Patients' observations of bioprosthetic valve failure: "My heart is honking, doctor"

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Abstract

Audible cardiac murmurs are uncommon and may indicate severe native valve dysfunction. In six patients with bioprosthetic mitral valves audible honking systolic murmurs suddenly developed. Doppler echocardiography showed characteristic striated regurgitant signals. At operation each prosthesis had torn cusps.

New audible murmurs and striated Doppler signals originating from mitral bioprosthetic valves are indicators of cusp tears. Recognition of this is important because early detection of prosthetic valve dysfunction may improve subsequent surgical outcome.

Audible honking murmurs have been heard throughout the cardiac cycle. Those in diastole have originated only from abnormal aortic valves. They have accompanied aortic cusp tears or leaflet prolapse arising either spontaneously¹ or from bacterial endocarditis¹ or syphilitic aortitis.^{2,3}

Audible systolic honks have arisen from both the mitral and tricuspid valves. Mitral regurgitation in dilated cardiomyopathy,⁴ mitral prolapse in adults⁵ and in children,⁶ and tricuspid prolapse⁷ have all given honks audible to patients, sometimes in amusing or embarrassing circumstances.^{6,8} Patients' descriptions of the murmurs differ but similes to animal noises are frequently used. We report on the menagerie of sounds that developed in six patients with mitral bioprosthetic valves and discuss their significance.

Case reports

CASE 1

A 57 year old woman had had a Carpentier-Edwards mitral valve prosthesis inserted 8 years before. While helping an elderly neighbour back to bed she was aware of the sudden development of a noise in her chest "like a goose honking". The noise was so loud she could not get back to sleep and she referred herself to us because she suspected something was amiss with her prosthetic heart valve.

On examination she had a grade 6/6 honking systolic murmur but no physical or radiological evidence of congestive heart failure. Echocardiography suggested a ruptured mitral prosthetic leaflet; mitral regurgitation was shown at angiography and she underwent

an operation to replace the prosthetic mitral valve. Rupture of one of the prosthetic cusps was found at operation.

CASE 2

A 62 year old widower had been given a Hancock mitral valve replacement six years before. He awoke one morning and was aware of a noise within the house. He thought this was coming from his central heating and bled all his radiators but the noise persisted. His next thought was that a pigeon was trapped in a chimney but after examining all of his chimneys he could not find a bird. Then he realised with a start that the sound was coming from his own chest. He telephoned the hospital to report this new noise. Acute prosthetic mitral incompetence was confirmed by examination, echocardiography, and angiography. He had a successful repeat valve replacement and at operation the original prosthesis was found to have a ruptured cusp.

CASE 3

After lunch epigastric pain developed suddenly in a 73 year old woman in whom Carpentier-Edwards mitral and tricuspid valves had been implanted 11 years before. Simultaneously she became aware of a "squeaking" from her heart and then she became breathless. She was referred to hospital where a grade 6/6 honking systolic murmur was heard. Echocardiography detected leaflet prolapse in the mitral position and Doppler echocardiography showed a striated mitral regurgitant jet. Angiography confirmed severe mitral regurgitation and at operation the mitral prosthesis was found to have flail torn cusps.

CASE 4

A 56 year old woman had had an Ionescu-Shiley mitral valve implanted 6 years before. Her husband was woken in the night by a "squeaking" noise. He searched the bedroom for the source of the noise which he eventually discovered came from his wife's chest. He woke her and she confirmed his finding. The next day in the cardiology clinic a grade 6/6 honking systolic murmur was easily heard at the apex. Echocardiography showed a prolapsed prosthetic mitral cusp and Doppler ultrasound detected mitral prosthetic regurgitation with a striated Doppler signal (figure). She was referred directly for an operation at which one leaflet of the prosthesis was found to be torn at its base.

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Pulsed wave Doppler echocardiogram from a patient with a ruptured cusp of a mitral bioprosthetic valve (case 4). The Doppler signal is striated suggesting harmonic summation of the ultrasound signal.

CASE 5

A 62 year old man had been given a Xenomedica mitral valve replacement six years before. His wife noted a grunting noise one morning at breakfast and they located it as coming from his chest. He quipped "if it's grunting it must be a pig's valve". He presented himself to our department. A 6/6 honking systolic murmur was heard and echocardiography and Doppler ultrasound showed features very similar to those in case 4. He was examined by coronary angiography which was normal and was referred for replacement of the prosthetic mitral valve.

CASE 6

An 83 year old man was kneeling by his bed at prayer one evening when he became aware that his utterances were accompanied by a cooing noise from his chest. That night he was troubled by breathlessness. Two days later he was admitted to hospital where a tear was found in his Hancock mitral prosthetic valve, which was implanted six years previously. Again Doppler echocardiography showed striated regurgitant signals.

Discussion

Loud honking systolic murmurs are typically associated with mitral valve prolapse⁹ but they have also been noted in patients with regurgitant mitral porcine prostheses.^{10 11} The murmur is probably caused by fluttering of cusp tissue. The striated Doppler echocardiographic signals are due to harmonic summation of the ultrasound beam reflected from the vibrating torn valve cusp. This Doppler echocardiographic appearance is characteristic of bioprosthetic cusp rupture.¹²

All the patients we describe presented because they heard a honking murmur. All were shown at operation to have rupture of the mitral bioprosthetic valve cusp. Acute prosthetic valve failure, which can usually be confirmed by Doppler echocardiography, should be suspected in all patients presenting with an audible honking systolic murmur. Only two of our patients presented with symptoms of breathlessness and in others the noise alone was the first indication of failure of the prosthetic valve. Surgical replacement of biological prosthetic valves carries a significant morbidity and mortality once heart failure has ensued. Such patients should be considered for urgent valve replacement before their condition deteriorates; this may occur rapidly. This is in contrast with honking murmurs associated with native valve prolapse which may be heard with all grades of severity of mitral reflux and do not imply an unstable condition.⁹

Failure of bioprosthetic heart valves is more common five or more years after implantation.^{13 14} There is now a large cohort of patients with these prostheses implanted in the 1970s and early 1980s. Patients in whom a loud new murmur develops at a mitral prosthetic valve should be referred urgently to their cardiac centre.

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