Original Research

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Surgical Management of Cardiac Myxomas in Elderly Patients

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ABSTRACT

Objective: Cardiac myxoma usually presents during early adulthood. There is generally a tendency for prompt surgical resection. However, advanced age of patients presenting with this disease may increase the operative risk due to other cardiac and non-cardiac problems. Therefore, we evaluated elderly patients who underwent surgery for myxoma to review the management of treatment.

Methods: Between September 1985 and March 2012, a total of 17 consecutive patients over 65 years of age (5 male, 12 female; mean age: 69.3±3.5 years) who had undergone surgical resection for cardiac myxoma were analyzed retrospectively. Echocardiography had been performed in all patients to diagnose the myxoma and evaluate other cardiac pathologies. Coronary angiography had been performed in all patients except in two cases who underwent emergency surgery.

Results: Thirteen patients (76.4%) survived the operation. Two patients who underwent emergency operation died early and four patients died during the follow-up time. Concomitant procedures included coronary artery bypass grafting in two, radiofrequency ablation in one, mitral valve reconstruction in one and femoral embolectomy in one patient.

Conclusions: In an era of aging population, myxoma tends to be diagnosed more frequently in elderly and high-risk patients. Complete preoperative assessment of these patients is a more appropriate approach in stable patients than the traditional emergency surgery applied to all cases.

Keywords: Coronary angiography, echocardiography, myxoma, older age

ÖZET

İleri yaş hastalarda kardiyak miksomanın cerrahi tedavisi

Amaç: Kardiyak miksoma genellikle erken erişkinlikte ortaya çıkar ve tanı sonrası hızlı bir şekilde cerrahi rezeksiyon yapılmaya eğilim vardır. Bununla beraber, daha ileri yaşlarda bu hastalığa maruz kalan hastalarda, cerrahi risk eşlik eden diğer kardiyak ve non-kardiyak rahatsızlıklardan dolayı daha yüksek olabilir. Bu nedenle, kardiyak miksoma nedeniyle cerrahi rezeksiyon yapılan yaşlı hastalarımızı, tedavi yönetimlerini gözden geçirmek için değerlendirdik.

Yöntemler: Eylül 1985-Mart 2012 arasında kardiyak miksoma nedeniyle ameliyat edilen 65 yaş üzerindeki ardışık 17 hasta (5 erkek, 12 kadın; ortalama yaş, 69.3±3.5 yıl) retrospektif olarak analiz edildi. Tüm hastalara miksoma tanısı ve diğer kardiyak defektlerin saptanması için ekokardiyografi yapıldı. Acil olarak opere edilen iki hasta dışında tüm hastalara koroner anjiyografi yapıldı. En çok gözlenen semptom dispneydi (%70.5), atriyal fibrilasyon 5 hastada gözlendi (%29.4). Sistemik embolizasyon 7 hastada vardı (%41.1). Tüm tümörler sol atriyumdan köken almışlardı.

Bulgular: Operasyon sonrası hayatta kalan hasta sayısı 13 (%76.4) idi. Acil olarak operasyona alınan iki hasta da erken dönemde kaybedildi. Takip esnasında 4 hasta kaybedildi. Eş zamanlı olarak iki hastaya koroner arter baypas cerrahisi, 1 hastaya radyofrekans ablasyon, 1 hastaya mitral kapak onarımı ve 1 hastaya da femoral embolektomi yapıldı.

Sonuç: Yaşlanan toplumda, miksomanın daha yaşlı ve yüksek riskli hastalarda tanı alma eğilimi vardır. Bu hastalara, eğer hasta stabil ise cerrahi öncesi tam bir değerlendirme yapılması geleneksel olarak acil cerrahi yapılmasından daha uygundur.

Anahtar kelimeler: Koroner anjiyografi, ekokardiyografi, miksoma, ileri yaş

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Introduction

Cardiac myxoma is usually defined as a disease of early adulthood or middle age. In aging populations, it may be diagnosed in elderly patients with other specific cardiac and internal problems who may have a higher operative risk. It is generally recommended to perform urgent surgery when myxoma is detected, especially in the presence of symptoms such as embolism or severe dyspnea. However, this may not be the case for every patient. Adequate preoperative assessment helps detecting any concomitant cardiac and non-cardiac disease, which may be helpful for proper management of these patients both during and after the operation. In this study, we evaluated patients who were over 65 years old, out of a series of 99 myxomas diagnosed between the years 1985 and 2012.

