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**ORIGINAL ARTICLE**

## Valvular papillary fibroelastomas Surgical approach

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### ABSTRACT

**Objective:** Papillary fibroelastoma (PFE) is the second most common benign cardiac tumors.

Although very rare but it has unique histopathological structure making it with higher tendency to embolization with fatal systemic or pulmonary complications

we present our experience in managing is very rare cardiac tumors. Surgery is the definitive treatment it can be done safely through conventional sternotomy or minimal invasive approach

**Methods :** From 2008 TO 2020, 7 Patients have been operated for of valvular papillary fibroelastoma

All are managed surgical base .4 aortic and 3 mitral cases.

Surgical approach according to surgeon preference

**Results:** All patients treated surgical with excision of the mass, neurological cerebral vascular accident are the main complications. one case requires Aortic valve replacement. Other mitral cases need ring annuloplasty for associated sever Mitral regurgitation. No mortality. Estimated ICU stay 30±7 hrs. and inpatient hospital stay 5± 1.5 days.

**Conclusions:** papillary fibroelastoma (PFE) although benign but has fatal outcome secondary to higher tendency to embolize. High clinical suspicious should be raised correlated with diagnostic tool TTE. Surgery is the definitive treatment can be done conventionally or minimal invasive approach safely

**Keywords:** Papillary fibroelastoma, minimally invasive cardiac surgery, cardiac tumors

### BACKGROUND

Cardiac tumors are very rare pathology with estimated incidence 0.7%. Majority of cardiac tumors are secondary from surrounding structure. Benign cardiac tumors are very rare with near 70% are myxoma. Papillary fibroelastoma (PFE) is the second benign tumors 10% dominantly affect cardiac valves structure. The aortic valve the commonest affected valve (1) The unique histopathology character of these tumors make it with higher tendency to systemic embolization (2). Cerebero vascular, myocardial infarction and mesenteric embolization are the commonest reported complications (3)

Echocardiography is the diagnostic tool as no specific symptoms and sign associated with PFE (4)

Surgical excision is the definitive and curative management; different surgical approaches are used safely with comparable outcome (5)

### OBJECTIVE

We present our surgical experience with different approaches in management of these rare benign cardiac tumors and its outcome

### METHODS

Study Design

This is a retrospective study analysis data of patients operated in zagazig university hospital, king Abdullah medical city Makkah, banha university. From 2008 TO 2020, 7

Patients have been operated for valvular masses (4 mitral and 3 aortic cases)  
Surgical approach according to surgeon preference

**Surgical Technique**

**Standard median sternotomy**

Aorto / caval (single or bilateral according to tumor site)

Cardioplegia antgrade in mitral valve and retrograde in aortic valve

Aortotomy for aortic case while left atriotomy in mitral valve

Excision of valve lesion

Asses of valve competency and closure and hemostasis

**In minimal invasive approaches (Right anterior thoracotomy, upper J shaped sternotomy, right anterolateral fifth space thoracotomy),**

Peripheral cannulation femoral artery and vein, Antegrade cardioplegia

. drafting of temperature transferase aortotomy / standard left atriotomy excision of lesion, the access to the tumor is depending on the side of it, ventricular side is more successful through the aortic valve (aortic approach) competence was confirmed intraoperatively before the incision was closed.

Ring annuloplasty is need in 3 mitral cases.

Postoperative TEE confirmed the functional integrity of the valve

Written informed consent was obtained from all participants, the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The study was done according to The Code of Ethics of the

World Medical Association (Declaration of Helsinki) for studies involving humans.

**Statistical analysis**

Categorical data were presented as frequencies and percentages while continuous variables are expressed as mean  $\pm$ SD or median va

**RESULTS**

In our study, The Mean age was  $47\pm 14$ , 4 male patients and 3 females. Three patients have neurological insult (3/7, 42%) All patients were initially diagnosed with transthoracic echocardiography. The diagnosis was, in every case, verified preoperatively and intra-operatively with transesophageal echocardiography. mitral valve mainly affected than aortic valve (4 cases 58%) all cases of mitral valve affecting AML mainly A2 while. Aortic valve 3 (42 %) cases one mass in RCC and other 2 on NCC

