

## **Determination of correlation between backflow volume and mitral valve leaflet young modulus from two dimensional echocardiogram images**

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### **ABSTRACT**

Mitral valve prolapse without proper monitoring might lead to a severe mitral valve failure which eventually leads to a sudden death. Additional information on the mitral valve leaflet condition against the backflow volume would be an added advantage to the medical practitioner for their decision on the patients' treatment. A study on two dimensional echocardiography images has been conducted and the correlations between the backflow volume of the mitral regurgitation and mitral valve leaflet Young modulus have been obtained. Echocardiogram images were analyzed on the aspect of backflow volume percentage and mitral valve leaflet dimensions on different rates of backflow volume. Young modulus values for the mitral valve leaflet were obtained by using the principle of elastic deflection and deformation on the mitral valve leaflet. The results show that the backflow volume increased with the decrease of the mitral valve leaflet Young modulus which also indicate the condition of the mitral valve leaflet approaching failure at high backflow volumes. Mitral valve leaflet Young modulus values obtained in this study agreed with the healthy mitral valve leaflet Young modulus from the literature. This is an initial overview of the trend on the prediction of the behaviour between the fluid and the structure of the blood and the mitral valve which is extendable to a larger system of prediction on the mitral valve leaflet condition based on the available echocardiogram images.

### **KEYWORDS:**

Backflow; blood flow; mitral regurgitation; mitral valve Young modulus; Young modulus

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