Cardiac myxoma: 10 years' experience in 29 patients operated on with crystalloid cardioplegia – short- and long-term results

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Abstract

Background: Cardiac myxoma is generally considered to be a surgical emergency. Cardiac myxomas were resected in 29 patients.

Material and methods: Patient data and data obtained during follow-up from the 10-year period 1999-2008 of the survivors were reviewed. The tumour was always removed within 24 hours of admission.

Results: Early survival was 100%. Long-term results were collected from a group of 27 patients and all of them were symptom-free. Most cases of cardiac myxoma observed over the last decade correspond to stable forms.

Conclusions: Myxoma is usually observed in the older and higher risk population, often at an early stage. Surgical excision of atrial myxoma gives excellent short-term and long-term results leading to an eventual cure of non-familial myxomas. However, familial myxomas retain a strong tendency to recur even 20 years after excision.

Key words: myxoma, cardiac surgery, crystalloid cardioplegia.

Streszczenie

Wstęp: Śluzaki są uważane za rozpoznanie wymagające pilnej operacji. Śluzaki serca zostały wycięte w grupie 29 osób.

Materiał i metody: Dane dotyczące pacjentów i uzyskane z 10-letniej obserwacji w latach 1999–2008 od żyjących pacjentów zostały przeanalizowane. Guzy były usuwane w ciągu 24 godz. od przyjęcia do szpitala.

Wyniki: Wczesna przeżywalność po operacji wynosiła 100%. Wyniki odległe uzyskano od 27 osób i wszystkie pozostawały asymptomatyczne. Większość śluzaków obserwowanych w badanym okresie okazała się formami stabilnymi.

Wnioski: Śluzaki są zwykle obserwowane w grupie osób starszych i bardziej obarczonych innymi czynnikami ryzyka, zazwyczaj na wczesnym etapie choroby. Chirurgiczne wycięcie daje dobre wyniki wczesne i odległe, prowadząc do zupełnego wyleczenia nierodzinnie występujących śluzaków. Jednakże śluzaki występujące rodzinnie mają tendencję do wznowy nawet po 20 latach od wycięcia.

Słowa kluczowe: śluzaki , kardiochirurgia, kardioplegia krystaliczna.

Primary cardiac tumours are uncommon and represent only 5% to 10% of all heart and pericardium neoplasms [1]. Approximately 85% of primary cardiac tumours are benign. Half of them are myxomas [1, 2]. Up to 80% of myxomas are localized in the left atrium; in 75% of cases they involve the interatrial septum; 7–20% are found in the right atrium; up to 10% are either biatrial, in the right ventricle, or in the left ventricle [1–3]. Diagnosis has been easier and less hazardous than in other cases thanks to two-dimensional echocardiography. Cardiac surgery enables a potential for cure. Early detection, improved anaesthesia and surgical techniques have made excision of cardiac myxomas possible with acceptable results. This report summarizes the last decade which is our 10-year clinical experience with intracardiac myxomas at the Department of Cardiac Surgery of Wrocław Medical University.

Material and methods

From August 1999 to June 2008, 29 patients with a cardiac myxoma were operated on in our unit. These operations comprised 0.23% of the 6,042 cardiac surgical procedures performed in this centre during that period. Eleven patients (37.9%) were male and 18 (62.1%) were female, and their median age was 57.2 years (range, 33 to 83 years) (Table I).

The clinical profile of the patients is summarized in Table II.

The duration of symptoms ranged from 2 to 8 months. Thirteen patients (44.8%) were in New York Heart Association class II, 16 (51.2%) were in class III, and changing cardiac murmurs and early diastolic tumour "plop" were heard in only 6 patients (9.1%). Six patients with right atrial myxoma had tricuspid regurgitation, and 1 patient had tricuspid stenosis.

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Echocardiography was diagnostic in almost all the instances and showed the characteristic tumour appearance. In combination with intraoperative image, a full characterization of myxomas was obtained. All the patients but 7 had myxoma in the left atrium. Location of cardiac myxomas is presented in Table III.

One patient was found to have myxoma in the Koch triangle of the right atrium. Of the 24 left atrial myxomas, 17 (70.8%) arose from the fossa ovalis of the atrial septum, 2 (8.3%) from the lower portion of the atrial septum, 1 (4.2%) from the interatrial groove, 1 (4.2%) from the free wall, and 2 (8.3%) from the posterior wall of the left atrium. Histopathological examination of the embolectomy specimen revealed the diagnosis of atrial myxoma.

