

A case of myocardial metastasis of bladder cancer

Shatov D.V., Grigoriev P.E., Shalanin V.V.

*V.I. Vernadsky Crimean Federal University
4, Vernadsky Av., Simferopol, 295007, Russian Federation*

ABSTRACT

The case of metastatic heart damage manifesting by a clinical picture of acute myocardial infarction in a patient with urothelial carcinoma of the urinary bladder is described. A 69-year old patient was admitted with the symptoms of acute myocardial infarction from the neurological department, where he was hospitalized due to a space-occupying lesion of the right hemisphere of the brain, which manifested in a convulsive episode with the development of left-sided spastic hemiparesis. After coronary angiography, percutaneous coronary intervention was performed for the lesions of the anterior interventricular branch of the left coronary artery. Despite the complex of the therapeutic measures, the patient died. A pathological study revealed urothelial carcinoma of the bladder with distant metastases to the brain and myocardium. This clinical case demonstrates the situation of intravital diagnosis of metastatic myocardial lesions, which requires a determination of the treatment approach in the described category of patients.

Key words: urothelial carcinoma of the bladder, metastases, metastatic heart damage, metastatic brain damage, myocardial infarction, heart lesion.

Conflict of interest. The authors declare the absence of obvious and potential conflicts of interest related to the publication of this article.

Source of financing. The authors state that there is no funding for the study.

For citation: Shatov D.V., Grigoriev P.E., Shalanin V.V. A case of myocardial metastasis of bladder cancer. *Bulletin of Siberian Medicine*. 2020; 19 (4): 241–246. <https://doi.org/10.20538/1682-0363-2020-4-241-246>.

Случай метастазирования рака мочевого пузыря в миокард

Шатов Д.В., Григорьев П.Е., Шаланин В.В.

*Крымский федеральный университет имени В.И. Вернадского
Россия, 295007, Республика Крым, г. Симферополь, пр. Вернадского, 4*

РЕЗЮМЕ

Представленный клинический случай метастатического поражения сердца у пациента проявился клиникой острого инфаркта миокарда при уротелиальной карциноме мочевого пузыря. Пациент 69 лет поступил с клиникой острого инфаркта миокарда из неврологического отделения, где находился по поводу объемного образования правого полушария головного мозга, манифестировавшего судорожным эпизодом с развитием левостороннего спастического гемипареза.

После проведения коронарографии было выполнено чрескожное коронарное вмешательство по поводу поражений передней межжелудочковой ветви левой коронарной артерии. Несмотря на проведенный комплекс лечебных мероприятий, пациент скончался. При патологоанатомическом исследовании обнаружена уротелиальная карцинома мочевого пузыря с отдаленными метастазами в головной мозг и

✉ Shatov Dmitrii V., e-mail: dmitrii_shatov@mail.ru.

миокард. Клинический случай демонстрирует ситуацию прижизненной диагностики метастатических поражений миокарда, которая требует определения лечебного подхода у описанной категории пациентов.

Ключевые слова: уротелиальный рак мочевого пузыря, метастазы, метастазирование в сердце, метастазирование в головной мозг, инфаркт миокарда, поражение сердца.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии финансирования.

Для цитирования: Шатов Д.В., Григорьев П.Е., Шаланин В.В. Случай метастазирования рака мочевого пузыря в миокард. *Бюллетень сибирской медицины*. 2020; 19 (4): 241–246. <https://doi.org/10.20538/1682-0363-2020-4-241-246>.

INTRODUCTION

Metastasis of urothelial bladder cancer (UBC) in the heart is a rare and dangerous case in clinical practice. To date, only 5 descriptions of UBC-metastasis in the heart have been discovered [1–5]; another 9 cases of metastases of the urogenital cancer (UC) in the heart with primary localization of the tumor in the urinary bladder (UB) were described in the article [6]. The clinical manifestations in such patients consist of impaired conduction, progression of heart failure due to obstruction of the exit tract of the right ventricle, effusion pericarditis with symptoms of pericardial tamponade and embolism of the pulmonary artery. In most of the cases described, patients lived (with rare exceptions) for no more than 1 month from the moment of verification and receiving medication, although in some cases pericardiocentesis, cytoreductive surgery and implantation of artificial pacemaker were performed. The cases described in the literature, as a rule, had other distant metastases; however, among them there were no patients with metastasis to the brain, which is why the case described in our article is relevant and significant.

