BNP in Valvular Heart Disease

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The two most common valvular lesions in adult cardiology are aortic stenosis and mitral regurgitation. Assessment and timing of surgery are always a challenge. Valvular replacement surgery or repair is usually delayed until symptoms develop in patients with moderate to severe aortic stenosis or mitral regurgitation determined by 2D echocardiography with doppler analysis. This Heartbeat will discuss how using brain natriuretic peptide (BNP), in addition to clinical assessment and echocardiography, may better define the timing of valvular surgery.

BNP

BNP is a cardiac hormone with vasodilating, natriuretic and renin-angiotensin-aldosterone inhibiting properties. It is secreted primarily by the myocardium in response to ventricular and atrial distention due to increased intracardiac pressure. February 2005 *Heartbeat* discussed how BNP could help with diagnosis, prognosis, and as a guide to optimizing therapy in heart failure (HF) patients. An important caveat was that this is not a stand alone test. BNP can be used as an aide to assist with decision making in certain clinical situations. Two recent studies evaluated using BNP in valvular heart disease and essentially came to the same conclusion.

MR

Assessing severity of mitral regurgitation and timing of surgery is difficult. A small study (129 patients) from the Mayo Clinic assessed the value of BNP levels for predicting the severity of MR and its outcome.[1] The authors conclude that BNP is not useful for confirming the severity of the MR. It represents the left ventricular and atrial adaptation to the MR rather than the severity. Higher levels of BNP (> the median BNP level of 31pgmL) predict worse outcomes under medical management and may be useful as a prognosticator for decisions regarding surgery.

Conclusion: More study and time will tell if measuring BNP is valuable for clinical decision making for MR. Given the multiple causes of elevated BNP (such as age, gender, pulmonary and renal problems) and controversy over the best assay. A high BNP should prompt a closer look at the patient with MR but no definitive conclusions should be made solely on the basis of BNP levels.

AS

Classically surgery is reserved for patients with symptomatic severe aortic stenosis (AS) by echocardiography. But in older patients who are much more sedentary, both from age and the insidious progression of their disease, symptoms may become unreliable. A small study evaluated the use of serial BNP measurements to predict the development of dyspnea, angina or effort syncope in patients with moderate to severe aortic stenosis (peak velocity $\geq$ 2.5 m/s.[2] Values of BNP > 50pmol/L had a high predictive value for predicting the early development of symptoms (< 2 years), however, its negative predictive value wasn't very good.

Conclusion: Measuring BNP, in addition to clinical assessment and echocardiography, may help define the timing of aortic valve surgery in moderate to severe AS. Longer and larger studies are needed.

Summary:

Both of these studies are encouraging and support the use of BNP to assist us in determining when to surgically intervene in our patients with AS and MR. Unfortunately the studies are short, small and inconclusive and therefore not definitive. But BNP is an easy, inexpensive study and if elevated can push us a little closer to the decision for surgery or at least alert us to monitor and or study a patient more closely.

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[1] Detaint D et al. BNP in Mitral Regurgitation. *Circulation* 2005; 111: 2391-2397.
[2] Cerber IL et al. BNP for Aortic Stenosis. *Am J Cardiol.* 2005; 95: 898-901.