum 1) were the main presentation of the patients (14 cases = 43.36%), confirming the acute onset by evolutionary complications of the small bowel tumors, so that the diagnosis in these cases remains an intraoperative discovery. Otherwise, the preoperative diagnosis was: anemic syndrome cause unspecified, colon cancer, obstructive jaundice, tumor of the ovary, gastric polyposis, duodenal or pyloric stenosis; and in these cases, the diagnosis was established intraoperatively.

The morphologic diagnosis is an important step in the diagnosis algorithm of the small bowel tumors, especially under circumstances that the preoperative diagnosis of the small bowel tumor is established usually in less than 50% of cases (28,5% of all cases and 50% of those completely preoperatively in our series); it requires mandatory a macroscopic study and a microscopic one (histological and immunohistochemical).

The establishing of the macroscopic form and characters of the tumors is the result of the preoperative exploration and of the complex exam of the resection specimen, the following

parameters being assessed: the location, number, size, macroscopic type and local extension of the tumor. Our study revealed the following morphological aspects: the ileum was the main location of the tumors (14 cases), followed in order by jejunum (10 cases) and duodenum (6 cases, from which 4 ampular tumors); the tumors were unique in 21 cases (70%) and multiple in 9 (30%), with size ranging between 0.7 and 15 cm, most of them with their great diameter between 1 and 3 cm. Macroscopically, most of the tumors belonged to the ulcerated-polypoid forms (10 cases, all of them complicated with perforation, obstruction or bleeding) or infiltrating-stenosing forms (8 cases); in 5 cases, the preoperative exploration revealed a complex tumoral bloc, whose nature could be established only by histologic exam. 2 were exofitic extralumenal tumors of the ileum, one of them leading to a nontraumatic haemoperitoneum and the second being the cause of an intestinal intussusceptions. Regarding to the tumoral extension, we noticed local lymphadenopathy in 8 cases, the invasion of the neighboring viscera in 5 cases and the invasion of the great omentum in 2 cases; 2 patient had liver metastases an 3 peritoneal carcinomatosis.

In spite of their rarity, more than 40 histological types of the tumors originating from the structures of the small bowel wall were identified.

Histological, the most tumors (80%) in our series were true neoplastic proliferations developed from the small bowel wall structures, the rest being non-neoplastic tumors. Except for one case, labeled as the metastasis of a malignant melanoma, the neoplastic tumors were primary proliferations, originated in the intestinal wall structures. In 2 cases, in which the operation was limited to an exploratory laparotomy, the morphological tumor type could not be specified. In terms of tissue origin, from those 23 tumors histological assessed, more than a half had their origin in the mesenchymal structures of the intestinal wall. On the other hand, the cellular phenotype was of the malignant type in the vast majority of cases (92%). It should be mentioned that we also included here the two non-resectable tumors because the macroscopic intraoperative aspect suggested the malignant character of the tumors. The benign neoplastic proliferations were very rare (only two cases) and had only epithelial origin. Finally, all the 6 tumors labeled as being nonneoplastic presented only an intense inflammatory reaction at the histologic exam.

The analysis of the incidence of various types of malignant neoplasms in the study group revealed the predominance of the carcinomas among the epithelial neoplasia and of the gastrointestinal stromal tumors (GIST) among the mesenchymal proliferations.

The most common type of primary malignant epithelial tumor was the adenocarcinoma, common form (5 cases), localized to the ampulla of Vater in 3 cases (well differentiated 1 case and moderately differentiated 2 cases) and ileum in 2 cases (well differentiated and poorly differentiated one case each); apart from the common form of adenocarcinoma, we noticed an polypoid ampullary tumor, with microscopic appearance of mucinous carcinoma, poorly differentiated. Generally, the macroscopic and microscopic morphology of the six carcinomas in our series were within the classic description in the literature.

