Case Report :

Impact Of Covid 19 Infection On Rare Combination Of Subaortic Membrane And Patent Ductus Arteriosus In Adult Female

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Abstract

Background:

Variable presentations manifesting outflow obstruction may lead to non-significant symptoms or produce symptoms linked to the degree of the left ventricular outflow tract obstruction. A patent ductus arteriosus is also an infrequent non-cyanotic congenital heart disease, which usually occurs as an isolated lesion, but in association with subaortic membrane, the prevalence is even lower. This combination affects the presentation, symptoms and management approach. Careful evaluation is important as the management strategy is based on the evaluation.

Case presentation:

This is a case report, discussing a female patient in her middle-ages with subaortic membrane along with patent ductus arteriosus as a rare presentation. The electrocardiogram showed left ventricular hypertrophy and strain pattern. The chest X-ray revealed cardiac enlargement with enlarged aorta. The echocardiography indicated a dilated left ventricle with mild left ventricular systolic dysfunction, a sub-aortic membrane with high gradient and moderate aortic regurgitation. There was also a PDA with a left to right

الملخص

الخلفية:

يؤدي الدرجات المختلفة للغشاء تحت الأبهري إلى أعراض غير مهمة أو ينتج عنه أعراض مرتبطة بدرجة انسداد مجرى تدفق البطين الأيسر. القناة الشريانية السالكة هي أيضًا مرض قلبي خلقي نادر الحدوث، والذي يحدث عادةً كمرض منفصل، ولكن اقترانه مع الغشاء تحت الأبهري، يكون نادر الحدوث. سيؤثر على الكيفية التي سيبرز بها المريض لأول مره وكذلك الأعراض ونهج المعالجة. التقييم الدقيق مهم لأن استراتيجية العلاج تعتمد بشكل كبير على هذا التقييم

عرض الحالة:

هذا تقرير حالة ، يناقش مريضة متوسطة العمر لها غشاء تحت الأبهري بالإضافة إلى القناة الشريانية السالكة كعرض تقديمي نادر. أظهر مخطط كهربية القلب تضخم البطين الأيسر ونمط الإجهاد ، وكشفت الأشعة السينية للصدر عن تضخم القلب مع تضخم الشريان الأورطي. أشار تخطيط صدى القلب إلى اتساع البطين الأيسر مع ضعف خفيف في وظيفة البطين الأيسر الانقباضي ، وغشاء تحت الأبهر بضغط عالي وارتجاع اورطي متوسط. كان هناك أيضًا القناه الشريانية السالكة مع تدفق الدم من اليسار إلى اليمين. أشار تصوير الأوعية التاجية إلى أن الشرايين التاجية طبيعية وكشفت قياسات ضغط قسطرة القلب اليمنى عن ارتفاع ضغط الدم الرئوي.

أصيبت المريضة بفيروس كورونا ١٩ مما أدى إلى تدهور حالتها الطبية وتغيير طريقه العلاج المخطط لها

shunt. The coronary angiogram indicated normal coronaries, and a large PDA. The right heart catheter pressure measurements revealed pulmonary hypertension. The patient infected with COVID-19 that had resulted in deterioration of her medical status and the planned management.

Conclusions:

The combined lesion presents a challenging clinical presentation and diagnosis. Cardiac catheterization might be helpful. Management strategy might need modification. Exposure to COVID 19 infection compose a risk to such patient and influence the management strategy.

Keywords:

Ductus Arteriosus, Patent; Discrete Subaortic Stenosis; Heart failure

Case Reports; Hypertension, Pulmonary; Thoracic Surgery; Vascular Closure Devices

الخلاصة:

اقتران مرضي قلب خلقي تمثل عرضًا وتشخيصًا إكلينيكيًا صعبًا. قد تكون القسطرة القلبية مفيدة. تحتاج استراتيجية العلاج إلى تعديل بين جراحي وتداخلي او مزيج بينهما. مرضي القلب الوراثي معرضين لالتهابات فيروس الكورونا، مما قد يغير العلاج المناسب لحالتهم

Introduction

The prevalence of a subaortic membrane is less than 1% of all congenital cardiac defects، with males being affected more than females [1]. Differences in anatomical growth has been proposed as the etiology, but the exact mechanism is still not clear. A patent ductus arteriosus (PDA) represents 15% of all congenital heart diseases[2]. Typically, children remain asymptomatic and may exhibit exercise intolerance or a murmur [3]. A PDA is usually associated with a coarctation of the aorta. However, the association of a PDA with a subaortic membrane (SAM) beyond the neonatal period is exceptionally rare [4]. In this case report, we are presenting a case of a PDA and a SAM in an adult female.

