

AREA OF COMBINED SURGICAL INTERVENTIONS, INCLUDING THOSE WITH AN ANGIOSURGICAL COMPONENT, IN TERMS OF MALIGNANT NON-ORGAN RETROPERITONEAL TUMORS' TREATMENT

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ABSTRACT

Purpose of the study. To analyze the immediate outcomes following surgical treatment of locally advanced malignant non-organ retroperitoneal tumors (NRT).

Materials and methods. Surgical interventions for malignant NRTs were performed in 114 patients at Abdominal Oncology Department No. 1, National Medical Research Centre for Oncology. There were 48 males and 66 females among them. According to the histological structure, liposarcoma was commonly detected in 64 (56.1 %) cases.

Results. Intraoperative revision revealed the spread of the tumor to adjacent anatomical structures in 67 (58.8 %) cases. Resection surgical interventions were performed in 109 patients, of which 106 (97.2 %) patients had operations performed in an amount of R0. Combined surgical interventions for NRTs were performed in 62 (54.4 %) patients, and multiorgan happened to be in 45 (72.6 %) patients out of those. Resection of the inferior vena cava was performed in 12 patients. Resection of the superior mesenteric vein was performed in 2 patients and the iliac-colonic vein in 2 patients. In 1 observation the left renal vein was resected with suturing of the lateral defect of the vessel wall. Complications during surgery and in the early postoperative period were noted in 14 (12.3 %) patients. In total, 2 patients died after operations, the mortality rate was 1.8 %.

Conclusions. Tumor invasion of big main blood vessels is not a contraindication for surgical treatment of locally spread malignant non-organ retroperitoneal tumors.

Keywords: locally spread tumors, retroperitoneal tumors, non-organ tumors, liposarcomas, retroperitoneal space, multiorgan resections, combined operations, prosthetics, angiosurgical interventions, resection, marginal resection, circular resection, complications, mortality, survival rates, vascular invasion, bleeding

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Compliance with ethical standards: the research was carried out according to the ethical principles, set forth by World Medical Association Declaration of Helsinki, 1964, ed. 2013. The study was approved by the Biomedical Ethics Committee at the National Medical Research Center for Oncology (extract from the protocol of the meeting No. 22 dated 07/05/2023. Informed consent was obtained from all participants of the study.

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МЕСТО КОМБИНИРОВАННЫХ ХИРУРГИЧЕСКИХ ВМЕШАТЕЛЬСТВ, В ТОМ ЧИСЛЕ С АНГИОХИРУРГИЧЕСКИМ КОМПОНЕНТОМ, В ЛЕЧЕНИИ ЗЛОКАЧЕСТВЕННЫХ НЕОРГАНЫХ ЗАБРЮШИННЫХ ОПУХОЛЕЙ

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РЕЗЮМЕ

Цель исследования. Анализ непосредственных результатов хирургического лечения злокачественных неорганных забрюшинных опухолей (НЗО).

Материалы и методы. В отделении абдоминальной онкологии № 1 ФГБУ «НМИЦ онкологии» Минздрава России хирургические операции по поводу злокачественных НЗО выполнены у 114 больных. Среди них мужчин было 48, женщин – 66. По гистологической структуре наиболее часто в 64 (56,1 %) наблюдениях выявлена липосаркома.

Результаты. Интраоперационная ревизия выявила распространение опухоли на смежные анатомические структуры в 67 (58,8 %) наблюдениях. Резекционные хирургические вмешательства удалось выполнить 109 пациентам, из них у 106 (97,2 %) больных операции были выполнены в объёме R0. Комбинированные хирургические вмешательства по поводу НЗО выполнены у 62 (54,4 %) больных, из них у 45 (72,6 %) пациентов они были мультивисцеральными. Резекция нижней полой вены выполнена у 12 пациентов. У 2 пациентов выполнена резекция верхней брыжеечной вены и у 2 больных – подвздошно-толстокишечной вены. В 1 наблюдении резецирована левая почечная вена с уширением бокового дефекта стенки сосуда. Осложнения во время операции и в раннем послеоперационном периоде отмечены у 14 (12,3 %) больных. Всего после операций умерли 2 больных, летальность составила 1,8 %.