Finally, we have included among the carcinomas and the two malignant neuroendocrine tumors identified in our series, both of them having an infiltrating-stenosing pattern with the invasion of the whole intestinal wall and the extension to the neighboring structures. Histological, both tumors were labeled, according to classification of the WHO (2004) and of National Cancer Institute (2011), as the typical carcinoide tumors or neuroendocrine carcinomas poor differentiated, being similar to the poor differentiated adenocarcinomas, but with hyperchromic big nuclei, prominent nucleoli and clear nuclear pleomorphism, higher mitotic activity (2010/10 HPF) and sometimes with the necrotic foci.

The mesenchymal tumors of the small bowel include two main categories: entities with the same histological aspects to those of the benign or malignant tumors of the soft tissue with another location (schwannoma, leyomioma and lymphoma) and neoplasms with spindle cells, which most often express CD117 (c-kit), named gastrointestinal stromal tumors (GIST).

GIST (7 cases) was the most frequent mesenchymal tumor; in 2 cases, the tumor, localized on the jejunum, had an exofitic ulcerated-polypoid aspect with the great diameter between 10 and 15 cm, which falls them among the tumors with a highly malignant degree, according to the changes proposed by Joensuu (2008) at the National Institute of Health

classification (2002). In both cases, the tumoral proliferation was predominantly of an storiform aspect, one of them presented and epitelioid areas, and immunohystochemical panel confirmed the high degree malignancy. In other 5 patients the tumors were localized between 100 and 150 cm from the ileo-cecal valve, having their great diameter between 5 and 10 cm, in other words all large tumors which also `frame just according to these criterion from the malignancy of the intermediate degree up; macroscopic these had a polypoid or ulcerated – polypoid aspect and with tumoral cellular proliferation of storiform type at histologic exam, except one case in which the epitelioid pattern was also met. Both the diagnosis of the mesenchymal proliferation and the degree of malignancy were confirmed by the immunochemistry.

The gastrointestinal tract is a common location for the extranodal lymphomas, the stomach being most frequent involved, followed by the small bowel and colon. B-cell lymphomas are the most frequent. We met malignant lymphoid proliferations in 3 cases, framed according to their histologic aspect among the follicular B-cell lymphomas (2 cases) or Hodgkin lymphoma (1 case).

Among the rare tumors, we met malignant paraganglioma, originated from the paraganglionar structures of the vegetative nervous system (2 cases) and malignant melanoma (1 case).

The benign neoplastic proliferations were very rare (2 cases): tubular adenomatous polyp with low degree dysplasia in one case and a tubulo-villous ulcerated polyp with high grade dysplasia in another one.

The nonneoplastic tumoral formation (6 cases) suspected as being neoplastic proliferations took varied morphological forms: tumoral block with inflammatory signs (2 cases), infiltrating or polypoid forms (2 cases each). However, the histological exam revealed only an unspecific and unorganized inflammatory reaction in all cases with vascular congestion and edematous distension of the interstitial spaces in the mucosal and submucosal chorion and with the tendency of the accumulation of the inflammatory cell's population as lymphoid aggregates similar to the lymphoid follicles. This morphologic picture in which the myofibroblastic proliferation with spindle cells, frequent typical mitoses and mixoid stroma missed, led to the diagnosis of chronic inflammatory reaction in all cases, excluding the diagnosis of myofibroblastic inflammatory tumor of the small bowel. Sometimes, the presence of a very reach lymphocyte cells component could have raise the suspicion of an immunoproliferative disease of the small bowel, a distinct form of the B-cell lymphoma, considered as being a special form of MALT lymphoma, which was speculated as being initially a lymphoplasmacytic reaction as a response to a permanent antigenic stimulation, possible of the infectious nature, hypothesis sustained by the polyclonal nature of the proliferation and by the response to the treatment with tetracycline.

