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LETTER TO THE EDITOR

Dyspnea in hemodialysis and early echocardiographic examination at the bedside: Two case reports

Introduction

Dyspnea is an extremely common symptom among patients on dialysis [1–3]. At first instance nephrologists generally considers it as a symptom of volume overload in patients with uremia and manages it by gradually reducing the patient's dry weight. Here we describe two clinical cases in which echocardiography proved to be a very useful tool in the differential diagnosis of dyspnea in patients on hemodialysis.

Clinical case Nr. 1

This case describes the clinical picture of a 52-year-old patient with a long clinical history of post-streptococcal glomerulonephritis and rheumatic disease, who after two years of renal replacement therapy started developing a severe form of secondary hyperthyroidism (intact parathyroid hormone (iPTH): 1417 pg/ml). The patient was being treated with Sevelamer hydrochloride orally administered (at a dose of 4.8 g/day) and intravenous vitamin D (at a dose of 3 g/week). Electrocardiogram showed signs of left ventricular overload, while echocardiography performed by a nephrologists showed left atrial enlargement, left ventricular hypertrophy and mitral stenosis due to mild to moderate scleral calcific changes (mitral valve area estimated to be 2 cm²).

A year later the patient began to experience dyspnea in connection with also minor efforts and not directly related to the hemodialysis treatment sessions. Physical examination revealed a systolic murmur 3/6 in the mitral valve area. Attempts to reduce the patient's dry weight resulted only in the onset of frequent episodes of hypotension. Echocardiogram showed a substantial increase in the left atrium size as well as diffuse calcification of the annulus and the anterior edge of the mitral valve suggesting severe mitral valve stenosis (mitral valve area estimated to be 0.9 cm²) (Fig. 1) confirmed by three-dimensional echocardiography performed in the department of cardiology. At this point the patient was referred

to the department of cardiac surgery and underwent valve replacement surgery which led to immediate clinical improvement. Table 1 describes the clinical classification of mitral stenosis.

Clinical case Nr. 2

A 78-year-old female patient treated in our outpatient nephrology service for severe chronic renal failure. The first cardiological evaluation carried out at nephrological referral showed good cardiovascular compensation with no episodes of angina and/or dyspnea. Electrocardiogram showed no significant alterations and echocardiographic examination, performed by a nephrologist, showed the presence of left ventricular hypertrophy with mild diastolic dysfunction grade I (early/atrial ratio <1). Two years later the patient started renal replacement therapy, and in the same period another echocardiographic examination was performed which confirmed good left ventricular compliance (ejection fraction 55%) despite the presence of mitral insufficiency with mild to moderate left atrial enlargement.

About a year later, the patient began to experience severe episodes of dyspnea resulting in the loss of 4 kg dry weight in one month, but without showing significant improvements in respiratory symptoms. The patient was not affected by anemia (hemoglobin mean levels were 12 g/dl and mean levels of hematocrit were 35%); spirometry examination showed a condition of mild chronic obstructive pulmonary disease. A new echocardiographic examination showed a further increase in the left atrium volume (left atrium area was 26 cm²) and an increase in mitral regurgitation (moderate to severe with a vena contracta diameter of 15 mm). Estimated pulmonary artery pressure was 30 mmHg and there was no evidence of pericardial effusion (Fig. 2).

The patient was then referred to the department of cardiology for a clinical evaluation. The echocardiographic pattern was completely confirmed, but there was no indication for surgery. However, the patient's medication was modified with the addition of losartan (100 mg/day) and carvedilol (6.25 mg/day). With this modification, the patient reported a marked improvement in respiratory symptoms. Table 2 shows the classification of mitral regurgitation.

Fig. 1 Left atrium dilation and mitral ring calcification (left); 3D rendering of mitral valve area (right).

Table 1 Echocardiographic parameters related to mitral stenosis (Ref. Otto C, Textbook of Clinical Echocardiography, Ed Saunders & Co, 2004).

Mitral stenosis	Light	Medium	Severe
Valve area	1.5–2 cm ²	1–1.5 cm ²	<1 cm ²

Discussion

Heart valve disease is frequently associated with secondary hyperparathyroidism in patients with terminal uremia [4,5]. The description of our clinical cases shows that ultrasound examination is of great help in the treatment of patients

Table 2 Echocardiographic parameters related to mitral regurgitation (Ref. Otto C, Textbook of Clinical Echocardiography, Ed Saunders & Co, 2004).

Mitral insufficiency	Light	Medium	Severe
Regurgitation volume (ml)	<30	3–6.9	>60
Vena contracta (mm)	<3	3–6.9	>7

with chronic kidney disease, ranging from routine ultrasound study of the urinary tract morphology to echocardiographic examination. Nephrologists with basic ultrasound know-how can perform the initial echocardiography screening in order to refer the patients to the department of cardiology without delay [6].

Appendix. Supplementary material

Supplementary data related to this article can be found online at [doi:10.1016/j.jus.2011.06.003](https://doi.org/10.1016/j.jus.2011.06.003).

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Fig. 2 Mitral valve regurgitation in left atrium.

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