The aim of the research was to describe the clinical case of metastasis of bladder cancer in the myocardium, taking into account the manifestation of the disease with neurological symptoms, which has not been previously described.

CLINICAL CASE

A 69-year old patient was admitted to the cardiology department with intensive care units of the N.A. Semashko Republican Clinical Hospital with complaints of intense burning pains behind the sternum, which suddenly appeared 3 hours previous, dyspnea, general weakness, and sweating.

Prior to this, he was admitted to another medical institution with a diagnosis of the space-occupying lesion of the right hemisphere of the brain, a convulsive episode, and left-sided spastic hemiparesis. Computed tomography revealed the presence of extraaxial space-occupying formation adjacent to the parietal bone, measuring 4.5×3.0×7.0 cm, with density of 40–45 HU, accumulating contrast medium up to 80 HU, and mass effect with deformation of the right ventricle and surrounding structures. Decrease in the density of the brain substance to 18 HU was found perifocally (Fig. 1).

Over the past three days the patient was suffering from short-term episodes of sternal pain, which stopped on their own. On the day of admission, a prolonged pain attack occurred with the development of ST-segment elevation in I, II, III, aVL, V₂–V₆. Taking into account the contraindications for thrombolytic therapy, he was sent to the cardiology department for emergency coronary angiography and to determine the further treatment measures.

The general condition at admission was regarded as severe. Consciousness was clear. The skin was pale pink, dry, warm. The legs were pasty. The apical beat was in the 5th intercostal space. The boundaries of relative cardiac dullness were extended leftwards to the midclavicular line. The heart sounds were dull, regular. Blood pressure was 90/60 mm Hg, heart rate is 90 per minute. Respiratory rate was 18 per minute. Breathing during auscultation was rough, weakened in the lower parts on the right; at the same place crepitation was heard. The abdomen was painful in the lower sections. There were no signs of peritoneal irritation. The lower margin of the liver was located at the level of the costal arch and was painless. On electrocardiography the elevation of ST-segments in I, II, III, aVL, V₂–V₆ was found (Fig. 2).