Material and Methods

Between September 1985 and March 2012, a total of 17 consecutive patients (5 male, 12 female; mean age: 69.3±3.5 years) presented in our institution with cardiac myxoma. These patients were either diagnosed as myxoma in our cardiology department or were referred from other centers to our clinic for operation.

Hospital records have been reviewed for patient demographics, medical history, surgical procedure, and pre- and post-operative data. The most common findings at admission were cardiac obstructive symptoms, and among them dyspnea and palpitation were the most frequent (70.5% and 35.2%, respectively). Atrial fibrillation was observed in 5 patients (29.4%), and 4 of them had at least one episode of embolism. Altogether, systemic embolization (both peripheral and in the central nervous system) was observed in 7 patients (41.1%). Three of 7 patients (42.8%) had signs of cerebral embolism (transient ischemic attack in 1 patient, brain infarct in 2 patients) and four patients (57.2%) had peripheral embolism. Only two patients had chest pain (11.7%). None of the patients was completely asymptomatic and none of them had a family history of myxoma.

Diagnosis

Transthoracic echocardiography was performed in all patients to diagnose the myxoma and to evaluate cardiac structures and chambers. In case of suspicion, transesophageal echocardiography was utilized to clarify the diagnosis. Because of the patients' age, it was decided to use transesophageal echocardiography to avoid missed diagnosis of valvular heart disease. The myxoma was located in the left atrium in all cases. No biatrial tumor was encountered and only one patient had multifocal tumors in the left atrium. The tumor originated from the atrial septum in 14 cases, the posterior wall in 3 cases, and the pulmonary vein in 1 case.

In order to rule out atherosclerotic coronary artery disease and coronary embolism, coronary angiography was performed in all patients except in those two who underwent urgent surgery due to high risk of embolism and the presence of pulmonary congestion.

Follow-up and Data Analysis

Survivors were followed up on an outpatient basis at regular intervals. TTE was performed routinely prior to discharge and then subsequently every year. After discharge, three patients passed away during follow-up. Causes and dates of death were learned from the patients' relatives through telephone interview. Statistical analysis was performed using the statistical software SPSS 15.0 for Windows (SPSS Inc., Chicago, IL). Data are expressed as mean±standard deviation for continuous variables and as numbers with percentages for categorical variables.

Results

Operative Data

All patients underwent surgical removal soon after the diagnosis of atrial myxoma had been established to avoid embolic complications or sudden death. Median sternotomy was the standard approach. Aortic arterial, bicaval venous cannulation and intermittent antegrade cardioplegia were utilized under moderate hypothermia. Mean cardiopulmonary bypass time was 72.6±29.5 minutes (range: 36 to 137 minutes) and mean aortic cross-clamp time was 46.2±21.2 minutes (range: 20 to 87 minutes).

The surgical approach was uniatrial in 12 patients (70.5%); left atriotomy in 8 patients (47%), and right atriotomy with transseptal approach in 4 patients (23.5%). In 5 patients (29.5%), the tumor was resected through inspection of both atria. The mass was entirely resected in all patients except one who had multifocal myxomas in the left atrium. In this case, one part of the tumor, arising from left inferior pulmonary vein, was pedunculated and was resected successfully. However, the posterior wall component was sessile and was invading almost all the branches of the pulmonary veins, and therefore the mass

was resected partially. Tumors were excised without an associated endocardial resection in 6 cases. In 11 cases, they were excised with a cuff of full-thickness. In these patients with full-thickness resection, the defect was repaired by pericardial patch in 3 patients and primarily sutured in the rest. Copious irrigation of the atria and ventricles with cold saline solution was performed after resection to prevent tumor seeding and intraoperative embolization. Associated procedures consisted in coronary artery bypass grafting in two, radiofrequency ablation (postoperative rhythm was NSR) in one, mitral valve reconstruction in one, and femoral embolectomy in one case.

Pathological Findings

All resected tumors were sent for histological examination and the diagnosis of myxoma was confirmed with disseminated fibrin deposits, proliferation of capillaries, and blood extravasations. Mean tumor dimension was 5.1±2.4 cm (range: 1.8 to 8 cm). Solid myxoma which has a smooth regular border and tough consistency was diagnosed in 11 patients (64.7%), and papillary myxoma, which is characterized by an irregular and gelatinous exterior with friable, soft consistency, was diagnosed in 6 patients (35.3%).