Minimal invasive approaches are the most common techniques used in surgical exposure 5 cases (72%) and standard median sternotomy in 2 cases (28%)

Estimated bypass time and cross clamp time ( $67\pm 7$ ) min and ( $57\pm 5$ ) min respectively with median size of excised tumors ( $9\pm 4$  mm)

All excised masses are histopathology confirmed papillary fibroelastoma

Post-operative median ICU stay  $33\pm 9$  hrs and inpatient hospital stay  $5\pm 1.5$  days

No transfusion or Re exploration reported in our patients as well as No Mortality

Patients followed up to 18 months for recurrence of tumor or new mass on other valve with no evidence of recurrence.

**Table (1):** Preoperative Data of The patients

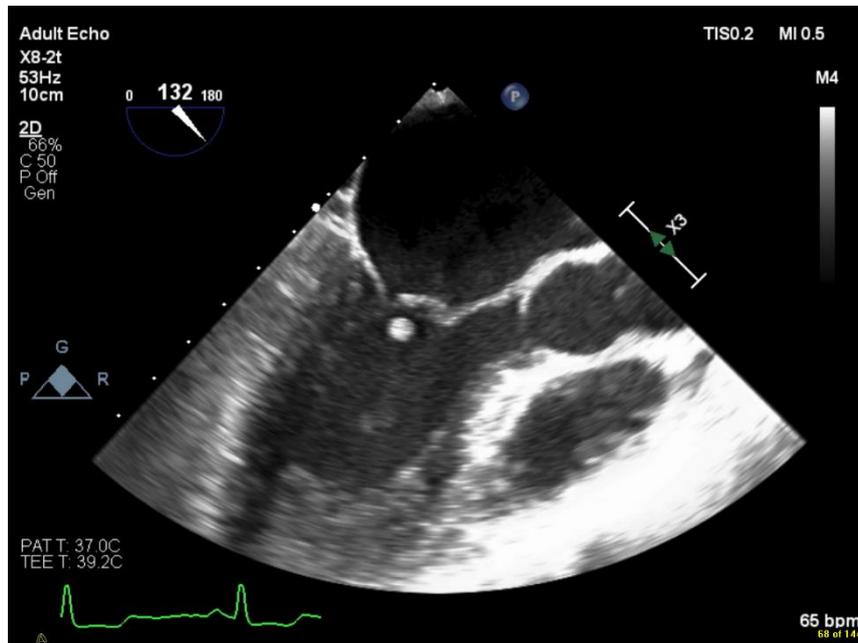
Mean AGE	57±16
GENDER M/F	4/3
STROKE	3 (42%)
PALPTATION	1
DYSYPNEA	1
INCIDENTAL DISCOVER	2
ECHO FINDING	
Mass on mitral valve	3 (42%)
Mass on aortic valve	4 (58%)
Mitral regurgitation	3
Aortic regurgitation	1
EF	55 ± 7

**Table (2):** Intra operative Data

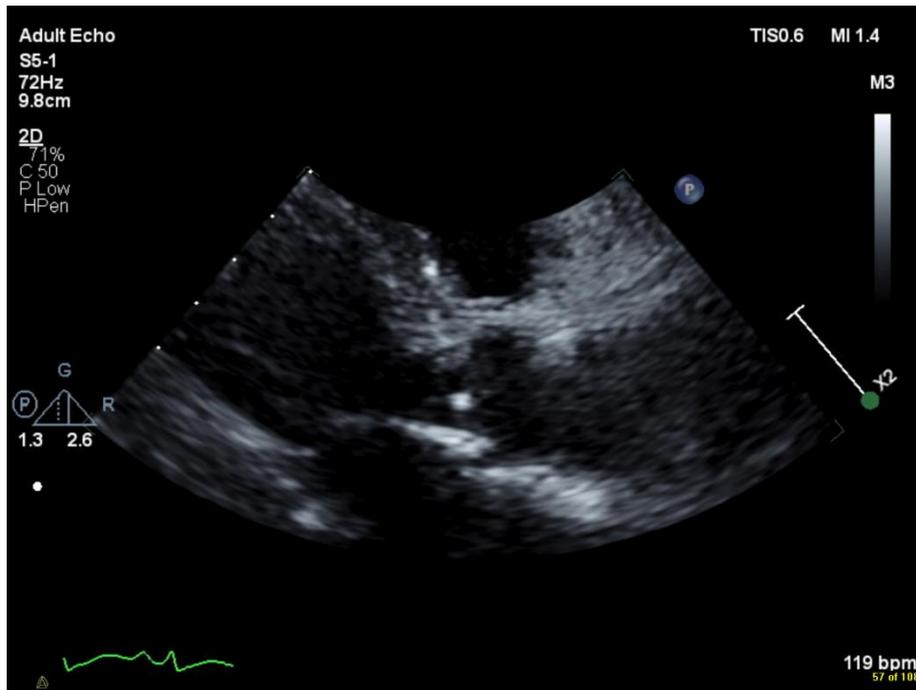
<b>Median sternotomy</b>	<b>2</b>
Mini J-sternotomy	2
RIGHT ANTERIOR THORACOTOMY THRID SPACE	1
Anterolateral thoracotomy	2
Cardiopulmonary bypass time [min]	67 ± 7 min
Aortic cross clamp time [min]	57±5 min
Associated surgery	
Aortic valve replacement	1
Mitral valve repair	3 (42%)