Operative findings and surgical technique

Standard cardiopulmonary bypass was established through median sternotomy via bicaval drainage and cardiac arrest was obtained under aortic cross-clamping and repeated antegrade clod crystalloid cardioplegia. As a rule of thumb, perfusion pressure for antegrade delivery was kept between 50 and 80 mm Hg. Volume around 1000 ml sufficed for adequate cardioplegic arrest. In patients after the arrest cardioplegia infusion was continued for 1 or 2 min. If the heart resumes electrical activity during the procedure or if a prolonged cross-clamp time is anticipated, additional doses of 200 to 500 ml of the cardioplegic solution are administered at intervals. Complete excision of the tumour with a cuff of interatrial septum was the basic principle of excision. All four cardiac chambers were thoroughly explored for additional myxomas. In 1 patient with a left atrial myxoma such exploration resulted in detection and excision of another myxoma inside the right atrial cavity attached to the lower part of the interatrial septum. In cases where the left atrial myxoma was attached to the posterior left atrial wall, it was excised with the involved portion of the left atrium, and the defect was repaired directly. The surgically created atrial septal defect was repaired directly in 2 patients (6.89%) and with a pericardial patch in 1 of them (3.5%). Seven patients with left atrial myxoma had rough and thickened mitral leaflets, and 2 other patients showed degenerative changes in the mitral valve, but only 5 of them had evidence of mild mitral regurgitation. Repair or replacement of the mitral valve was not necessary in these series. One patient needed coronary artery grafts to the right coronary artery (saphenous vein). All tumours were sent to the histopathology department and initial diagnosis was confirmed during that examination.

Tab. I. Age distribution among patients.

Age	No. of patients
30–40	1
41–50	3
51–60	13
61–70	7
71–80	2
81–90	1

Tab. II. Clinical profile of patients.

Symptoms	Percentage of patients (%)
Palpitation	60
Congestive heart failure	47
Embolic accidents to the central nervous system	15
Peripheral embolic accidents	7
Dyspnoea	55
Weight loss	12
Fatigue	30

Tab. III. Location of myxomas in the group.

Location of myxoma	No. of patients	%
Left atrium	21	72.5
Right atrium	7	24
Both	1	3.5

Short-term results

The 30-day survival rate during this 10-year period was 100%. Four patients required application of catecholamines during the first postoperative day at the intensive care unit. Most of the patients were discharged home after the operation. However, 8 of them (27%) were sent to the referring hospitals. All the patients were followed up on an outpatient basis at regular intervals. They underwent clinical examination, electrocardiography, and echocardiography. Transthoracic echocardiography was performed routinely prior to discharge and then subsequently during an outpatient visit which was made two months after discharge. There was no need to perform transoesophageal echocardiography. Most of the patients did not come to the outpatient clinic after completion of the first visit.

Long-term follow-up

The 10-year follow-up of our patients was reported in 2009, at which time there was no recurrence. No patients were lost to follow-up. Complete follow-up is available for 27 of the operative survivors. All the survivors were asked to undergo echocardiographic screening in our outpatient clinic and all but 3 were admitted to this investigation. Special emphasis was put on potential recurrence of tumour in heart chambers. The mean follow-up was 66.9 months (range 7 to 141 months). There were 2 late deaths, both due to lung cancer. 17 patients were in New York Heart Association class I and 10 patients in class II at follow-up. Trivial mitral regurgitation was present in 4 patients and mild regurgitation was present in 2. Trivial tricuspid regurgitation was seen in 3 patients, 1 of whom had an excision of a right atrial myxoma.

Discussion

Cardiac myxomas are benign intracavitary neoplasms. Their incidence in cardiac surgery is between 0.0013% and