Morbidity and Mortality

Thirteen patients survived the operation with a high mortality rate of 23.5%. Two patients required emergency operation. One of them was operated due to pulmonary edema and acute heart failure and died of adult respiratory distress syndrome postoperatively. This patient also had chronic renal disease. The other patient underwent concomitant femoral embolectomy due to femoral embolism and died of multiorgan failure despite high-dose inotropic support and intraaortic balloon pump insertion. This patient had probable mesenteric and renal embolization before the surgery. One patient who underwent simultaneous mitral reconstruction died of acute renal failure necessitating dialysis. The last patient who had concomitant coronary artery bypass surgery died of low cardiac output syndrome. The patients' non-cardiac and concomitant cardiac problems are shown in Table 1. High-dose inotropic support was required in these four patients, and one patient additionally required intra-aortic balloon pump support. Postoperative mortalities are shown in Table 2.

Early complications were seen in 4 patients (23.5%). These included temporary nodal rhythm in 2 (11.7%) and transient atrial fibrillation that was successfully converted to sinus rhythm after intravenous amiodarone infusion in 1 case (5.8%). None of these patients required permanent pace maker implantation.

Among the 13 survivors, three patients were lost to follow-up and four patients died during the follow-up period. Only one patient, who had multifocal myxomas, died of the tumor three months after surgery. Probably, residual tumor attached to the posterior wall of the left atrium that could only be resected partially had interfered with the pulmonary venous return to the left atrium, contributing to congestive heart failure. The patient underwent reoperation under emergency but died in the operating room. The other three patients died of lung cancer at 17 months, gastrointestineal bleeding at 76 months, and hemorrhagic stroke at 153 months during follow-up.

Table 1: Patients' concomitant cardiac and non-cardiac problems

	No
Coronary artery disease	2
Chronic renal disease	2
Atrial fibrillation	5
Mitral insufficiency	1
Gastric cancer	1

Table 2: Patients' postoperative mortality

Variables	Case 1	Case 2	Case 3	Case 4
Rhythm	AFR	AFR	NSR	AFR
EF	40%	65%	65%	40%
NYHA	4	2	3	4
Embolism	-	+	-	-
Emergency	+	+	-	-
Concomitant disease	CRD	-	CRD, MI	-
CAD	-	-	-	+
Associated procedure	-	Fem embolectomy	Mitral rx	CABG
Cause of death	ARDS, renal failure	MOF	Renal failure	LCOS

AFR: Atrial fibrillation, NSR: normal sinusoidal rhythm, EF: ejection fraction, NYHA: New York Heart Association, CRD: chronic renal disease, MI: mitral insufficiency, CAD: coronary artery disease, ARDS: acute respiratory distress syndrome, MOF: multiorgan failure, LCOS: low cardiac outflow syndrome

Discussion

Myxoma is the most common cardiac tumor in adults. Clinical presentation shows that the disease is frequently seen in early adulthood or middle age, and mostly in the female sex. Although myxomas develop in all of the cardiac chambers, they tend to occur in the left atrial septum in the fossa ovalis (1), as was the case in our patients. Two kinds of tumor can be distinguished by histopathological examination: papillary and solid (2). Type and implant site of the tumor generally determine the clinical symptoms (3,4), which include obstructive symptoms, congestive heart failure, and central and peripheral embolic events. Survival rate after surgical management is quite high with low risk of recurrence (5,6). However, in our own elderly cases, mortality rate was higher than in the other series.

In elderly patients, evaluation of the myxoma and other concomitant cardiac and non-cardiac health problems is important for the management and treatment strategies. The use of echocardiography has greatly facilitated the diagnosis of myxoma and structural heart pathologies. It allows a quick preoperative assessment with a fair degree of accuracy. Considering that the majority of studies reported a high degree of concomitant cardiac procedures (3,7-9), the requirement of a careful examination of cardiac valves and chambers via echocardiography is obvious. In addition, the histopathological type and clinic features of myxoma may be predicted by echocardiography (10), and treatment strategies may be altered. In addition, transesophageal and 3D echocardiography should be performed to clarify the exact tumor shape, size, and mobility. The presence of immobile, small, calcified, well circumscribed, and non-obstructive myxomas may present a low risk of obstruction and embolism, and for elderly patients with a high risk while being in very poor condition, the classical surgical treatment may even be unnecessary and could be avoided (11). We had a patient in poor condition, but because of the presence of an acute pulmonary edema, the patient had to undergo emergency surgery; however, he died on the 4th day postoperatively.

