Primary Angiosarcoma of the Heart
Report of a Case and Review of the Literature

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SUMMARY

We report on a 44-year-old male with primary cardiac angiosarcoma who died 11 months after onset of nonspecific symptoms (thoracic pain and general fatigue) of intracerebral metastases. A right atrial tumor mass and a pericardial effusion could be demonstrated by transthoracic and transesophageal echocardiography. Cardiac angiography showed a right atrial hemangioma, fed by the right coronary artery.

In a review of 108 cases of primary cardiac angiosarcoma we summarize clinical features, diagnostic means, therapeutic approaches and life expectancy of this rare disease. (Jpn Heart J 34: 667–683, 1993)

Key Words:
Primary cardiac tumors Cardiac angiosarcoma Cardiac hemangioma Right atrial mass Hemorrhagic pericardial effusion Endomyocardial biopsy

PRIMARY cardiac malignancies are extremely rare, accounting for less than 0.05% of all autopsy cases. The most common histologic type is angiosarcoma. We report on a typical case of hemangiosarcoma of the heart, located in the right atrium and causing the characteristic features of hemorrhagic pericardial effusion and right sided heart failure. An overview on 107 cases of primary angiosarcoma of the heart in the literature is given, summarizing clinical features, diagnostic means, treatment and prognosis of this rare entity with poor prognosis.

CASE REPORT

The patient, a 44-year-old male, first presented in September 1989 with acute onset of stabbing left sided thoracic pain. His primary physician noted ST-
T changes on his ECG consistent with acute myocardial ischemia and referred the patient to our institution. For a few weeks prior to admission he had noted dyspnea on exertion and reduced physical activity. The medical history was unremarkable except for a tonsillectomy in 1960 and a herniotomy in 1965. There was no family history of coronary artery disease or any other cardiac disease. He smoked 40 cigarettes a day but had no other risk factors for coronary artery disease.

**Physical examination:** When we saw the patient, a middle aged male, for the first time he was in apparently good health and without signs of acute distress. Height: 183cm, weight: 75kg, no signs of jaundice, cyanosis, dyspnea or edema. Central venous pressure was normal, hepatojugular reflux was negative. Cardiac apex beat was orthotopic, cardiac rhythm was regular at 80/min, S1 and S2 normal, no S3 or S4, no clicks or murmurs were audible. BP was 100/80 mmHg.

Pulmonary auscultation revealed left sided fine rales, with the lungs otherwise clear. There was light hepatomegaly of 5 cm below the costal margin, all peripheral pulses were palpable, and no peripheral edema was present. Neurologic examination failed to reveal any abnormalities.

**ECG:** ECG on admission showed atrial flutter with 2:1 conduction and ventricular response at 150/min and unspecific ST depression in the left precordial leads. Sinus rhythm subsequently returned to normal.

**CXR:** Cardiomegaly, right sided pleural effusion, pulmonary congestion, no infiltrates, no intrapulmonary masses.

**Echocardiogram (transthoracic):** Normal thickness of septum and posterior wall, normal diameters for left atrium, right and left ventricle. Regular contraction of left ventricle and valvular movements by Doppler. Pericardial effusion of 13 mm behind the free posterior wall.

**Laboratory findings:** Laboratory values were normal except for maximum ESR of maximal 70/130 n.W., slight elevation of WBC (10.1/nl) with normal differential count, slight elevation of SGOT (37 U/l) and GGT (67 U/l). Viral titers revealed normal values for Echo, Adeno and Influenza A/B viruses, but elevated CBR for Coxsackie B1 and B6 (titer 1:40). ASL was negative and RF not detectable.

α2 protein was elevated to 15.2% with normal total protein. Creatinine was increased to 104 μm/l with normal creatinine clearance. Autoantibodies: ANA, AMA, and antibodies against nDNA, and cardiac muscle were all negative.