0.005% [4, 5]. The exact incidence in Poland is not known, but these tumours were the cause of 0.24% of all cardiac operations performed at our institution and constituted 93.54% of all primary cardiac tumours (n = 31) operated on during the last decade. This incidence is higher than the one in the literature (40%) but it agrees with figures reported by Miralles and colleagues [6]. Echocardiography is preferred and it is currently the most important diagnostic tool for imaging cardiac tumours. Since Schattenberg [7] reported the echocardiographic diagnosis of left atrial myxoma, many reports have followed to demonstrate the usefulness and accuracy of echocardiography in the imaging diagnosis of cardiac tumours, which obviates the necessity of cardiac catheterization in this type of tumours. Although transoesophageal echocardiography generally offers higher resolution imaging than transthoracic echocardiography, its advantage is especially evident when imaging posterior structures, such as the left atrium, which are distant from the anterior chest wall. It is especially important thanks to its non-invasive character. It is worth mentioning that it does not pose a risk of tumour embolization. Echocardiography allows a preoperative diagnosis with a fair degree of accuracy. Such investigation gives us almost a complete characterization of the tumour, consisting of tumour size, attachment, shape and mobility, and it can screen other cardiac chambers accurately for additional tumours. It provides better imaging of right heart tumours and may pre-empt the need for diagnostic cardiac catheterization [8–11]. Transoesophageal echocardiography has increased the specificity and sensitivity of the diagnosis, especially in patients having a poor transthoracic echocardiographic window. Only patients requiring coronary angiography undergo the invasive catheterization procedure. Although little is known of the time course of myxomas before their symptomatic period, we agree with other investigators [12–14] that they grow fairly rapidly, as evidenced by the high mitral valve gradient without appreciable enlargement of the atrium on chest roentgenography and echocardiography. Furthermore, the duration of symptoms in our patients ranged only from 2 to 8 months. Surgical excision of cardiac myxomas must be done as soon as possible after establishing the diagnosis, because of the high risk of valvular obstruction or systemic embolization.

The surgical access to the myxoma may vary depending on the tumour location. Myxoma excision by way of atriotomy may be feasible in most cases. This approach facilitates exposure of the left-ventricular-sided aspect of the mitral valve apparatus. In all the cases presented here, and in most cases presented in the literature, the originally compromised mitral, tricuspid or aortic valves and the interventricular septum were completely preserved, and patients were treated by resection of the tumour alone. The place where myxoma originated was treated with coagulation, and in some cases, when the basal part of the myxoma was relatively large, an additional patch was placed on the scar created after removing the myxoma. In those rare cases in which the tumour arises from an atrioventricular valve (AV), the valve occasionally requires valvuloplasty or even replacement. Special care must be taken to avoid intraoperative systemic or pulmonary embolization of the myxoma. With systolic prolapse of some tumours into the left ventricular outflow tract, patients are at a higher risk of intraoperative embolization. We explore all the cardiac chambers for additional tumours, as it may be missed by preoperative studies. One of our patients showed an additional myxoma in the right ventricular cavity that was not detected preoperatively. Murphy and coworkers [15] also recommended exploration of all four chambers of the heart, though by a biatrial approach. Attention should be given to the way we protect the heart after cross-clamping. In all those cases requiring heart arrest, we administered cold crystalloid cardioplegia 10 ml/kg of body weight. All patients were cooled down to 32°C. According to the literature this method is not frequently applied.

According to a recent survey conducted in the UK and Ireland, 84.3% of surgeons used cardioplegia and 15.7% used intermittent cross-clamp and fibrillation techniques for on-pump CABG. Among those who used cardioplegia, 83.5% chose blood cardioplegia and 16.5% chose crystalloid cardioplegia [16]. Myocardial damage during CABG surgery, evaluated by measuring creatinine kinase-MB (CK-MB) and cardiac troponin I (cTnI) release, was significantly lower in patients who received warm blood cardioplegia in comparison to patients with either cold crystalloid or blood cardioplegia [17]. In the presented studies we did not observe significant elevation of the above markers of ischaemia during our operations.

Our results were satisfactory: 100% 30-day survival and 93% for the 10-year period of our observation. Therefore, this is our first choice method of myxoma excision. Since this operation is relatively short, our routine strategy is short, too.

The classic approach of urgent operation of cardiac myxoma is rarely questioned [18]. This attitude is logical in the case of acute symptomatic forms, such as heart failure with pulmonary oedema, or embolism. It is also justified in high-risk forms in stable patients presenting threatening echocardiographic images: a clapper-shaped tumour intermittently prolapsing into the mitral orifice, or a large multi-lobed tumour suggesting a risk of embolism. However, emergency management appears to be much less clearly indicated in stable patients, in whom the only real risk is that of embolism. Most of our patients were not admitted to angiographic evaluation of coronary vessels and were considered as high risk patients. In the presented series we performed 3 angiographies which resulted in 1 coronary artery bypass grafting. Such an approach may require some modulation in times to come. During follow-up visits, patients did not present angina and on this basis we conclude that cardiac myxomas did not correlate with coronary artery disease. The risk of embolism is probably low for tumours smaller than 2 cm in diameter. All 8 patients in our series presenting embolism had tumours larger than 3 cm. There is little mention in the literature about the correlation

between size and risk of embolism. However, to the best of our knowledge, no case of embolism has ever been reported for small tumours. In conclusion, surgical intervention probably offers a cure for patients with sporadic intracardiac myxomas. Familial myxomas have a strong tendency to recur, even 20 years after excision.