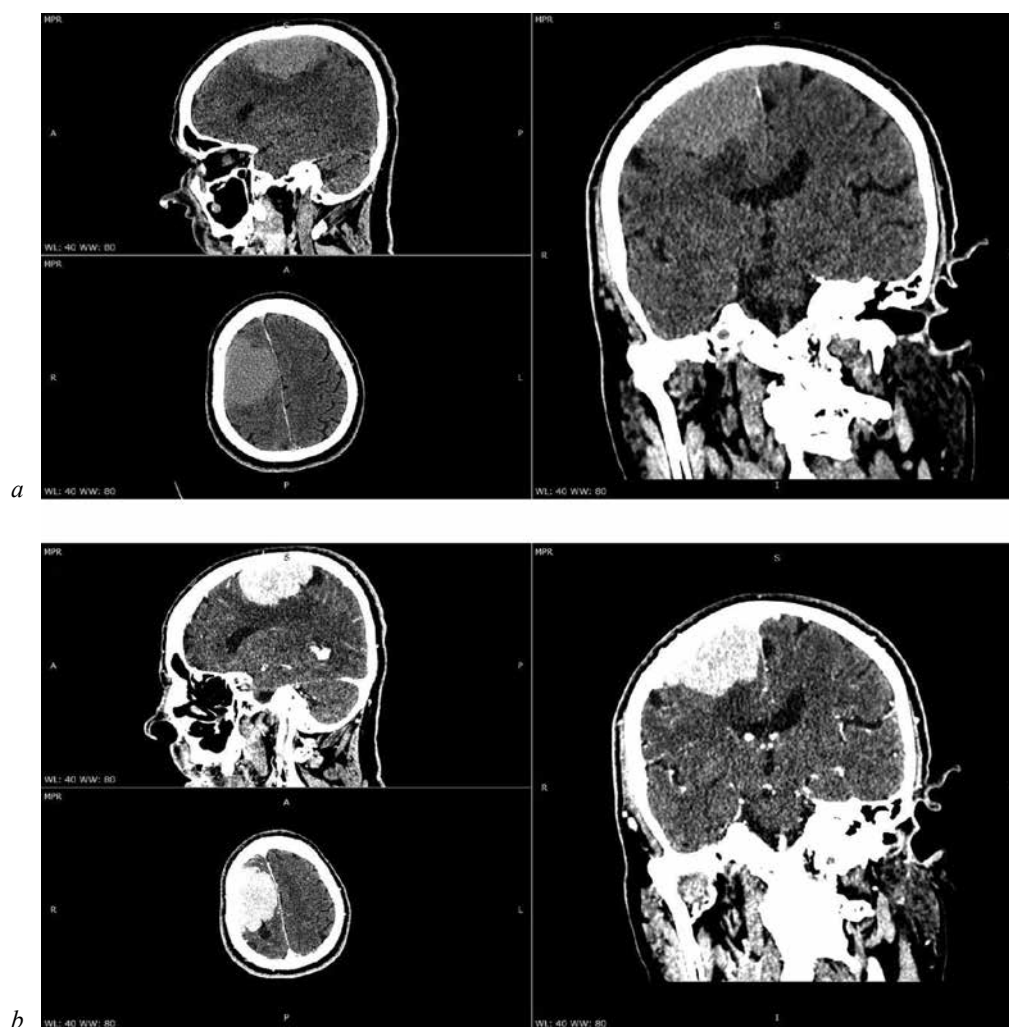


Fig. 1. Computed tomography of the patient's brain: *a* – without contrast enhancement; *b* – with contrast enhancement

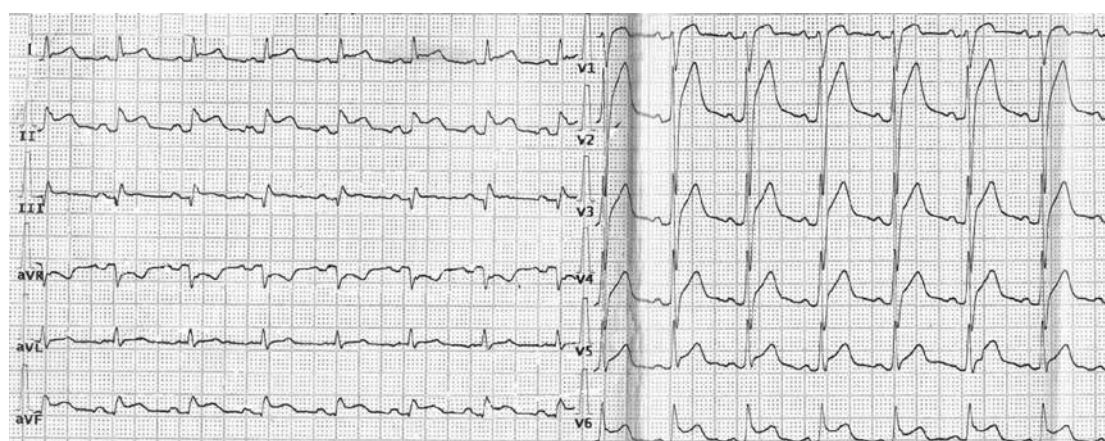


Fig. 2. Electrocardiogram of the patient during admission: speed 25 mm/s; voltage 10 mm

The following diagnose was made: CHD, circular myocardial infarction with ST-segment elevation, atherosclerosis of the coronary arteries, Killip II.

Complete blood count: hemoconcentration (hemoglobin 169 g/L, hematocrit 47%), leukocytosis up to

$22.4 \times 10^9/L$ due to neutrophils (metamyelocytes 3%, stabs 42%, segmented 39%, toxigenic granularity of neutrophils – 50%). In the biochemical analysis of blood: urea – $17.7 \mu\text{mol/L}$, creatinine – $126 \mu\text{mol/L}$, total protein – 49 g/L, albumin – 28.9 g/L, potassium –

3.97 mmol/L, sodium – 124,7 mmol/L, cholesterol – 2.71 mmol/L, triglycerides – 2.27 mmol/L, HDL – 0.62 mmol/L, LDL – 1.42 mmol/L, LDH – 866 units/L, creatine kinase – 727 units/L. Coagulogram: PTI – 69.8%, INR – 1.44, fibrinogen A – 4.53 g/L, APTT – 31.7 sec., thrombin time – 20.1 sec.

30 minutes after admission, emergency coronarography was performed; it revealed atherosclerosis of the coronary arteries, the right type of coronary circulation. Stenosis of the orifice of the anterior inter-

ventricular branch (AIB) is about 50%, stenosis of the proximal third of the AIB is more than 70% with angiographic signs of instability, the intramural course of the distal third of the AIB in systole is more than 50%, stenosis of the proximal and middle thirds of the right coronary artery is about 40%. According to the results of coronarography, pre-dilatation, stenting and post-dilatation of stenosis of the proximal third of the AIB with good angiographic result were performed. The ECG after the intervention is shown in Fig. 3.

