

# Heart Tumors in Puerto Rico De Novo Atrial Fibrillation as Clinical Presentation in a Subgroup of Patients

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**Objective:** Primary cardiac tumors are rare neoplasms in humans, of which the most common is the atrial Myxoma. The objective of this study was to find the incidence of these tumors at the Heart Center of Puerto Rico and the Caribbean.

**Methods:** This study was approved by the Institutional Review Board of the Medical Sciences Campus University of Puerto Rico to review the records at the Heart Center of patients with heart tumors in the last 14 years.

**Results:** The sample consists of 55 patients (78.9% were females and 24.1% were male) with a median age of 52 years. Sixty-five percent of patients lived in rural areas. Clinical presentations included shortness of breath (43.1%), chest pain (37.9%), asymptomatic (25%), palpitations (20.7%), neurologic symptoms (10.3%) and dizziness (6.9%). Electrocardiographic findings included normal sinus rhythm (53.4%), non-specific ST-T changes (32.8%), sinus tachycardia (20.7%), left atrial enlargement (10.3%) and atrial fibrillation (8.6%). A subgroup presenting with atrial fibrillation prior to diagnosis had left atrial myxoma. The tumors found, in descending order of frequency are: left atrial myxoma, right atrial myxoma, papillary fibroelastoma, hamartoma, lipoma and rhabdomyoma. We found a correlation between large left atrial myxoma and atrial fibrillation.

**Conclusion:** The most frequent heart tumor was atrial myxoma. The larger myxomas were associated with atrial fibrillation. [*PR Health Sci J* 2013;1:14-17]

*Key words:* Heart Tumors, Atrial Fibrillation, De Novo

Primary cardiac tumor are rare tumors of the heart (1,2,3). Autopsy series shows secondary cardiac tumors to be up to hundred times more prevalent than primary ones (2). Autopsy series performed in recent years may be no longer regarded as representative. Incidental discovery, mostly by means of echocardiography has been reported to occur in up to 10% of cases (4). Echocardiography is now the most common main of diagnosing cardiac tumors. Prior to 1977, such diagnosis was made angiographically, with the first diagnosed 1951 (1-4).

Of all primary cardiac tumors, benign tumors have a higher incidence, of which the most common is the atrial myxoma (4). Reports of atrial myxoma incidence show that approximately 75% occur in the left atrial cavity, 23% in the right atrial cavity, and about 2% in a ventricular cavity (5). The data also shows that cardiac myxoma occur predominantly in females who comprise approximately two thirds of all studied myxoma cases (6).

We report here the experience of the Cardiovascular Center of Puerto Rico and the Caribbean (CCPRC) with such tumors. We analyze the epidemiological and pathological features of the cardiac tumors found in our population, further expanding the

sample size and variables presented in previous studies from our institution (7).

## Material and Methods

This study was approved by the Institutional Review Board of the Medical Sciences Campus University of Puerto Rico. We reviewed the records of 55 patients with a diagnosis of heart mass at the CCPRC in 14-years period (1996-2010). All had an official pathological report. The final diagnosis in 11, out of the total 55 pathological reports, was either thrombus or vegetation. Each patient's medical records were reviewed,

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and data concerning clinical presentation, comorbidities, diagnostic methods, baseline EKG, pathological report and post-operative complications were collected and analyzed. In all cases echocardiography was the main diagnostic tool.

Frequency distributions and summary statistics were used to categorize the studied population according to socio-demographic and clinical characteristics. Fisher's exact test was used to compare the frequency of atrial fibrillation by gender, whereas the Mann-Whitney-Wilcoxon test was used to compare the median age and tumor size in patients with and patients without atrial fibrillation. Data analysis was performed with Statistical Analysis System version 9.1 software.

## Results

### Patient characteristics

The study group included 41 women (78.9% of the whole sample) and 14 men (24.1% of the sample). The median age was 52 years, and the sample age range extended from 1 month of age to 84 years. Only 35% of the patients diagnosed with heart tumors lived in urban centers of the island, 65% lived in the city's outskirts or in rural areas. Clinical comorbidities at presentation in descending order were as follows: hypertension (55.2%), coronary artery disease and diabetes mellitus (34.5% each), dyslipidemia (12.1%), tobacco use (10.3%), no comorbidities (6.9%), collagen disease (5.2%) and deep venous thrombosis (3.4%).

