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Peculiarities of Tactics of Surgical Treatment of Primary Benign Heart Tumours

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Abstract. The frequency of diagnosing primary heart tumours (PHT), of which more than 80% are morphologically benign tumours, ranges from 0.09% to 1.9% of the total number of hospitalized patients. In the structure of cardiac neoplasms, myxomas constitute 80-90% of benign heart tumours.
The objective of the study is to determine the peculiarities of tactics of diagnosis and surgical treatment of primary heart tumours.
Material and methods. 939 patients underwent surgical interventions for primary cardiac tumours in National Amosov Institute of Cardiovascular Surgery of the National Academy of Medical Sciences of Ukraine for the period from January 1, 1969 to January 1, 2019. Cardiac myxomas (CM) were diagnosed in 838 (89.2%) patients, of which left atrial (LA) CM – in 738 (88.1%) cases. The right atrial (RA) myxomas were diagnosed in 73 (8.7%) cases, left ventricular (LV) and right ventricular (RV) CM – in 8 (1.0%) cases, respectively. Multicentric tumour growth with damage to two or three cardiac chambers was found in 11 (1.3%) patients. The age of patients with CM was from 3 to 78 years (on average 47.5 ± 3.4), the age of 608 (72.5%) patients ranged from 31 to 60 years. Non-myxomic benign tumours were observed in 35 (3.7%) cases, malignant tumours – in 66 (7.0%) cases.
Results and discussion. 304 (36.3%) and 71 (8.5%) patients had NYHA classes III and IV, respectively, which often required urgent surgical treatment in these groups. Hospital mortality over the past 18 years was 0% in CM surgical treatment, namely, 475 operations were performed without lethal outcomes.
Conclusions. The accepted tactics of urgent diagnosis and surgical intervention ensure the efficacy of cardiac myxoma treatment, as evidenced by long-term findings: 626 (78.4%) patients had NYHA class I, 118 (14.6%) patients had NYHA class II respectively. 20-year survival rate was observed in 79.8% cases.
Keywords: *myxomas, benign heart tumours, surgical treatment.*

Primary heart tumours (PHT) are manifested by a diverse clinical picture that mimics other diseases of the heart. In the structure of cardiac neoplasms, myxomas

constitute 80-90% of benign heart tumours. The frequency of diagnosing primary heart tumours (PHT), of which more than 80% are morphologically benign tumours, ranges from 0.09% to 1.9% of the total number of hospitalized patients [1, 2]. Clinical manifestations are observed mainly at the later stages of the disease, moreover, without surgery, the prognosis for this pathology remains unfavourable. The issues of diagnosing heart tumours and their adequate, often urgent surgical treatment remain relevant [3-5].

The **objective** is to determine the peculiarities of tactics of diagnosis and surgical treatment of primary heart tumours.

Materials and methods

939 patients with morphologically verified primary heart tumours were observed in National Amosov Institute of Cardiovascular Surgery of the National Academy of Medical Sciences of Ukraine from January 1, 1969 to January 1, 2019. Malignant tumours were reported in 66 (7.0%) cases. Non-myxomic benign heart tumours (NBHT) were observed in 35 (3.7%) cases. Rhabdomyomas accounted for 8 (22.9%) cases, hemangiomas were detected 8 (22.9%) cases, papillary fibroelastomas – in 9 (25.7%) cases, lipomas were detected in 2 cases (5.7%), fibromas – in 4 (11.4%) cases, leiomyofibromas – in 3 (8.6%) cases and immature teratoma – in 1 (2.9%) case. Patients' age ranged from 1 day to 67 years (mean 34.5 ± 4.3 years).

Cardiac myxomas (CM) were diagnosed in 838 (89.2%) patients, of which left atrial (LA) CM — in 738 (88.1%) cases. The right atrial (RA) myxomas were diagnosed in 73 (8.7%) cases, left ventricular (LV) and right ventricular (RV) CM – in 8 (1.0%) cases, respectively. Multicentric tumour growth with damage to two or three cardiac chambers was found in 11 (1.4%) patients. The age of patients with CM was from 3 to 78 years (on average 47.5± 3.4), the age of 608 (72.5%) patients ranged from 31 to 60 years.