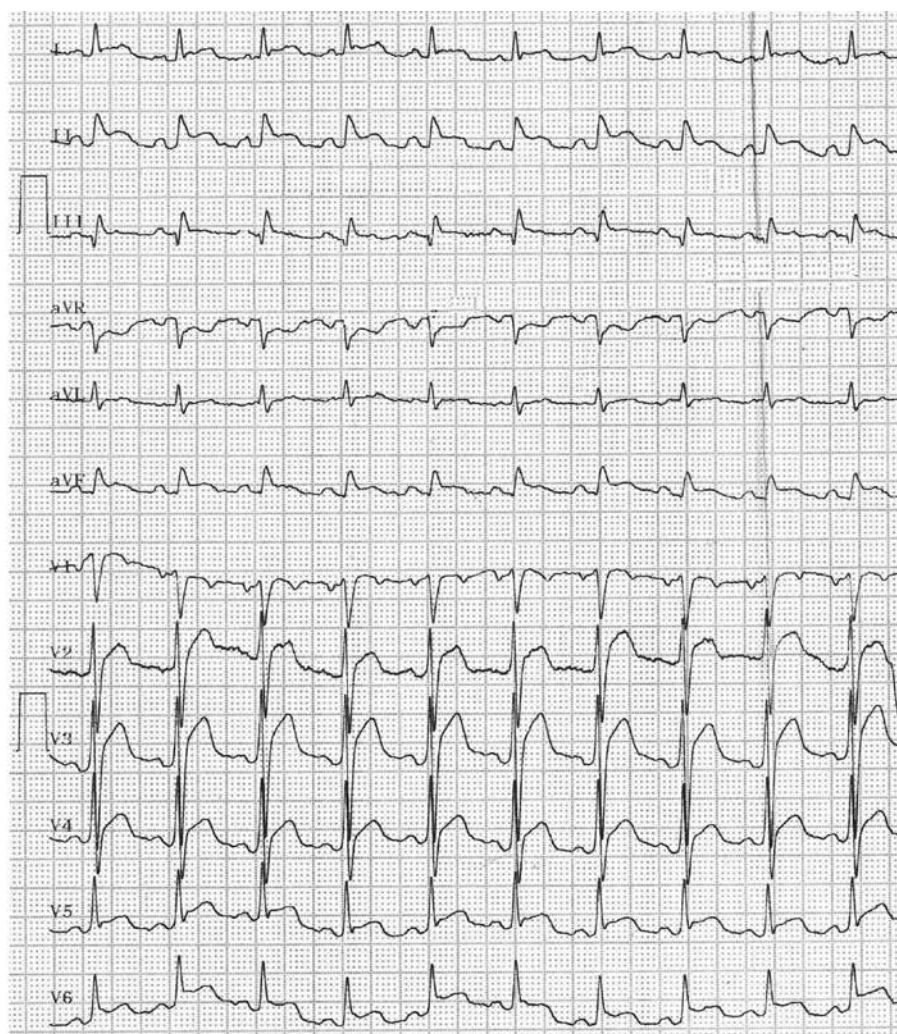


Fig. 3. Electrocardiogram of the patient after pre-dilatation, stenting and post-dilatation of stenosis of the proximal third of the AIB: speed; 25 mm/s.; voltage 10 mm

In the postoperative period, a chest X-ray and echocardiography were performed: aortic diameter in the ascending part is 4.6 cm, at the root – 3.5 cm, opening of the aortic valve cusps – 1.8 cm, the chambers are not enlarged, left ventricular wall hypertrophy is present (posterior wall – 1.3 cm, interventricular septum – 1.4 cm), ejection fraction – 54%, anteroposte-

rior shortening – 22%, stroke volume – 29 ml, mitral and tricuspid insufficiency of the 1st degree are present. Disturbances of segmental contractility were not reliably detected due to tachycardia (heart rate – 140 per minute). Separation of pericardial layers along the contour of the left ventricle is 12 mm, along the contour of the right ventricle – 14 mm.

In the postoperative period, the symptoms of heart failure continued to progress, despite the ongoing therapy. 12 hours after the intervention, the patient died.