Заключение. Опухолевая инвазия крупных магистральных кровеносных сосудов не является противопоказанием для хирургического лечения местно-распространенных злокачественных неорганных забрюшинных опухолей.

Ключевые слова: местно-распространенные опухоли, забрюшинные опухоли, неорганные опухоли, липосаркомы, забрюшинное пространство, мультивисцеральные резекции, комбинированные операции, протезирование, ангиохирургические вмешательства, резекция, краевая резекция, циркулярная резекция, осложнения, летальность, выживаемость, сосудистая инвазия, кровотечение

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Соблюдение этических стандартов: в работе соблюдались этические принципы, предъявляемые Хельсинкской декларацией Всемирной медицинской ассоциации (World Medical Association Declaration of Helsinki, 1964, ред. 2013). Исследование одобрено Комитетом по биомедицинской этике при ФГБУ «НМИЦ онкологии» Минздрава России (выписка из протокола заседания № 22 от 05.07.2023 г.). Информированное согласие получено от всех участников исследования.

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INTRODUCTION

Non-organ retroperitoneal tumors (NRTs) are a combined group of neoplasms without organ affiliation, localized in the retroperitoneal space proper, between the peritoneal leaves of the intestinal mesentery or peritoneal in the pelvic cavity. The histogenetic source of NRTs can be fatty, connective, vascular or nervous tissue, as well as embryonic elements located in the retroperitoneal space.

NRTs are extremely rare and account for 0.03 to 1 % of all tumor diseases. They are more common in young and middle-aged women. According to various researchers, up to 85 % of NRTs are malignant [1; 2]. There are no epidemiological data on the incidence of retroperitoneal non-organ tumors in Russia. The treatment of malignant non-organ retroperitoneal tumors remains one of the difficult and complex problems of modern clinical oncology, while due to the relatively low sensitivity of NRTs to radiation therapy and treatment with cytostatics [3], the surgical method is the main one.

Important characteristics of almost all morphological forms of NRTs are frequent recurrence and relatively rare metastasis. The frequency of recurrence is variable and depends on many factors, the most important of which are the morphological characteristics of the tumor and the degree of radicality of the surgical treatment. According to a number of authors, relapses after radical operations amount to 20–90 % [2; 4]. Operations for NRTs are technically complex, due to the prevalence of the tumor process, the deep location of neoplasms and the relatively frequent need for resection of neighboring organs [5]. A special place among malignant NRTs is occupied by locally advanced tumors with invasion into the main vessels due to the fact that performing a combined radical operation in the volume of R0 is technically possible only if angiosurgical intervention is performed [6–9].

MATERIALS AND METHODS

During the period from 2016 to 2021, surgical operations for malignant NRTs were performed in 114 patients in the Abdominal Oncology Department No. 1 of the thoracoabdominal Department of the Rostov National Medical Research Centre for Oncology.

Among them, there were 48 men and 66 women, the ratio of men and women was 1 to 1.4. The operated women were younger than men. The average age of men was 57.4 years (in the range from 21 to 82 years) and women 49.4 years (in the range from 18 to 79 years).

According to the histological structure of the studied postoperative material, there was a significant variety. As a result of morphological examination, liposarcoma was detected most often in 64 (56.1 %) cases, leiomyosarcoma was the second most common malignant NRTs in 13 (11.4 %) cases. Malignant schwannomas and gastrointestinal stromal tumors were somewhat less common (in 7 (6.1 %) and 6 (5.3 %)) accordingly (Table 1). Such tumors as rhabdomyosarcoma, angiosarcoma, fibrosarcoma, malignant paraganglioma, malignant lymphoma were relatively rare. Extremely rare cases such as extraosseous localization of osteogenic sarcoma and bladder cancer with a predominantly extraperitoneal solid component have also been identified. In 3 cases, the source of NRTs was metastases of malignant tumors of other localizations.