Some congenital heart disease become symptomatic at the age of 10-20 years, but at the age of 44 years, it is rare [5]. Exertional dyspnea, effort angina and syncope are the most prevalent symptoms [5]. The presence of a PDA murmur may dominate the low-pitched ejection systolic murmur in the second and third left intercostal space and the absent ejection click being characteristic of a SAM [2]. An electrocardiogram will indicate previous signs of left ventricular hypertrophy and a strain pattern. A careful echocardiography is the preferred diagnostic imaging tool, but the sensitivity

to identify these defects in adult readers is expected to be lower than a pediatric cardiologist [2]. The challenge increases if read by an echo technician, who are not trained to detect such deviations. The combination will limit the use of a non-surgical intervention, and it may affect the surgical approach and possibly the outcome [1,6]. The current Coronavirus disease (COVID-19) had added a big challenge to such case. Adults with congenital heart disease (ACHD) are prone to higher risk of complications with COVID-19. The type, the anatomic complexity and the patient's physiologic status will determine the clinical course and the management approach. An individualized approach to risk stratification is a mandatory [7].

Case presentation:

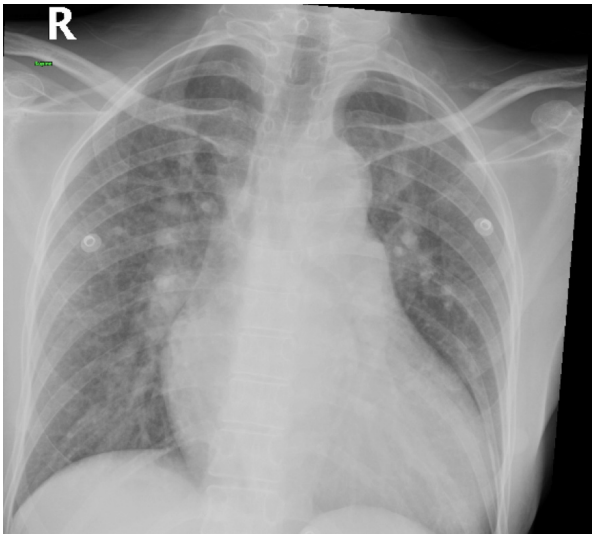
A 44-year-old Saudi female, living in a suburban town in Saudi Arabia, presented with chest pain and dyspnea (New York Heart Association Classification class II). She was referred for evaluation as a Non-ST-Elevation Myocardial Infarction. She has been diagnosed with a congenital heart disease since childhood and was lost to follow-up from that period. The patient was also diagnosed with type 2 diabetes mellitus, which was poorly controlled.

On examination, she was vitally and hemodynamically stable. The patient was underweight, her body mass index (BMI) was 17.6 kg/m2; she appeared pale, but there was no cyanosis, clubbing or jaundice. The examination of the precordium revealed a displaced apex, which was forceful and well sustained. The 1st heart sound was normal in intensity. The 2nd heart sound was faint, and a systolic and diastolic murmur were audible in the right upper parasternal area. The examination of the other systems revealed no abnormalities.

The patient's complete blood count and comprehensive metabolic panel were within normal limits, except for an elevated HbA1C. The electrocardiogram findings were a normal sinus rhythm with left ventricular hypertrophy and strain pattern. The chest X-ray revealed cardiac enlargement with an enlarged cardiothoracic ratio. Increased pulmonary vascularity was noted. The trachea was slightly pushed to the right side, suggesting an enlarged aorta (Figure 1). A computerized tomography of the chest was offered to the patient, but she declined due to the fear of contrast reaction.

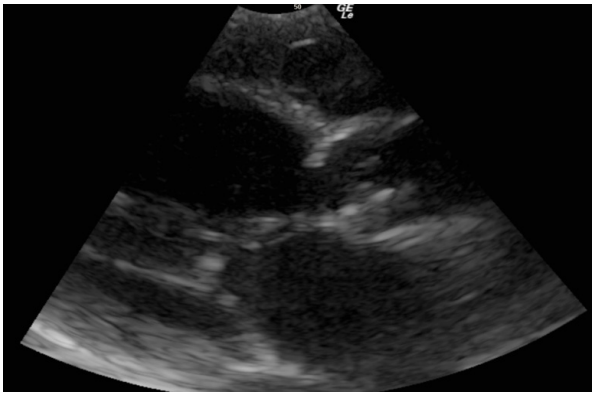
The echocardiography, transthoracic and transesophageal, indicated a dilated left ventricle with an end diastolic dimension of 6 cm, end systolic dimension of 5 cm, with mild left ventricular systolic dysfunction, EF 42%: a sub-aortic membrane with a peak gradient across of 67 mmHg