In conclusion, surgical interventions probably offer a cure for patients suffering from sporadic intracardiac myxomas, but familial myxomas have a strong tendency to recur even 20 years after excision.

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References

1. MacGowan SW, Sidhy P, Aherne T, Luke D, Wood AE, Neligan MC, McGovern E. Atrial myxoma: national incidence, diagnosis and surgical management. Ir J Med Sci 1993; 162: 223-226.
2. Castells E, Ferran V, Octavio de Toledo MC, Calbet JM, Benito M, Fontanillas C, Granados J, Obi CL, Saura E. Cardiac myxomas: surgical treatment, long-term results and recurrence. J Cardiovasc Surg Torino 1993; 34: 49-53.
3. Chakfe N, Kretz JG, Valentin P, Geny B, Petit H, Popescu S, Edah-Tally S, Massard G. Clinical presentation and treatment options for mitral valve myxoma. Ann Thorac Surg 1997; 64: 872-877.
4. Reece IJ, Cooley DA, Frazier OH, Hallman GL, Powers PL, Montero CG. Cardiac tumors. Clinical spectrum and prognosis of lesions other than classical benign myxoma in 20 patients. J Thorac Cardiovasc Surg 1984; 88: 439-446.
5. Pavie A, Gandjbakhch I, Hallali P. Traitement chirurgical des masses intracardiaques. Coeur 1984; 15: 31-41.
6. Miralles A, Bracamonte L, Soncul H, Diaz del Castillo R, Akhtar R, Bors V, Pavie A, Gandjbackhch I, Cabrol C. Cardiac tumors – clinical experience and surgical results in 74 patients. Ann Thorac Surg 1991; 52: 886-895.
7. Schattenberg T. Echocardiographic diagnosis of left atrial myxoma. Mayo Clin Proc 1968; 43: 620-627.
8. Marvasti MA, Obeid AI, Potts JL, Parker FB. Approach in the management of atrial myxoma with long-term follow-up. Ann Thorac Surg 1984; 38: 53-58.
9. Dein JR, Frist WH, Stinson EB, Miller DC, Baldwin JC, Oyer PE, Jamieson S, Mitchell RS, Shumway NE. Primary cardiac neoplasm. Early and late results of surgical treatment in 42 patients. J Thorac Cardiovasc Surg 1987; 93: 502-511.
10. Lappe DL, Bulkley BH, Weiss JL. Two-dimensional echocardiographic diagnosis of left atrial myxoma. Chest 1978; 74: 55-58.
11. Feigenbaum H. Echocardiography. 5th ed. Lea & Febiger, Philadelphia 1994; 599-603.
12. Hanson EC, Gill CC, Razavi M, Loop FD. The surgical treatment of atrial myxomas. J Thorac Cardiovasc Surg 1985; 89: 298-303.
13. Pochis WT, Wingo MW, Ginguegrahi MD, Sagar KB. Echocardiographic demonstration of rapid growth of left atrial myxoma. Am Heart J 1991; 122: 1781-1784.
14. Malekzadeh S, Roberts WC. Growth rate of left atrial myxoma. Am J Cardiol 1989; 64: 1075-1076.
15. Murphy MC, Sweeney MS, Putnam JB Jr, Walker WE, Frazier OH, Ott DA, Cooley DA. Surgical treatment of cardiac tumors – a 25-year experience. Ann Thorac Surg 1990; 49: 612-618.
16. Karthik S, Grayson AD, Oo AY, Fabri BM. A survey of current myocardial protection practices during coronary artery bypass grafting. Ann R Coll Surg Engl 2004; 86: 413-415.
17. Barassi A, Merlini G, Finazzi S, Pallotti F, Mantovani V, Sala A, d'Eril GM. Comparison of three strategies for myocardial protection during coronary artery bypass graft surgery based on markers of cardiac damage. Clin Biochem 2005; 38: 504-508.
18. Bire F, Roudaut R, Chevalier JM, Quiniou G, Dubecq S, Marazanoff M, Choussat A. Cardiac myxoma in patients over 75 years of age. Report of 19 cases. Arch Mal Coeur Vaiss 1999; 92: 323-328.