In the studied group of patients, a primary tumor was detected in 78 (68.4 %) cases, and in 36 (31.6 %) cases, a recurrent one. Among patients with newly diagnosed NRTs, stage I was in 17 (21.8 %) patients, stage II and III in 28 (35.9 %) and 30 (38.5 %), respectively, and stage IV in 3 (3.8 %) patients (Fig. 1).

Table 1. Histological identity of NRTs

Histological identity	Percentage (%)
Liposarcoma	64 (56.1 %)
Leyomyosarcoma	13 (11.4 %)
Schwannoma	7 (6.1 %)
Gastrointestinal stromal tumors	6 (5.3 %)
Others	24 (21.1 %)

STUDY RESULTS AND DISCUSSION

Intraoperative revision revealed the spread of the tumor to adjacent anatomical structures in 67 (58.8 %) cases. Most commonly affected organs were kidneys, colon and its mesentery, pancreas, spleen, small intestine, as well as various musculo-skeletal structures (lumbar muscles, abdominal wall muscles, sacrum, diaphragm). Liver germination was observed in 2 cases.

Resection surgical interventions were performed in 109 patients, out of which 106 (97.2 %) patients had operations performed in the amount of R0. In 5 patients, the amount of the operation was diagnostic.

Combined surgical interventions were performed in locally advanced tumors of malignant NRTs, out of which 45 (72.6 %) patients had multiorgan. The most common components of combined surgical interventions were right-sided or left-sided nephrenalectomies, right-sided or left-sided hemicolectomy, diaphragm resection, lumbar muscle resection, splenic and pancreatic resection. Combined interventions were performed in 26 (82.3 %) cases out of 32 operations carried out for recurrent tumors.

Combined surgical operations for locally spread non-organ retroperitoneal tumors with resection of large venous blood vessels were performed in 25 patients. Angiosurgical interventions were generally a component of combined multivisceral resections and were performed in connection with direct tumor invasion of large blood vessels. X-ray endosurgical embolization of arterial blood vessels of the tumor

was applied 24–48 hours before surgery to reduce intraoperative blood loss in 4 patients with a massive tumor and the main type of arterial blood supply of the latter.

Resection of the inferior vena cava was performed in 12 patients, 8 of them were marginal and 4 circular. Resection of the external iliac vein was performed in 8 cases. Resection of the superior mesenteric vein was performed in 2 patients and the iliac-colonic vein in 2 patients. In 1 observation, the left renal vein was resected with suturing of the lateral defect of the vessel wall.

Prosthetics of the inferior vena cava was performed in all cases of its resection, in 8 patients with marginal resection, the defect of the vessel wall was replaced with a synthetic "patch", in 4 patients with circular resection, the defect was replaced with an adequate tubular prosthesis.

Prosthetics of the external iliac vein with a synthetic graft after its resection was required in 3 out of 8 cases, in 3 cases the defect in the vessel wall was sutured, in 2 cases, due to a well-defined network of collaterals, ligation was performed. In all 4 cases of resection of the superior mesenteric and iliac-colonic veins, their prosthetics were performed.

Significant complications (class II–V according to Clavien-Dindo) during surgery and in the early postoperative period were noted in 14 (12.3 %) patients. The most serious and frequent complication was bleeding, observed in 3 patients directly during extensive combined surgical intervention, and in 2 patients in the early postoperative period. The main cause of bleeding was damage to the pathologically