**Clinical course:** On the second day of his hospital stay the patient deteriorated dramatically. He complained about severe stabbing thoracic pain and acute dyspnea. He was cyanotic, dyspneic and orhopsneic, showed massive jugular venous distension, positive Kussmaul sign and pulsus paradoxus. Cardiac apex beat was impalpable and heart sounds were muffled. The ECG showed ST-elevation
in almost all leads and the primary diagnosis was cardiac tamponade secondary to ventricular rupture in acute myocardial infarction. An emergency pericardiotomy was performed by a subxiphoid access. Cardiac rupture could be excluded, but 1.3 l of hemorrhagic fluid were removed from the pericardial sack. Cardiac enzymes (CK, incl. CK-MB subfraction, HBDH, SGOT) remained normal. Microscopic examination of the pericardial fluid showed mild inflammatory changes but no malignant cells or acid fast bacilli. Histologic examination of the pericardial biopsy revealed chronic fibrosing pericarditis of moderate grade with focal hemorrhages, no signs of malignancy. On the following day cardiac catheterization was performed.

Cardiac catheterization (9/28/89): Normal pressures were recorded for right atrium, right ventricular inflow tract, pulmonary artery and pulmonary capillary wedge pressure, left ventricle and ascending aorta. Ventriculography showed thickening of the pericardium in the right atrium of some 2 cm with possible pericardial effusion. Normal diameters were found for left ventricle and normal contractility; ejection fraction was 76%. The right coronary artery fed via an atrial branch a vascularized mass within the right atrium. Coronaries were otherwise normal. (Fig. 1)

The presumed diagnosis was right atrial hemangioma/hemangiosarcoma causing cardiac tamponade by massive hemorrhagic pericardial effusion. A surgical resection of the tumor was planned but refused by the patient. Because the pericardial fluid had failed to reveal any malignant cells, the patient was discharged without specific therapy and regularly seen as an outpatient.

Fig. 1. Primary cardiac angiosarcoma demonstrated by cardiac catheterization. Selective right coronary angiography shows a tuft of thin vessels originating from the proximal RCA; drainage of this highly vascularized tumor occurs directly into the right atrium and via the cardiac veins. Fig. 1a: Early injection phase. Fig. 1b: Capillary phase.
Further investigations:

**Cardiac CT (9/19/89):** Moderate pericardial effusion, pericardium itself obviously only slightly thickened. Prominent enlargement of the epicardial space, neighbouring the right atrium with irregular borders towards the inner cardiac space. A myocardial or pericardial tumor cannot be ruled out.

**Thoracic CT (9/21/89):** Massive cardiomegaly, with the esophagus shifted to the left, large right pleural effusion, no signs of mediastinal mass or central bronchial carcinoma.

**Thoracic MR (10/31/89):** Prominent thickening of the lateral wall of the right atrium up to 1.5 cm, differentiation between angiomatous malformation and tumor not possible.

For histologic confirmation of the diagnosis an endomyocardial biopsy of the right atrium was done on 11/1/89 (approach via right femoral vein). Six biopsy specimens of the right atrium were obtained and showed chronic granulocytic and scarring resorptive inflammation with hemorrhages on histologic examination. No signs of malignancy or specificity for tuberculosis were found.

For control of tumor growth a second cardiac catheterization was performed.

**Cardiac catheterization (10/18/89):** A right atrial filling defect, increased in size as compared to 9/89, and a fistula between the right coronary artery and right atrium could be demonstrated.

On a CXR of 10/19/89 an atrial tumor mass was detected. No intrapulmonary masses were seen.

**Echocardiogram (1/15/90, transthoracic):** Intracardiac mass at the lateral wall of the right atrium (2.8 cm × 6.0 cm) with possible invasion of the lateral wall of the RA was seen. (Fig. 2a)

**Echocardiography (1/15/90, transesophageal):** Irregular endocardial structure at the lateral wall of the right atrium, growing into the cavum, possible impression of the right atrium extrapericardially. Parietal thrombus formation in the right atrium possible (Fig. 2b).

By now (January 1990) the patient was complaining of increased fatigue and a weight loss of 7 kg. On a CXR on 3/26/90 multiple right sided pulmonary nodules, highly suspicious of metastatic lesions, were seen.

**Cardiac CT (3/22/90):** Massive growth of the formerly described right atrial vascularized tumor, now partially necrosed, possibly reaching the thoracic wall. Pulmonary window: suspicion of multiple metastases.

**Thoracic CT (3/23/90):** Multiple pleural metastases of a cardiac tumor in both lung fields.

**CCT (4/4/90):** No intracerebral masses.

With the occurrence of intrapulmonary metastases an open lung biopsy to
obtain histologic tumor material was done and the diagnosis of a primary angiosarcoma of the heart was confirmed by this method.