**Table (3):** Postoperative finding

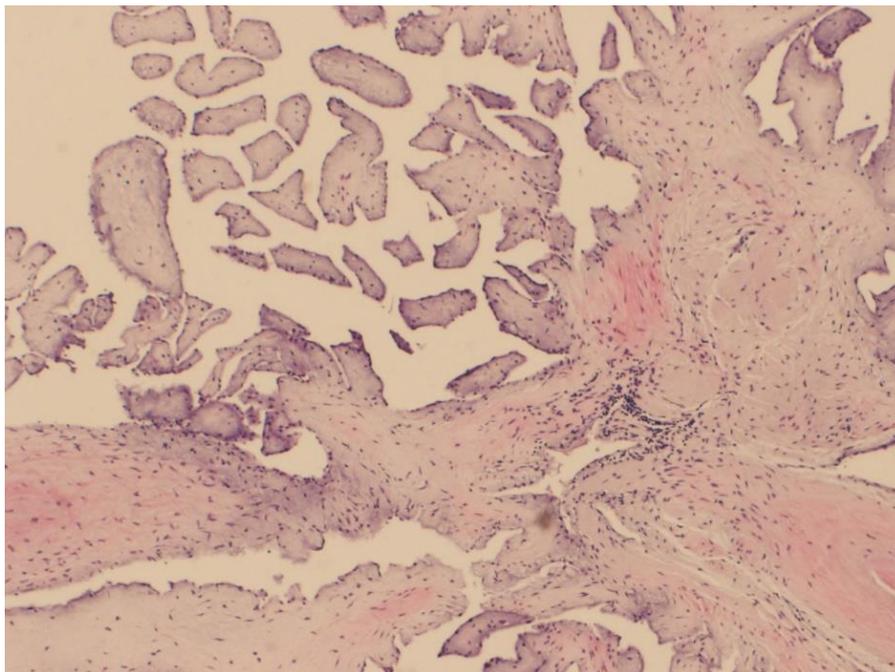
<b>POSTOPERATIVE BLEEDING</b>	<b>330±60</b>
tumor dimension	9 ±4 mm
ICU stay	33±9 hrs
hospital stay post-operative	5 ± 1.5 days
<b>MORTALITY</b>	<b>0</b>