The treatment of the small bowel tumors is a complex one, medical and surgical, having a wide range of therapeutic means. Given to the wide variety of clinical and anatomical forms, this treatment is impossible to be standardized, so that there are a multitude of therapeutic algorithms, if not for each type of tumor in part, at least for certain classes or subgroups of tumors. Anyway in choosing of the therapeutic means and their sequences within the therapeutic algorithms, the following parameters have to be taking into account: the macroscopic characters of the tumor (location, size, form, number), clinical staging, histological type, degree of cell differentiation, benign or malign character of the tumor, the presence or absence of the complications, postoperative staging (pTNM) and the biological status of the patient (age, general condition, comorbidities, etc.)

Surgery is the main therapeutic option no mater of the benign or malign character of the tumor. For the benign tumors the surgical indication is of principle one at least for two reasons: the removal of the tumor prevents the risk of the appearance of the evolutive complications and the benign or malign character of the tumor cannot be established only by the histological exam of the resection specimen. Except the small tumors located in the areas accessible to endoscopic resection, for the rest of tumors surgery remains the method of choice, the extent of the resection depending on the size, number and location of the tumor and of the presence of the evolutive complications.

Regarding to the malignant tumors, their treatment is a complex one, medical and surgical, in which the surgery is the main therapeutic option, the common surgical procedure being the resection within the oncologic safety limits, with the particularities depending on the tumor locations, type and stage. If the resection with curability oncologic character can not be performed, the palliative resection or digestive derivations could prevent or solve the evolutive complications.

Surgery was and in our series the main therapeutic option. 30 (96.77%) cases were operated on, 14 as an emergency (12 immediate emergency operated in the first 24 hours and 1 postponed emergency operated at 48 hours), the operation being imposed by the acute complications of the tumors: peritonitis, bowel obstruction 6, bleeding 2 and nontraumatic haemoperitoneum 1. In the rest of 16 (53.4%) cases, the operation was performed as a scheduled one, after the rebalancing and complete investigation of the patient and had both diagnostic and therapeutic aim, as the preoperative diagnosis of the small bowel tumor was established only in 25.8% of cases. Under these circumstances, the systematic and thorough preoperative exploration became the most important gesture for the establishing the diagnosis end choosing the surgical procedure; it identified the tumor, established its belonging to the small bowel and offers data regarding to the number, size, location, macroscopic aspect, local and distance extension, strictly necessary elements for the assessment of the length and character of the resection. Given that, except two ampullary tumors confirmed as benign by endoscopic biopsy, in the rest of the cases we did not have any preoperative information about the benign or malign character of the tumors, the therapeutic attitude was in principle like for the malignant tumors – extended resection with margins free of tumor. The extended segmentary enterectomy of the jejunum or ileum was the main surgical procedure, imposed by the fact that the most small bowel tumors were located at this level. Always the enterectomy was a large one, at the distance from the tumor, and the reestablishment of the digestive transit was made by an one layer suture enteral anastomosis, end-to end type in 14 cases and end to side type in 5 cases with old peritonitis or bowel obstruction, distended intestinal loops and occlusive shock. Wedge enterectomy with enteroraphy was an exceptional procedure, used only in small tumors (2 cases) located on the free margin of the intestine. The ampullary tumors (4 cases) were solved by ampulectomy in 2 cases which were confirmed as benign by endoscopic biopsy and by cephalic duodenopancreatectomy in 2 ampullary adenocarcinomas with the pancreatic head invasion. The associated surgical procedures imposed by the local tumoral invasion was: right colectomy (1 case), Hartmann simgoidectomy (1 case), hysterectomy (1 case) and gastro-enteroanastomosis in 1 case with a large tumor, realizing a fixed duodeno-jejunal tumoral block.

The postoperative evolution was good in 66.7% of cases. The high morbidity and postoperative mortality rate (33% and 26.6%) could be explained by the fact that in 14 cases, the surgery was performed as immediate emergency, imposed by the severe acute complications of the small bowel tumors (bleeding, perforation with peritonitis in occlusive stage or acute bowel obstruction), in old patients with severe comorbidities. We mention that none of the deaths occured in patients operated as scheduled surgery, after their biological rebalance.