In an aging population, many diagnostic tools are applied to patients to find out the reasons for their complaints. Consequently, the presence of myxoma may be detected incidentally by echocardiography or computed tomography that has been performed in elderly patients for other reasons. Thus, incidental diagnosis of myxoma is frequent in these asymptomatic patients. In those cases, it should be possible to do a thorough preoperative assessment and preparation. Generally, with the exception of emergency situations, coronary angiography should be performed in patients over 40 years of age or if they have had a history of chest pain to rule out atherosclerotic coronary artery disease and coronary embolization (6). In the literature, patients were reported to undergo coronary revascularisation early after myxoma resection due to an undiagnosed coronary artery disease before the first operation (8). In many series, in the absence of emergency situations (acute pulmonary edema or high risk of embolism), patients over the age of 40 or 50 years underwent coronary angiography before surgery (3,12,13). We also advocate coronary angiography before surgery and believe that the presence or absence of angina alone should not be the only criteria for performing coronary angiography. Coronary angiography was performed in all our patients except two cases undergoing urgent surgery and two patients requiring coronary revascularization. The survivors did not need coronary revascularization in the follow-up period. Therefore, preoperative evaluation should be performed as thoroughly as possible in all stable patients to avoid reoperation for coronary or valvular heart disease in the follow-up period.

The survival rate for surgical resection of myxoma is quite good. Generally, the survivors return to their preoperative level of daily activities within a very short time after surgery. The early and late mortality could be related to the patients' preoperative extracardiac conditions and to their age at the time of surgery (6,12). Emergency operations alone can increase the risk of mortality. Our two patients who underwent surgery because of emergency situations died just after the intervention. The other two patients died of acute renal failure and low cardiac output syndrome and had concomitant procedures. Therefore, it should be noted that early mortality was seen in high-risk patients due to the presence of either emergency situations or concomitant procedures. On the other hand, one of these patients had chronic renal failure and one developed acute renal failure after the operation and died of related complications. This suggests that age-related non-cardiac pathologies and preoperative condition of patients also play an important role in mortality as well as cardiac condition. Preoperative assessment of the extracardiac conditions may facilitate the evaluation of proper risk, allowing surgery to be performed under better conditions.

Annual follow-up including echocardiographic assessment for recurrence should be performed for every patient regardless

of age. The recurrence rate of myxoma is quite low in sporadic isolated myxomas in contrast with familial and multiple myxomas (14). We had one recurrence due to partial resection of multiple tumor, and the patient died three months after the surgery. There is no correlation between old age and recurrence. However, the survival time in elderly patients may be shorter due to other health problems. Furthermore, these patients may develop extracardiac tumors during the follow-up period, and it has been found that these can be most frequently associated with myxoma (12). In our series, one patient died of lung cancer after myxoma resection after two years. However, this correlation may simply be due to the older age in these myxoma patients. In fact, the older population has a higher incidence of extracardiac malignant tumors than the younger population. Other non-cardiac health problems are also an important cause of long-term mortality as in our patients.

Conclusion

In conclusion, in aging populations the rate of diagnosis of cardiac myxoma has been increasing. Therefore, surgeons encounter a high-risk group of myxoma patients at an advanced age. Emergency surgery is still appropriate in patients who have acute pulmonary edema and heart failure or high risk of embolism. Other than that, a complete preoperative assessment should be performed in stable patients to determine coronary and structural heart disease and other health problems for a better patient preparation and management. Older age, emergency surgery and concomitant cardiac and non-cardiac diseases are related to mortality.

Contribution Categories	Name of Author
Development of study idea	V.E., K.B., A.A.D., S.K.,M.A.
Methodological design of the study	N.K., K.B., M.A.
Data acquisition and process	I.A., K.B., A.A.D.
Data analysis and interpretation	N.K., V.E., I.A., M.A.
Literature review	A.A.D., K.B., I.A., S.K.
Manuscript writing	K.B., I.A., S.K.
Manuscript review and revisation	T.A., N.K., V.E.

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