The autopsy revealed urothelial bladder cancer G2 ($T_3N_3M_1$) with metastases to the brain, heart, liver, kidneys, lungs, paraaortic lymph nodes, pelvic lymph nodes, pericardial carcinomatosis complicated with fibrinous-purulent pericarditis. In the brain, edema of the pia mater, severe dystrophy of glial cells, rarification fields, severe perivascular, pericellular edema, numerous metastases in the vessels of the pia mater and brain tissue, and plethora of the vessels were observed (Fig. 4). In the heart: the epicardium is thickened and edematous, with severe leukocyte infiltration and accumulations of fibrin, perivascular metastases; the muscular fibers are moderately hypertrophied and have a coiled course; dystrophy of myocardiocytes, focal fragmentation of muscle fibers; in the parenchyma – extensive areas of metastatic growth; around them – edema of the stroma of cardiomyocytes, signs of karyolysis and karyopyknosis; oxyphilia of the cytoplasm, focal swelling and clumpy decomposition of muscle fibers; loose leukocyte intermuscular infiltration, spasm of part of arterioles with reorientation of the endothelium, focal pronounced hyperemia, especially in the subendocardial vessels; signs of small focal perivascular intermuscular sclerosis; the walls of the vessels of the heart are unevenly thickened, dissociated, fibrous, sclerotic, the vessels are full-blooded (Fig. 5,6). In the urinary bladder: infiltrating growth of urothelial cancer G2 with the invasion of all layers of the wall.

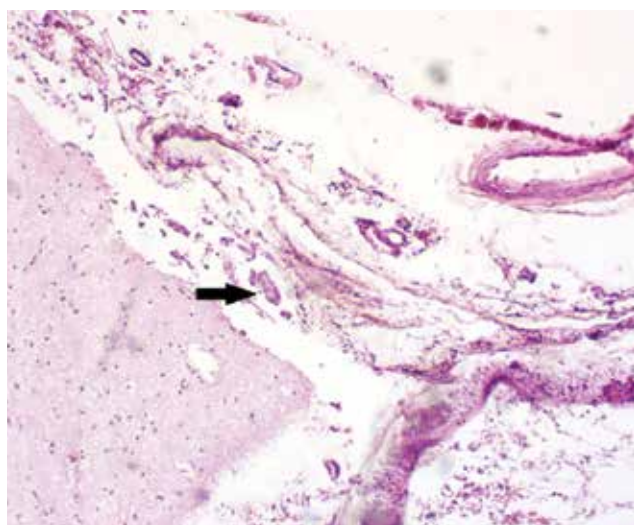


Fig. 4. Metastasis of urothelial bladder cancer in the brain (arrow); Hematoxylin and eosin stain $\times 100$

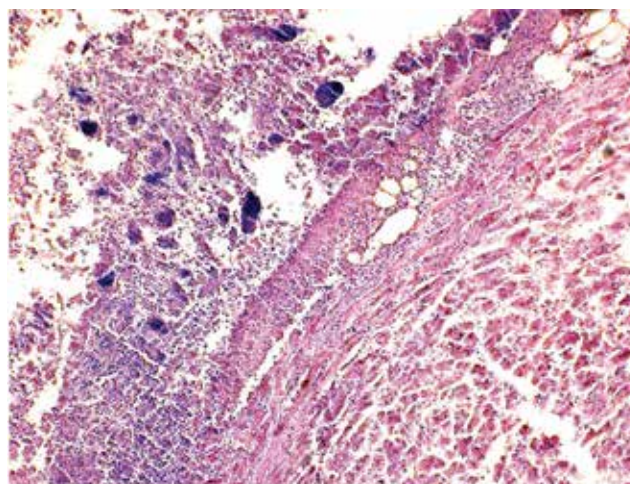


Fig. 5. A fragment of the patient's epicardium and pericardium. Hematoxylin and eosin stain; $\times 100$

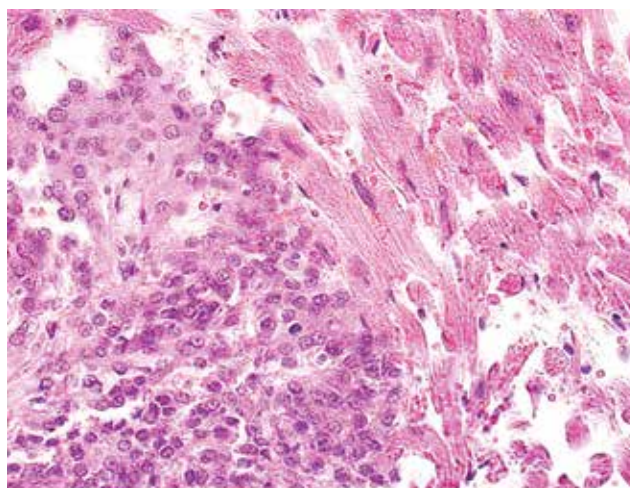


Fig. 6. Metastasis of urothelial bladder cancer (on the left) to the myocardium (on the right); hematoxylin and eosin stain $\times 100$

