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SIGNIFICANCE OF BRACHYTHERAPY TREATMENT IN ADVANCED CANCER OF TRANSVERSE COLON (CASE REPORT)

Introduction. ***Colorectal cancer, including cancer of the transverse colon, is known for its potential to metastasize to distant organs. Although the liver and lungs are common metastatic sites, metastasis to the vagina is rare and poses unique challenges for treatment.***

Methods. ***This case report details a rare instance of vaginal metastasis in a 58-year-old patient with advanced transverse colon adenocarcinoma. According to our experience, intracavitary brachytherapy of metastasis into the vagina is not effective, especially in cases of volumetric tumors.***

Results. ***As a rule, we use interstitial brachytherapy with an intracavitary applicator of maximal diameter. Over a 24-month follow-up period, there was no local recurrence or progression of the disease, along with improved quality of life for the patient.***

Conclusions. ***This case highlights the importance of personalized treatment approaches and underscores the need for further research to optimize brachytherapy protocols for the effective treatment of rare metastatic sites in colorectal cancer.***

Keywords: ***brachytherapy, transverse colon cancer, metastasis, intratissue irradiation.***

Introduction

For advanced colon cancer, a special approach is required, which involves doctors of different specializations in oncology. Radiation therapists working in the field of external beam radiation therapy and brachytherapy usually take an active part in treatment. The result of treatment usually depends on the well-coordinated work of the team. The main task of radiation therapists was to eliminate vaginal metastases using interstitial brachytherapy after combined treatment of a patient with transverse colon adenocarcinoma.

Methods

In 2020, a 58-year-old female patient was diagnosed with stage IIA transverse colon cancer, T3N0M0, adenocarcinoma G1. We obtained written informed consent from the

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patient to present this clinical case. She underwent a right-sided hemicolectomy combined with an atypical resection of the left liver lobe. A few months later, the disease progressed with secondary involvement of both ovaries and the iliac lymph nodes. She underwent further surgery: a type II panhysterectomy with selective lymph node dissection. Additionally, she received multiple courses of chemotherapy (8 courses with oxaliplatin and capecitabine and 6 courses with irinotecan).

In 2021, disease progression was again diagnosed, presenting as secondary involvement of the retroperitoneal and mesenteric lymph nodes, along with the discovery of a metastasis in the vagina. Surgical intervention was performed, including retroperitoneal lymph node dissection, followed by 6 courses of chemotherapy (leucovorin, irinotecan, 5-FU), and combined radiation therapy. 39,6 Gy (2.2 Gy*18 fractions) to pelvis with concomitant intracavitary brachytherapy 7 Gy*4, total dose 28 Gy with normalization 5 mm from mucosa was delivered (Kwon et al., 2020).

In three months, volumetric lesion in vagina right wall was confirmed at CT scans and visually. Intratissue brachytherapy with rigid needles was decided to use. Dose distribution and needle location is shown at the Fig. 1. Needle insertion was done by freehand under anesthesia. Doses amounted to 30 Gy (1 time per week, 10 Gy fraction). Treatment was carried out at Microselectron 30 channels on the base of CT scans (Marchal et al., 2006). The radiation reactions (burning and profuse discharge) observed were consistent with Grade 2 criteria according to the Common Terminology Criteria for Adverse Events (CTCAE). These reactions lasted one month approximately.



Fig. 1. Dose distribution and needles location in the first fraction

Results

Following the initial intratissue brachytherapy treatment, the patient's positive clinical outcomes were reflected in the three-month contrast-enhanced CT scans, which showed no pathological lesions and no signs of tumor recurrence in the vagina. This early response is indicative of the therapy's efficacy in targeting and controlling localized disease. Intratissue brachytherapy's ability to deliver precise, high-dose radiation directly to the tumor while minimizing exposure to adjacent healthy tissues is a significant advantage. This targeted approach not only enhances the effectiveness of the treatment but also reduces potential side effects, thereby improving the patient's overall quality of life.

Long-term follow-up at the two-year mark further affirms the success of the intratissue brachytherapy approach. The sustained absence of disease progression over this period demonstrates the durability and effectiveness of the treatment in managing vaginal metastases. This extended period of disease control is particularly noteworthy, as it underscores the potential for intratissue brachytherapy to provide long-lasting results compared to more traditional treatment methods. The reduced likelihood of disease recurrence or progression suggests that this technique could be a viable option for patients requiring localized treatment with minimal systemic impact.