The right atrial tumor was felt to be inoperable due to its rapid growth and size and polychemotherapy on the CWS protocol was begun. (Duration 4/4/90 to 5/26/90: 8 days of carboplatin 500 mg/m², vincristine 1.5 mg/m², followed by 8 days of ifosfamide 3 g/m², Actinomycin D 1.5 mg/m², vincristine 1.5 mg/m², and finally 8 days of ifosfamide 3 g/m², VP-16 200 mg/m² and vincristine 1.5 mg/m²).

The patient finished one cycle of treatment and regression of primary tumor mass as well as of intrapulmonary metastases could be demonstrated on CXR and thoracic CT. However in June 1990 he developed left sided weakness
and a staggering gait and CT scan demonstrated intracerebral metastases in the right parahippocampal region and right parietal region with perifocal edema. In enhanced CCT left sided temporobasal, left basal and bilateral high parietal lesions could also be demonstrated. In spite of a second cycle of chemotherapy (CWS protocol, see above), and palliative radiation of the neurocranium (10 MV photons, fractional radiation $5 \times 2$ Gy with a total dose of 40 Gy) there was rapid progression of both intracardiac tumor and pulmonary metastases in number and size and the patient died during the second cycle of chemotherapy on 8/10/90 of his intracerebral metastases, some 11 months after the onset of symptoms. An autopsy was refused by the relatives.

**DISCUSSION**

Primary cardiac tumors account for approximately 0.2% of all autopsy cases. Most of them are benign, malignant tumors are found in 10% to 25%. More often than primary cardiac tumors are metastatic lesions, accounting for up to 96% of all cardiac tumors. The most common primary malignancies metastasizing to the heart are bronchial carcinoma, breast cancer, melanoma, leukemia and lymphoma. Some 75% to 83% of all primary cardiac tumors are benign, mostly myxomas which accounted for 50% of 103 primary benign cardiac tumors in a series of 124 primary cardiac tumors. In a large surgical series 23% of 533 primary cardiac tumors were myxomas. Myxomas are followed by rhabdomyomas, papillomas, fibromas, hamartomas, teratomas, lipomas, mesotheliomas, fibroelastomas, hemangiomas, glomangiomas and a few others in descending order of frequency. The most common histologic type of primary cardiac malignancy is angiosarcoma, ranging from 19% to 31%. In descending frequency this is followed by rhabdomyosarcoma, mesothelioma, fibrosarcoma and lymphoma.

In contrast to cardiac myxomas, which are usually located in the left atrium, malignant tumors are almost exclusively found in the right heart, with involvement of the right atrium in almost all cases. The reason for this preferred location is unknown.

The symptoms and signs of intracardiac tumors are usually determined by tumor location rather than by type. Common in cardiac malignancy are the signs of right sided heart failure and pericardial tamponade, precordial pain, supraventricular rhythm disorders, hemorrhagic pericardial effusion and dyspnea. Misdiagnosis of this rare disease used to be common but with increasing use of modern imaging techniques (CT, MR, cardiac catheterization and especially echocardiography) diagnosis intra vitam is more frequent.
Prognosis of this rapidly progressive, early metastasizing tumor is poor, leading to a mean life expectancy of some 7 months after onset of symptoms. Treatment is guided by experience with other soft tissue tumors and consists of surgical resection of the primary tumor mass, polychemotherapy and radiation of metastases.
Clinical features of cardiac angiosarcomas were well described by Glancy et al (1968) and Janigan et al (1986). Recently Herrman et al (1992) published a review of another 6 cases. We add a review of another 15 cases to the former description of 41 by Glancy et al, 46 cases by Janigan et al, and 6 cases by Herrman et al, leading to a total of 108 cases of primary cardiac angiosarcoma (including the one case presented here, see Tables I–VII), covered in this review.