### Electrocardiographic findings

Baseline electrocardiograms prior to surgical intervention showed predominantly normal findings with normal sinus rhythms (observed in 53.4% of the cases). Abnormal findings in descending order were as follows: non-specific ST-T changes (32.8%), sinus tachycardia (20.7%), left atrial enlargement (10.3%), atrial fibrillation and left ventricular hypertrophy (8.6% each, not occurring together), sinus bradycardia (6.9%), and right atrial enlargement and AV block (1.72% each). Of the patients presenting with atrial fibrillation as their initial electrocardiographic finding, all were females except one, the mean age was 53 years (mean age of patients without atrial fibrillation was 59). The presentation as atrial fibrillation showed a tendency to present in cases where tumor size was significantly larger than the average tumor size studied in the sample. All tumors were left atrial myxomas.

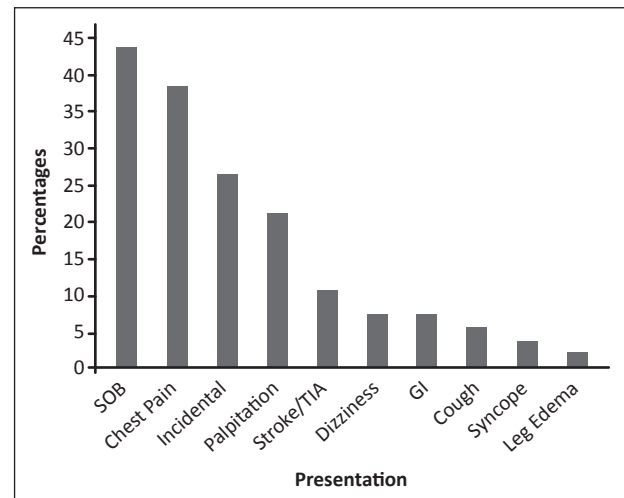
### Echocardiographic findings

All echocardiograms showed a pattern suggestive of heart tumors.

### Presenting symptoms

These findings were extracted from subjective data (i.e. patient-described symptoms), as written in the initial history

form at admission. Twenty-five percent of these patients were allegedly asymptomatic and diagnosis resulted by chance after unrelated 2D echocardiography exams. The findings are shown in Figure 1. The most common symptoms in our series were shortness of breath and chest pain. The physical examination findings were unremarkable except those patients with atrial fibrillation. None showed signs of congestive heart failure or neurological deficits.



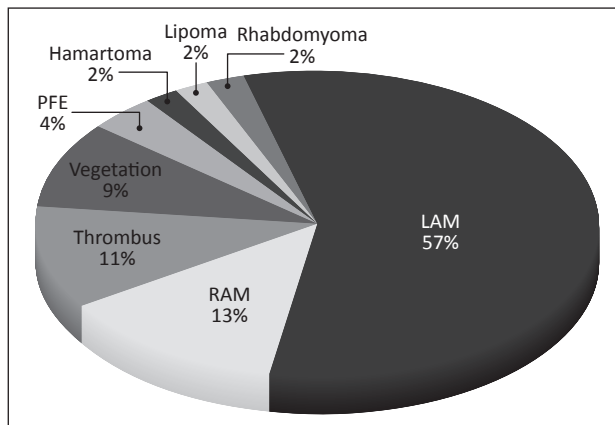
**Figure 1.** Presentation of cases studied. SOB: shortness of breath; TIA: transitory ischemic attack; GI: Gastrointestinal symptoms

### Pathology

Atrial myxomas were the most prevalent heart tumor found during pathological studies. These tumors made up 38 out of the total 55 pathological samples and accounted for 70.4% of all the tumors studied. Out of these 38 myxomas, 7 were right atrial myxomas, of which 6 occurred in females. As for the rest of the myxomas, there was an increased incidence in women. The female-to-male ratio for myxoma occurrence in our population reached almost 4:1. Figure 2 shows the distribution of intracardiac mass type. Tumors in descending order of occurrence were left atrial myxomas, right atrial myxomas, papillary fibroelastomas, hamartomas, lipomas and rhabdomyomas.

### Surgery and follow-up

Follow up was accomplished via the study of the documentation (records) that was made from the time of presentation to discharge, transfer, or death. We report here on 55 surgeries with a total mortality of 2 patients. The most common complications after surgery were atrial fibrillation (in 13.8%), infection (in 12.1%), atrioventricular block (in 5.2%), and pleural effusion (in 1.7%). At 6 months all of the patients were alive. The ones discharged with atrial fibrillation maintained the same rhythm and remained anticoagulated.