Figure 1. Chest x-ray showed cardiac enlargement with enlarged cardiothoracic ratio. Increased pulmonary vascularity was noted. Trachea was slightly pushed to the right side suggesting enlarged aorta



and moderate aortic regurgitation (Figure 2). There was also a PDA with a left to right shunt; the size of the PDA was about 1.3 cm, the systolic and diastolic gradient across the PDA were 60 and 10 mmHg respectively.

Figure 2. Transthoracic echo - Parasternal long axis view showing sub-aortic membrane.



The coronary angiogram indicated normal coronaries, and the pullback showed no gradient across the aortic valve, the left ventricular end-diastolic pressure was 5 mmHg, and an aortography showed a large PDA. The right heart catheter pressure measurements were as follows: right atrium=8 mmHg, right ventricle=59/0 (mean 11 mmHg), pulmonary artery=50/20 mmHg (mean 32 mmHg). The patient was discharged and referred to another hospital , experienced in congenital heart disease for an elective PDA closure in 10 days. Unfortunately, she had coronavirus disease (COVID-19) infection and experienced respiratory arrest at her local hospital, where she lived. Extubation was difficult and she required a tracheostomy, and she is still managed medically at this stage. Our patient is considered a High-risk patient as per European Society of Cardiology working group having uncorrected anatomy, heart failure, pulmonary hypertension and moderate valvular heart disease. In the event of COVID-19 infection, early admission even in asymptomatic might be considered combined with joint care of the ACHD team [7, 8].

Discussion:

The simultaneous occurrence of a congenital aortic stenosis and a PDA is rare. It was first reported by a 27-year-old physician. A literature review revealed a few cases with such a combination [2]. Local literature review had highlighted 7 cases in a large tertiary hospital, but all were children and

the oldest was 8 years only 3. The etiology of an isolated sub-aortic stenosis, in combination with a patent ductus arteriosus, is unclear [4, 9].

The presentation of the PDA in adulthood is often associated with congestive heart failure, pulmonary arterial hypertension, atrial fibrillation, recurrent pneumonia and signs of volume overload. Endocarditis, if present, may be silent. We report a case of a PDA in an adult, presenting with chest pain and clinical features of NSTEMI, rather than symptoms related to her underlying congenital heart disease. Primary care physicians should be mindful of clinical situations suggesting a previously undiagnosed PDA [5]. There were a few similar reports in the literature review. Most of the reported cases presented with pulmonary hypertension and heart failure [10].

A PDA increases the pulmonary blood flow with subsequent left ventricular dilation, increased pulmonary vascular resistance and pulmonary hypertension. In our patient, the systolic and diastolic gradient between the aorta and pulmonary artery, with a systolic gradient across the PDA, was approximately 100 mmHg, indicating the absence of significant pulmonary hypertension. Right and left heart catheterization was performed which revealed an aortic pressure of 150/70 mmHg and a pulmonary artery systolic pressure of 50 mmHg. In such a situation, the PDA should be closed first, followed by the re-assessment of the severity of the aortic stenosis$_2$. A percutaneous transcatheter occlusive device is effective and safely used in both children and adults and may remove the need for surgical ligature [6, 10].

The most favorable surgical method for patients with SAM is debatable. Some surgeons prefer the dissection of the discrete membrane. Another method is to resect the hypertrophied muscle with a routine myomectomy [11]. However, in our case, the diagnosis is complex, and a surgical approach may change from a left posterolateral thoracotomy to a median sternotomy. Unfortunately, COVID infection had a major impact of on the case as being a reason for no intervention which will make it unique as case report form what already published. Ongoing studies are currently underway to determine the effect, outcome and management approach of COVID-19 occurring in congenital heart disease patients [8, 12].

Conclusion:

The association of a PDA with a sub-aortic membrane is exceptionally rare. The possibility of such a presentation, at the adult age, should not be ignored. The combined lesion presents a challenging clinical presentation, and the diagnosis can easily

be missed by echo technicians or readers. Cardiac catheterization data might be helpful. Careful evaluation is important as the management strategy, whether surgical or through a device, will need modification. Such patients are susceptible to current COVID-19 infection, which might influence the management and the prognosis.

Our institution does not require ethical approval for reporting individual cases. Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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