Age range is 10–80 years, mean 39.6 years. Men appear to be affected more often than women, accounting for 67.6% of all 108 cases reviewed. Symptoms were uniformly determined by tumor location. The right atrium was the primary tumor site in 71.4% of cases, either as the only tumor site (55.6%) or in combination with the right ventricle (6.5%), in combination with the pericardium.
### Table III. Metastases in Primary Angiosarcoma of the Heart

<table>
<thead>
<tr>
<th>Metastases</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alive</td>
<td>10/108</td>
<td>9.3%</td>
</tr>
<tr>
<td>Dead</td>
<td>98/108</td>
<td>90.7%</td>
</tr>
<tr>
<td>Without or with incomplete autopsy</td>
<td>55/98</td>
<td>11.6%</td>
</tr>
<tr>
<td>Complete autopsy</td>
<td>43/98</td>
<td>44.8%</td>
</tr>
<tr>
<td>With metastases</td>
<td>38/43</td>
<td>88.4%</td>
</tr>
<tr>
<td>Single metastasis:</td>
<td>6/43</td>
<td>14.0%</td>
</tr>
<tr>
<td>- Lungs</td>
<td>2/43</td>
<td>4.7%</td>
</tr>
<tr>
<td>- Pleura</td>
<td>9/43</td>
<td>20.9%</td>
</tr>
<tr>
<td>- CNS</td>
<td>9/43</td>
<td>20.9%</td>
</tr>
<tr>
<td>Multiple metastases:</td>
<td>32/43</td>
<td>74.4%</td>
</tr>
<tr>
<td>- Lungs</td>
<td>22/43</td>
<td>51.2%</td>
</tr>
<tr>
<td>- Liver</td>
<td>16/43</td>
<td>37.2%</td>
</tr>
<tr>
<td>- CNS</td>
<td>13/43</td>
<td>30.2%</td>
</tr>
<tr>
<td>- Pleura</td>
<td>9/43</td>
<td>20.9%</td>
</tr>
<tr>
<td>- Bone</td>
<td>9/43</td>
<td>20.9%</td>
</tr>
<tr>
<td>- Spleen</td>
<td>9/43</td>
<td>20.9%</td>
</tr>
<tr>
<td>- Lymph nodes</td>
<td>7/43</td>
<td>16.3%</td>
</tr>
<tr>
<td>- Kidneys</td>
<td>5/43</td>
<td>11.6%</td>
</tr>
<tr>
<td>- Adrenal glands</td>
<td>4/43</td>
<td>9.3%</td>
</tr>
<tr>
<td>- Ovaries</td>
<td>4/43</td>
<td>9.3%</td>
</tr>
<tr>
<td>- Peritoneum</td>
<td>3/43</td>
<td>7.0%</td>
</tr>
<tr>
<td>- Skin</td>
<td>3/43</td>
<td>7.0%</td>
</tr>
<tr>
<td>- GI-tract</td>
<td>3/43</td>
<td>7.0%</td>
</tr>
<tr>
<td>- Pancreas</td>
<td>1/43</td>
<td>2.3%</td>
</tr>
<tr>
<td>- Muscle</td>
<td>1/43</td>
<td>2.3%</td>
</tr>
<tr>
<td>- Uterus</td>
<td>1/43</td>
<td>2.3%</td>
</tr>
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</table>

In the review by Glancy et al, the number of autopsies is not stated, but the authors report in 40 patients with primary angiosarcoma of the heart the following localizations of metastases: lungs: 24, liver: 11, lymph nodes: 10, bone: 7, adrenal glands: 5, CNS: 2, spleen: 2, peritoneum: 2, kidneys: 1, pancreas: 1, thyroid gland: 1, muscle: 1, prostate: 1, ovaries: 1.

### Table IV. Tumor Location in Primary Angiosarcoma of the Heart

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA alone</td>
<td>60/108</td>
<td>55.6%</td>
</tr>
<tr>
<td>P alone*</td>
<td>22/108</td>
<td>20.4%</td>
</tr>
<tr>
<td>RV alone</td>
<td>4/108</td>
<td>3.7%</td>
</tr>
<tr>
<td>LA alone</td>
<td>3/108</td>
<td>2.8%</td>
</tr>
<tr>
<td>RA and RV</td>
<td>7/108</td>
<td>6.5%</td>
</tr>
<tr>
<td>RA and P</td>
<td>7/108</td>
<td>6.5%</td>
</tr>
<tr>
<td>RA, RV and P</td>
<td>2/108</td>
<td>1.9%</td>
</tr>
<tr>
<td>RV and LV</td>
<td>1/108</td>
<td>0.9%</td>
</tr>
<tr>
<td>RA and LA</td>
<td>1/108</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

* In 1 patient it could not be determined whether the primary tumor site was the pericardium (P) or the lungs.