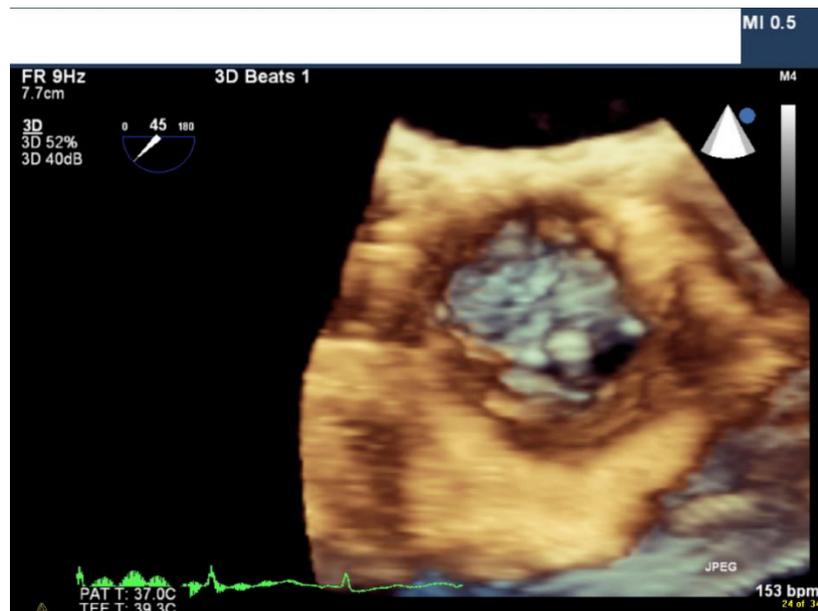
**Figure (1):** Transesophageal echo



**Figure (2):** Aortic valve transthoracic



**Figure (3):** Aortic Valve papillary fibroelastoma



**Figure (4):** View of papillary fronds

## DISCUSSION

There has been increased recognition of the papillary fibroelastomas (PFE) as the second most common primary cardiac tumor. They can occur anywhere on the endocardium, most commonly arising in the left side of the heart and in the valvular structures, particularly at the aortic valve with an incidence of (29%). The mitral valve was the second common location of involvement (25%), followed by tricuspid (17%) and pulmonary valve (13%) In our study all cases are left side affected valves. In a recent study by Abu Saleh et al., fourteen patients underwent surgical excision of PFE, 50% of them originated from the left side of the heart [4].

Although these tumors are Clinically benign tumors are generally small and asymptomatic. But they possess life-threatening complications, secondary to higher tendency to embolization mainly affecting cerebrovascular and cardiovascular Also It may cause, mesenteric ischemia, renal infarction and limb ischemia [5-9].

The Cause of embolization mainly due to its histopathology character of the tumor itself or surface formation of platelets and fibrin thrombi are the cause of these embolic fragments [10].

Transthoracic echocardiography (TTE) and transesophageal echocardiogram (TEE) are the fundamental diagnostic techniques, as they are

imperative in determining the emboli source and plan the surgical approach. [11].

The mean size of the excised tumor is ( $9 \pm 4$  mm). Which is as documented in many studies that prove The size of papillary fibroelastoma on echocardiography ranges from 2 mm to 40 mm. [11]

The sensitivity and specificity of TTE in detecting PFE greater than 2 mm, are 88.9% and 87.8%, respectively. However, when the PFE are less than 2 mm, TEE is the most used modality in the diagnosis as it possesses a 76.6 % sensitivity compared to 61.9% sensitivity reported with TTE [12]

All our cases treated with surgical excision. Minimal invasive approaches according to affected valve are comparable to standard median sternotomy approach

Unlike our study, there is a great deal of debate surrounding the need for surgical treatment of asymptomatic patients, as anticoagulation and antiplatelet can be offered to these patients. However, Convincing data from randomized trial have demonstrated that, cerebrovascular accidents were observed in patients suspected to have PFE who did not undergo surgical excision[13].

But, most of the current evidence supports that, preventing further cardiovascular and embolic events is why surgical resection is strongly recommended in symptomatic patients [14, 15]. The advantages of minimal invasive approaches in different cardiac pathology have

been widely reported regarding less pain. Less blood transfusion and very low incidence of surgical site infection, make it the commonest approach in our study. we reported no blood transfusion, no surgical site infection and high patient's satisfaction on visual pain score post-operative. these finding widely reported in many studies [16]

### CONCLUSSION

Papillary fibroelastoma is very rare begin cardiac tumors but carry malignant course secondary its higher tendency to systemic embolization

Echocardiography is the diagnostic tool

Surgery is the curative treatment of papillary fibroelastoma, Valve-sparing excision produces good and long-term results. Minimal invasive approaches are comparable to standard median sternotomy with adequate long term outcome

### List of abbreviations

(PFE): papillary fibroelastoma

(TTE): Transthoracic echocardiography

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