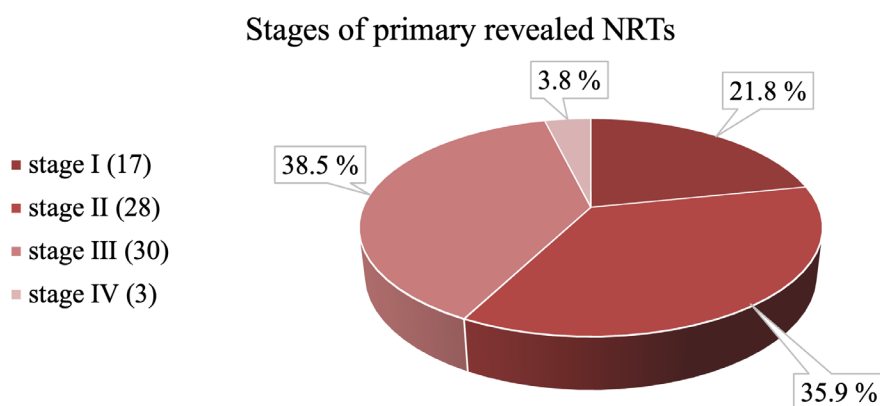


Fig. 1. Stages of primary revealed NRTs.

branched vascular network with insufficient visual control during the technically difficult mobilization of locally widespread NRTs. In 2 cases, intraoperative bleeding was successfully managed during surgery (Clavien-Dindo class IIIB), however, in one patient, massive simultaneous blood loss led to the development of hemorrhagic shock, DIC syndrome, multiple organ failure and death on the first day after surgery, which, according to the Clavien-Dindo classification, belongs to class V. Patients with bleeding in the postoperative period were successfully re-operated. 2 patients had perforation of the small intestine, 2 had adhesive intestinal obstruction. These patients underwent repeated laparotomies (Clavien-Dindo class IIA). In 2 cases, the development of acute postoperative pancreatitis was noted, which was stopped by conservative therapy (Clavien-Dindo class II).

One patient died 13 days after surgery from pulmonary embolism (Clavien-Dindo class V).

In the group of patients with combined surgical operations for locally spread NRTs with resection of large blood vessels, 2 patients had femoral vein thrombosis in the early postoperative period, which required thrombectomy (Clavien-Dindo class IIIB). There were no fatal complications following angiosurgical operations.

Overall, 2 patients died after operations, so the mortality rate was 1.8 %.

The results of treatment of patients with primary non-organ tumors of the retroperitoneal space remain unsatisfactory, and the prognosis is not encouraging. This is due to several circumstances. In particular, the complexity of diagnosis, a pronounced tendency to relapse in the next one and a half to two years, compression or germination into adjacent organs, including spread to vital structures, which leads to serious, sometimes fatal complications, the severity and traumatism of surgical interventions, low sensitivity of the most frequent morphological

variants malignant NRTs tumors to standard drug and/or radiation therapy. The growth of the tumor into large blood vessels significantly complicates surgical intervention and is a negative prognostic factor [10].

Currently, there are four views on the problem of surgical treatment of NRTs with invasion into the main blood vessels: refusal to attempt to remove the tumor, partial removal of NRTs with the tumor site remaining on the vascular wall, resection of a large vessel without restoring the main blood flow and removal of NRT with resection and plasty of large blood vessels and restoration of proper blood flow [1]. We believe that the option with resection and plastic surgery of large vessels should be a priority. The first 2 options can be used only in extremely rare cases due to defects in preoperative diagnosis, the possibility of choosing the third option is also rare.

It should be noted however, that the possible tumor germination of large veins in all cases was determined before surgery, which required the use of a wide range of instrumental diagnostic methods, including X-ray endovascular method. It is necessary to note the effectiveness of endovascular techniques, in particular embolization of tumor blood vessels to reduce intraoperative blood loss.

CONCLUSIONS

Performing surgical operations with locally spread malignant non-organ retroperitoneal tumors requires a proper preoperative examination, determining the possible invasion of large blood vessels, technical readiness to perform angiosurgical interventions, as well as appropriate material support. Tumor invasion of large main blood vessels is not a contraindication for surgical treatment, however, performing an intervention on large vessels of the retroperitoneal space should be recommended only if the operation is an oncological radical one.

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Snezhko A. V. – wrote the paper, performed processing of the material, operations, assisting in operations;

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