(6.5%), in combination with the left atrium (0.9%), or in combination with the right ventricle and pericardium (1.9%). The right atrium being affected by tumor mass in more than 70% of cases, it is not surprising that the presenting symptoms are often those of right atrial inflow obstruction with distended jugular veins,
positive Kussmaul sign, peripheral and facial edema, pulsus paradoxus and hepatomegaly in different combinations: 70.4% of all patients presented with symptoms and signs of right sided heart failure or cardiac tamponade. The most common symptoms of primary cardiac angiosarcoma are nonspecific: dyspnea (69.4%), thoracic pain (55.6%) and fever, weight loss, general fatigue (45.4%). Cough (27.8%) and hemoptysis (21.3%) are less common. About half the patients had a hemopericardium (50.5%).

Electrocardiographic signs are nonspecific: atrial fibrillation/flutter and
Table VII. Therapy and Mean Survival Time in Primary Angiosarcoma of the Heart, Diagnosed Intra Vitam

<table>
<thead>
<tr>
<th>Diagnosis intra vitam</th>
<th>42/108 (38.9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No specific therapy (because pat. died shortly after diagnosis)</td>
<td>10/42</td>
</tr>
<tr>
<td>32 patients, in whom appropriate treatment of cardiac angiosarcoma could be started</td>
<td></td>
</tr>
<tr>
<td>Surgical resection*</td>
<td>16/32 (50.0%)</td>
</tr>
<tr>
<td>Incomplete</td>
<td>15/16 (93.8%)</td>
</tr>
<tr>
<td>Surgical resection alone</td>
<td>4/16</td>
</tr>
<tr>
<td>Surgical resection and chemotherapy and radiation</td>
<td>7/16</td>
</tr>
<tr>
<td>Surgical resection and chemotherapy</td>
<td>3/16</td>
</tr>
<tr>
<td>Surgical resection and radiation</td>
<td>2/16</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>17/32 (53.1%)</td>
</tr>
<tr>
<td>Chemotherapy alone</td>
<td>4/17</td>
</tr>
<tr>
<td>Chemotherapy and radiation</td>
<td>6/17</td>
</tr>
<tr>
<td>Radiation therapy</td>
<td>12/32 (37.5%)</td>
</tr>
<tr>
<td>Radiation therapy alone</td>
<td>1/12</td>
</tr>
<tr>
<td>Mean survival time**</td>
<td>11.9 months</td>
</tr>
<tr>
<td>(32 patients, 10 of whom remain alive)</td>
<td></td>
</tr>
</tbody>
</table>

*Surgical resection was not performed in another 8 of 32 patients due to extensive tumor size seen intraoperatively. **32 patients in whom primary angiosarcoma of the heart was diagnosed intra vitam and appropriate treatment could be started.

other supraventricular rhythm disorders occurred in 8.4% of all patients, nonspecific ST-T changes were present in 36.1%. Only one patient showed AV conduction disturbances (0.9%). Imaging techniques to demonstrate intracardiac masses include echocardiography, cardiac catheterization, CT-scan, MR, and to some extent conventional chest-roentgenography. In 78.7% of all patients cardiomegaly could be shown by chest X-ray, in 15.7% a prominent right atrial silhouette was detected on the chest X-ray film. The typical echocardiographic finding in primary cardiac malignancy is a right atrial tumor mass [11 of 27 patients (40.7%), in whom echocardiographic results were stated], possibly associated with pericardial effusion. In rare instances only enlargement of a single cardiac chamber (14.8%), or thickening of cardiac walls (7.4%) may be detected. Cardiac catheterization usually reveals a filling defect at the tumor site (66.7%). Sometimes a vascularized mass can be demonstrated with selective coronaryography (20.8%); in one case this was fed by LAD and RCA, in one case by LAD alone and in the presented case by RCA; venous drainage occurred into cardiac veins or the RA (in the case presented here). Hemodynamic phenomena to be demonstrated with primary cardiac malignancy include right ventricular outflow tract obstruction (20.8%), SVC outflow obstruction (16.7%) and a pressure gradient between the right atrium and right ventricle (12.5%). CT and MR are further techniques for determining the exact tumor location, extent and possible metastases. Tumor mass as little as 0.5 to 1 cm in diameter can be demonstrated by CT scan or MR. Both methods are of great help in determining the operability of a tumor, but thus far no differentiation between benign and malig-
nant tissue by imaging techniques alone is possible.