Results and Discussion

The observations show an increase in the frequency of registered patients with CM in National Amosov Institute of Cardiovascular Surgery of the National Academy of Medical Sciences of Ukraine: for the period from 1969 to 1990, the number of patients with CM was equal to 160 (19.1%), and for the period from 1991 to 2019 – 778 (80.9%), which is due both to the widespread introduction of heart ultrasound in diagnosing and a probable increase in the frequency of this disease.

Congestive heart failure was the main clinical manifestation of the disease, which is explained by partial obstruction of valve orifices by the tumour with the subsequent development of hemodynamic disorders in the respective heart chambers, which was detected in 775 (92.5%) patients with CM. 304 (36.3%) and 71 (8.5%) patients had NYHA classes III and IV, respectively, which often required urgent surgical treatment in these groups. The diameter of the CM base was from

0.5 to 7.5 cm. In 724 (86.4%) cases, the interatrial septum (IAS) was the predominant place of CM fixation.

Important CM clinical symptoms included dizziness and fainting attacks, which were observed in 181 (21.6%) patients. In 118 (14.1%) patients, the onset of these symptoms was associated with a specific position of the body, which was characteristic of atrial localization of tumours and was not observed in cases of CM ventricular localization.

Such a severe complication of the clinical course of the disease as embolic syndrome was observed in patients with CM in 45 (5.4%) cases, and moreover with sinus rhythm. In these patients, cerebral vascular embolism occurred in 36 (4.3%) cases, of which 9 (1.1%) were multiple. 9 (1.1%) patients experienced embolism of vessels of other organs – vessels of kidneys, lower and upper extremities. Cardiac pain was reported in 313 (37.4%) patients with various CM locations. Most often, the pain was manifested as a feeling of heaviness in the chest, of non-anginal nature. In 732 (87.4%) cases, the duration of symptoms did not exceed 1 year before surgery. Manifestations of circulatory failure in CM (shortness of breath, palpitations, dizziness, fainting) were of varying degrees - depending on the position of the patient's body in 227 (27.1%) observations.

Auscultation in patients with CM demonstrated murmurs similar to those in rheumatic heart disease. The variability of auscultatory manifestations upon stable sinus rhythm with time and with the change in the position of the patient's body was determining that is caused by displacement of a tumour in relation to the heart valves, and was reported in 161 (19.2%) patients. Various rhythm disturbances, as clinical CM manifestations, were reported in 249 (29.8%) patients. It should be noted that in 188 (22.4%) patients they were represented by stable (117 cases (13.9%)) or paroxysmal (71 (8.5%) cases) with tachyarrhythmia in combination with extrasystole.

General weakness, rapid fatigue and malaise in 525 (62.7%) patients, subfebrile condition in 473 (56.4%) cases were defined as clinical CM manifestations; arthralgia and myalgia – in 262 (31.2%), weight loss – in 325 (38.8%) patients were regarded as a general response to the tumour.

Echocardiography is the main diagnostic method in the complex diagnosis of PHT. Of 838 patients with CM, 795 (94.9%) underwent echocardiography since 1984. In this cohort, in 542 (68.2%) cases, the tumour was visualized as a porous space-occupying lesion of a heterogeneous nature and with fuzzy uneven contours that varied during movement. In the other 253 (31.8%) cases, a space-occupying lesion of a homogeneous nature with clear even contours was visualized. In 59 (7.4%) cases, calcium inclusions were detected in the form of intense echo signals of different localization. The CM base was detected in 648 (81.5%) patients: in 504 (63.4%) cases, the site of tumour attachment was determined at the site of the IAS.

Severe clinical manifestations present during transportation and placement of patients on the operating table and associated with the obstruction of the valve orifices in preparation for surgery, occurred in 48 (5.8%) patients with CM. In such

cases, it was considered appropriate to put patients in a semi-sitting posture with a right-hand turn at the beginning of surgery.