**Figure 2.** Type of intracardiac mass. LAM: left atrial myxomas; RAM: right atrial myxomas; PFE: papillary fibroelastoma

## Discussion

We report here our patients with the heart tumors in the last 14 years. Our reported female predominance of atrial myxoma occurrence is consistent with other reported incidences; however our finding of a 4:1 female-to-male ratio exceeds the reported 2:1 and 3:1 ratios that have been reported by other studies (4, 6, 8, 9).

We found a higher incidence of heart tumors in rural areas. Although a higher overall prevalence of tumors in rural areas has been reported previously (10,11,12), we have not found any specific evidence of an increased incidence of heart tumors in rural areas. Human inbreeding has been reported to be widespread in developing countries and has been associated with certain types of cancers linked to heritable genetic mutations (13, 14, 15, 16). In the rural areas of Puerto Rico inbreeding is high. Is there any relation with this pattern? This is unknown because no genetic studies have been done in this population.

There were five patients presenting for the first time with atrial fibrillation on a baseline electrocardiogram. All had left atrial myxomas. They described these events as being both the first such episodes of palpitations in their lives and the reason they came to the emergency room. Of these, four were female and had a mean age of 53 years; the mean size (as reported by pathology) of the atrial myxomas that were not associated with atrial fibrillation was 2.0cm x 2.5cm, while the mean size of ones associated with atrial fibrillation was 5.1cm x 4.3cm ( $p=0.08$ ). Hoof van Huysduynen BF and Rienstra M, mention the importance of atrial size in the origin and permanence of this arrhythmia (17, 18). From this, we conclude that there seems to be an association between large tumors occurring in the left atrium and atrial fibrillation; however, a borderline statistical significance was obtained for this finding ( $p=0.08$ ). Neither the gender nor the age differences seen in these cases were of statistical significance. There are a few reported cases

of atrial fibrillation as the presenting finding of atrial myxomas in the literature (19, 20, 21). The five patients in our series all had uneventful surgeries; of the five, four went home with atrial fibrillation. We think that the reason most of them remained in atrial fibrillation was the size of the tumors, which increases atrial size and wall stress. This makes the affected atria more susceptible to reentry phenomenon and other mechanisms that make this structure more susceptible to atrial fibrillation (20, 21).

In summary, we are reporting in this manuscript our patients with heart tumors, especially myxomas with a subgroup of patients presenting as first symptoms atrial fibrillation. These were related to left atrial fibrillation.

## Resumen

**Objetivo:** Los tumores primarios del corazón son raros. Los tumores benignos tienen una mayor incidencia, siendo el más frecuente los mixomas auriculares. El propósito fue encontrar la incidencia de los tumores cardíacos que fueron encontrados en pacientes en el Centro Cardiovascular de Puerto Rico y del Caribe. **Métodos:** Este estudio fue aprobado por la Junta de Revisión Institucional de la Escuela de Medicina de la Universidad de Puerto Rico para archivos médicos en el Centro Cardiovascular de Puerto Rico y del Caribe de pacientes con tumores cardíacos en los últimos 14 años. **Resultados:** Revisamos los archivos de 55 pacientes 78.9% eran mujeres y 24.1 hombres, con una edad promedio de 52 años. 65% de los pacientes vivían en la zona rural de Puerto Rico. Las presentaciones clínicas consistió de fatiga (43.1%), dolor de pecho (37.9%), palpitaciones (20.7%), síntomas neurológicos (10.3%), mareo (6.9%) y asintomáticos (25%). Los hallazgos electrocardiográficos fueron: ritmo sinusal (53.4%), cambios no específicos del segmento ST (32.8%), taquicardia sinusal (20.7%), agrandamiento del atrio izquierdo (10.3%) y fibrilación atrial (8.6%). Un subgrupo de pacientes demostró fibrilación atrial de novo. La patología demostró una frecuencia en forma descendente: mixoma auricular izquierdo, mixoma auricular derecho, fibroelastoma papilar, hamartoma, lipoma y rabdomioma. Se encontró una correlación entre el tamaño de los myxoma del atrio izquierdo y fibrilación atrial de novo. **Conclusión:** Los tumores más frecuentes estaban localizados en el atrio izquierdo, los tumores más grandes se relacionaron con fibrilación atrial.

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