For final diagnosis of the type of intracardiac mass, until now histologic examination of the primary or metastatic tumor mass obtained by open thoracotomy seemed necessary. In 42 of 108 cases (38.9%) a definite diagnosis intra vitam was possible, 10 of these patients died shortly after final diagnosis. This was obtained by open thoracotomy for myocardial/pericardial or lung biopsy in 21 cases, by cardiac catheterization in 10 cases, by echocardiogram in 7 cases, by myocardial biopsy in 2 cases, by histologic examination of pericardial fluid in 1 case, and by visualization of tumor by pneumopericardium in 1 case. Endomyocardial biopsy was performed in 4 cases, two of which were falsely negative. In all but one case with hemorrhagic pericardial effusion, microscopic and histologic examination of the pericardial fluid were falsely negative. From these results it is obvious that accurate diagnosis of intracardiac malignancy can only be obtained with open biopsy of either the primary tumor mass or secondary tumor deposits. Unfortunately endomyocardial biopsy, pericardial or pleural biopsy as well as histologic examination of the pericardial effusion often found in primary cardiac malignancy frequently are falsely negative and may delay appropriate treatment. Even though tumor location and extent can be determined by echocardiography, CT and MR, no definite statement on tumor type can be made at present by imaging techniques alone (as long as no metastases have occurred). Echocardiographic evidence of a right atrial mass, not consistent with thrombus material, in association with hemorrhagic pericardial effusion should raise high suspicion towards primary cardiac malignancy and warrants further investigation.

Metastases in primary angiosarcoma of the heart are common and were present in 88.4% of the 43 patients in whom complete autopsy was performed. The most common metastatic sites of cardiac angiosarcoma are the lungs (51.2%), followed by liver (37.2%), CNS (30.2%), bone (20.9%) and lymph nodes (16.3%). Other metastatic sites include ovaries, pancreas, peritoneum, spleen, kidneys, and skin. Pleura and pericardium are not regarded as metastatic sites in this overview but rather as being involved by direct tumor invasion. Mean survival time in Glancy's overview was 5.9 months in the 33 patients in whom duration of symptoms could be determined. In Janigan's review, mean survival time was differentiated: for patients who did not undergo surgery: 4.2 months; 8 of 23 patients who underwent surgery died postoperatively, of the surviving 15, the mean survival time was 10.6 months. In the present review mean survival time from onset of symptoms was 11.9 months, with 2 patients being alive at the time of description. Of the patients with the longest reported survival time (39 and 22 months, respectively) one was treated by surgery, radiation and chemotherapy, the other one (22 months survival time) refused further treatment.
after resection was determined to be impossible. It is noteworthy that both pa-
tients with long survival times\textsuperscript{12,13} had no metastases clinically, although no au-
topsy was performed in either case. The patient with 39 months survival time was
still alive at the time of description.\textsuperscript{12} From these results it seems that survival
time in primary angiosarcoma of the heart has improved in recent years, which
may partly be due to early diagnosis by echocardiogram/cardiac catheterization
in patients with nonspecific cardiac symptoms.

**CONCLUSION**

Primary cardiac angiosarcoma is a rare disease which has recently been
diagnosed during lifetime more frequently due to the widespread use of
echocardiography and cardiac catheterization. Early diagnosis improves survival
time in this ultimately fatal disease. Thus far a differentiation between benign
and malignant intracardiac masses cannot be obtained by imaging techniques
alone. Open thoracotomy appears to be the only method of accurate histologic
diagnosis. Endomyocardial biopsy cannot be recommended as a general diagnos-
tic test when suspecting cardiac malignancy since it proves to be falsely negative
in 50\% of cases. Because of the great prognostic implications an echocar-
diographically visualized right atrial mass associated with a hemorrhagic pericar-
dial effusion warrants further investigations to rule out primary cardiac malign-
nancy.

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mens of this case.

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