Furthermore, the observed benefits of intratissue brachytherapy extend beyond disease control to include significant improvements in patient well-being. The precision of the treatment not only ensures targeted tumor destruction but also minimizes damage to surrounding healthy tissues, leading to fewer complications and a better quality of life. This favorable outcome highlights the technique's potential for broader application in managing similar conditions. The promising results from this case advocate for continued research and consideration of intratissue brachytherapy as a preferred modality for localized tumor management, potentially offering improved patient outcomes and enhanced therapeutic efficacy.

Dicussion and conclusions

This case underscores the importance of brachytherapy in achieving local control in patients at advanced stages of cancer, supporting a multidisciplinary approach to cancer treatment. Intratissue brachytherapy proves to be an effective method for managing vaginal metastases in colorectal cancer patients, as evidenced by successful disease control and absence of progression during a two-year follow-up period.

In addition to the positive clinical outcomes, the patient experienced minimal side effects during the course of treatment. The precision of intratissue brachytherapy, particularly with the use of rigid needles, allowed for targeted radiation delivery that spared healthy surrounding tissues, reducing the likelihood of severe radiation-induced complications. The management of any mild side effects, such as temporary local irritation, was effectively handled through supportive care, ensuring the patient's comfort throughout the treatment period.

Furthermore, this case highlights the potential of intratissue brachytherapy as a valuable component in the multidisciplinary management of complex oncological cases. By integrating this approach with other treatments, such as surgery and

systemic therapies, we were able to achieve a high level of disease control. This underscores the importance of ongoing research and clinical trials to further refine intratissue brachytherapy techniques and establish standardized protocols that can be widely adopted in clinical practice, ultimately improving outcomes for patients with advanced or recurrent cancers.

Authors' contribution: Hanna Fedorenko and Serhiy Romanenko – conceptualization; Oksana Kozak – methodology, writing-review and editing, visualization; Hanna Fedorenko – software, formal analysis, writing-original draft preparation; Lyidmila Romanenko, Serhiy Romanenko and Oksana Kozak – validation; Serhiy Romanenko – investigation, supervision, funding acquisition; Lyudmyla Romanenko – resources; Oksana Rodak – data curation; project administration.

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ЗНАЧЕННЯ БРАХІТЕРАПІЇ В ЛІКУВАННІ ПОШИРЕНОГО РАКУ ПОПЕРЕЧНО-ОБОДОВОЇ КИШКИ (КЛІНІЧНИЙ ВИПАДОК)

Вступ. ***Колоректальний рак відомий своєю здатністю метастазувати у віддалені органи. Але метастази у вагіну зустрічаються досить рідко, тому це створює певні виклики для визначення тактики лікування. Хочемо показати наш***

успішний досвід використання внутрішньотканинної брахітерапії для елімінації вагінальних метастазів колоректальної аденокарциноми.

Методи. ***Унікальність описаного випадку в застосуванні цього методу лікування після проведеного курсу дистанційної променевої терапії на малий таз і внутрішньопорожнинної брахітерапії (через 3 місяці КТ-дослідження і гінекологічний огляд підтвердили наявність об'ємного ураження правої стінки вагіни).***

Результати. ***Було прийнято рішення застосувати жорсткі голки. Сумарна вогнище-доза становила 30,0 Гр, разова – 10,0 Гр. Обстеження через 3 місяці підтвердили повну регресію утворення. Контрольне КТ-дослідження, фізикальний огляд через 2 роки показали відсутність ознак продовження хвороби.***

Висновки. ***Описаний випадок вказує на важливість персоналізованого підходу до кожного пацієнта, а також значення брахітерапії для локального контролю поширених форм колоректального раку. Внутрішньотканинна брахітерапія має велику перевагу над внутрішньопорожнинною брахітерапією, особливо за наявності об'ємних новоутворень. Тому важливо продовжувати розробку протоколів та проведення подальших досліджень у сфері внутрішньотканинної брахітерапії для покращення результатів лікування і використання максимального потенціалу цього методу лікування.***

Ключові слова: ***брахітерапія, рак поперечно-ободової кишки, вагінальні метастази.***

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