DISCUSSION

The described clinical case is unique in the manifestation of UBC with a convulsive seizure and focal right hemisphere symptoms. Against the background of the progression of the disease in the form of the development of severe protein-energy insufficiency and the leukemoid reaction, the patient developed a clinical picture of acute circular myocardial infarction with ST-segment elevation, which required surgical intervention. Among the previously described cases, in one case under the metastasis being found in the myocardium, a two-chamber stimulator for resynchronization therapy was implanted, and 17 months after the manifestation of metastasis against the background of pains of ischemic genesis the patient died

during the consideration of palliative stenting of the branch involved in metastasis [1].

The given clinical case raises the question about the extents of invasive care for patients with distant heart metastases, which requires an individual approach to avoid the exposing of the patients to unnecessary suffering.

REFERENCES

1. Arscott W.T., Lal P., Mamtani R., O'Quinn R., Deo R., Jones J. Long-term survival after treating cardiac metastasis with radiation and immune therapy: a case report. *Cureus*. 2018; 10 (5): e2607. DOI: 10.7759/cureus.2607.
2. Schreiner M., Schneider B., Pauls S. Cardiac metastasis of a recurrent urothelial carcinoma of the bladder. *Rofo*. 2015; 187 (12): 1124–1126. (in German). DOI: 10.1055/s-0041-104181.
3. Yamac A.H., Insanic D., Bockmeyer C. Cardiac metastasis from a urothelial cell carcinoma: a commented case report. *Cardiovasc. Pathol.* 2014; 23 (3): 178–180. DOI: 10.1016/j.carpath.2014.01.005.
4. Blagova O.V., Aliyeva I.N., Bezrukov E.A., Ippolitov L.I., Polunin G.V., Kogan E.A., Sedov V.V., Merzhina E.A., Sinityn V.E., Sarkisova N.D., Nedostup A.V., Fomin V.V. Acute decompensation of hypertensive heart disease in a patient with malignant urinary bladder paraganglioma: stages of diagnostics and treatment. *Rational Pharmacotherapy in Cardiology*. 2018; 14 (3): 370–378 (in Russ.). DOI: 10.20996/18196446-2018-14-3-370-378.
5. Kukharchik G.A., Dikarev K.V., Minkin S.R., Sorokin L.A., Koval I.N. A rare case of metastatic tumor of heart from bladder cancer. *Kardiologiia*. 2017; 57 (S1): 367–372 (in Russ.). DOI: 10.18087/cardio.2394.
6. Ueda N., Kawamura M., Nakazawa S., Hirai T., Kishikawa H., Nishimura K., Morimoto K. Complete atrioventricular block due to cardiac metastasis from bladder cancer: case report. *Hinyokika Kyo*. 2014; 60 (10): 501–506.

Authors information

Shatov Dmitrii V., Cand. Sci. (Med.), Associate Professor, Department of Medicine of Emergency Conditions and Anesthesiology, Medical Academy n.a. S.I. Georgievsky, V.I. Vernadsky Crimean Federal University, Simferopol, Russian Federation. ORCID 0000-0003-2248-5400.

Grigoriev Pavel E., Dr. Sci. (Biology), Associate Professor, Professor, Department of Condensed Matter Physics, Physical Methods and Information Technology in Medicine, Physical and Technical Institute, V.I. Vernadsky Crimean Federal University, Simferopol, Russian Federation. ORCID 0000-0001-7390-9109.

Shalanin Valeriy V., Cand. Sci. (Med.), Associate Professor, Department of Pathological Anatomy with the Course of Dissection, Medical Academy n.a. S.I. Georgievsky, V.I. Vernadsky Crimean Federal University, Simferopol, Russian Federation. ORCID 0000-0001-5380-2048.

(✉) **Shatov Dmitrii V.**, e-mail: dmitrii_shatov@mail.ru.

Received 23.02.2020

Accepted 29.09.2020