All but 15 (1.8%) surgeries performed at the early stage of CM surgery and one surgery with a right-sided mini-thoracotomy in 2015 were accessed via median sternotomy, which provided optimal conditions for removal of tumours of any localization. Various surgical approaches were used to remove LV CM and differed in a different frequency of neoplasm fragmentation upon their removal. The use of the left atrial access in 128 (15.3%) cases of LV CM was accompanied with CM fragmentation in 49 (38.1%) patients. A traditional access to LV CM through the right atrium (RA) and IAS proved to be the most convenient, with a reduced frequency of tumour fragmentation to 21.1% (136 patients per 638 operations). In 8 (1.0%) patients with LV CM, we were forced to use a combined access of the right atriotomy and septotomy with left atriotomy, which made it possible to safely end the operation. In 48 (5.7%) cases, when large (up to 8-12 cm) LV myxomas were detected, a trans double-atrial access was used, which allowed avoiding tumour fragmentation almost completely.

CM macroscopic examination showed that the tumours were villous in 484 (57.7%) cases and compact neoplasms of ovoid or round shape, with a shiny, smooth, sometimes humped surface were observed in 354 (42.3%) cases, respectively.

A concomitant pathology of the valvular heart apparatus with CM was detected in 69 (8.2%) patients. In 41 (4.9%) cases, there was an isolated lesion of the mitral valve (MV), in 25 (3.0%) – of the tricuspid valve (TV), in 2 (0.2%) cases – aortic valve lesions, in 1 case (0.1%) – combined lesions of the mitral and aortic valves. In this cohort of patients, mechanical damage to valve structures by a myxoma was detected in 28 (3.3%) patients. Other pathology of the valvular heart apparatus was represented by relative valve insufficiency due to significant expansion of the annulus fibrosis: of the tricuspidal annulus – in 24 (2.9%) and of the mitral annulus – in 16 (1.9%) cases. Involvement of the valvular heart apparatus in the tumour process was observed in 8 (1.0%) patients. In this case, 1 (0.1%) patient had a RV myxoma attached to TV papillary muscles and chords, and in 7 (0.9%) cases, LV myxoma affected the anterior mitral valve leaflet. Surgical correction of valve lesions was performed in 68 (8.1%) patients: 14 (1.7%) patients underwent valve replacement (11 – MV, 1 – TV, 1 – AV, 1 – AV + MV), in 44 (5,3%) cases restorative operations with a positive functional effect were performed.

Hospital mortality over the past 18 years was 0% in CM surgical treatment, namely, 475 operations were performed without lethal outcomes. However, it should be noted that before 2000, at the time of the development of CM surgical treatment tactics, hospital mortality was 4.6% (39 cases). Neurological complications were the cause of lethal outcomes in 16 (46.2%) patients; material embolism – in 7 (17.9%) cases, myocardial infarction – in 3 (7.7%) cases; septic complications – in 1 (2.6%) case; operation errors – in 5 (12.9%) cases.

In the remote period, the results of CM surgical treatment in 718 patients (89.6% of the patients discharged) were studied in the period from 6 months to 47 years (on average 19.5 ± 4.2 years). 20-year survival rate was observed 79.7%. In the remote period, 626 (78.4%) patients had NYHA class I, 118 (14.6%) patients had NYHA class II respectively. CM recurrence was detected in 17 (2.1%) patients 2 to 12 years (on average 3.5 ± 0.4 years) after primary surgery. Thus myxomic syndrome was reported in 4 cases of CM relapse (23.5%).

In surgical treatment of NBHT, hospital mortality was 2.9% (1 case). Two patients died in the remote period, no disease recurrence in the first years after surgery was detected.

Conclusions

Over the past 18 years, 475 non-lethal CM surgeries have been performed, thanks to the peculiarities of urgent diagnosis and surgical treatment, which reduces the frequency of preoperative complications and ensures the safety and radicality of removal of heart tumours.

The accepted tactics ensures the efficacy of cardiac myxoma treatment, as evidenced by long-term findings: 626 (78.4%) patients had NYHA class I, 118 (14.6%) patients had NYHA class II respectively. 20-year survival rate was observed in 79.7% cases.

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