CONCLUSIONS

1. The small bowel tumors are rare tumors, their incidence of 1.8% in our study being within the limits in the literature

2. Clear preponderance in male (sex ratio 2.5)

3. Maximal incidence in 7^{th} decade, with limits between 30 and 91 years

4. Difficult diagnosis, often established by chance, during the imaging tests performed for other suffering, during the surgery required by an acute complications (obstruction, bleeding) or even at the necropsy

5. Polymorphic and uncharacteristic clinical picture, depending on the topography, anatomic and clinical form, benign or malignant nature of the tumor, the way of growth and development (exo- or endolumenal), and the presence or absence of complications

6. There are no specific laboratory findings, these being rather investigations of biological balance, showing humoral changes induced by the presence of the tumor and are useful for the biological monitoring and rebalancing of the patients.

7. Plain abdominal X-ray with a limited value for the diagnosis of the uncomplicated small bowel tumors is usefully especially in the diagnosis of the acute complications, showing the fluid-air levels or pneumoperitoneum, pathognomonic signs for the diagnosis of the bowel obstruction or peritonitis.

8. The computed tomography (CT), the main imaging test with an overall accuracy of 45% and a sensitivity of 0-58%, although unable to detect the small tumors and having fewer possibilities to differentiate the tumor types, is indispensable for the clinical staging, allowing the assessment of the local invasion, mesenteric lymph nodes and liver metastasis

9. The upper and/or lower digestive endoscopy did not bring great benefits in the diagnosis of the small bowel tumor, except the ampullary tumors, because the small bowel is relatively inaccessible to the endoscopic examination.

10. The preoperative diagnosis is commonly established in less than 50% of cases (25.85 in our series). The suspicion of the small bowel tumor should be considered whenever there is a non-specific abdominal pain or unexplained iron deficiency anemia and common methodology for the investigation of such circumstances includes imaging tests, endoscopy and ultrasound; these can lead to the diagnosis especially in advanced lesions, but have a relatively low sensitivity for early diagnosis of malignant tumors in surgically curable stage.

11. The morphologic diagnosis, established during the preoperative exploration and by the examination of the resection specimen, is an important step in the diagnostic and therapeutic algorithm of the small bowel tumors

12. 80% were true neoplasia and 20% nonneoplastic tumors, the ulcerated-polypoid and infiltrating-stenosing tumors being the main macroscopic forms.

13. Large variety of histologic type (over 35 in the literature, 7 in our series), the adenocarcinoma being the most common type of epithelial tumor and GIST the main type of mesenchymal tumor

14. The treatment of the small bowel tumors is a complex one, medical and surgical, with a wide range of therapeutic means. Given to the wide variety of clinical and anatomical forms, this treatment cannot be standardized, so that there are a lot of therapeutic algorithms, if not for each tumor type in part, at least for certain classes or subgroups.

15. Surgery is the main therapeutic option no mater of the benign or malign character of the tumor (96.77% operated cases), the surgical indication being of principle for two reason at least: the removal of the tumor prevents the risk of the evolutive complications and the benign or malign nature of the tumor cannot be established only by the histological exam of the resection specimen.

16. Given that for the most cases there are not any preoperative information about the benign or malign nature of the tumors (except the ampullary tumors which benefits by endoscopic biopsy) the therapeutic attitude have to be in principle like for the malignant tumors – extended resection with free of tumor margins.

17. The extended segmentary enterectomy of the jejunum or ileum is the main surgical procedure, imposed by the fact that the most small bowel tumors were located at this level.

18. The high morbidity and postoperative mortality rate (33% and 26.6%) could be explained by the fact that in nearly half of cases, the surgery was performed as emergency one, imposed by the severe acute complications (bleeding, perforation with peritonitis or obstruction), in old patients with severe comorbidities.