

Echocardiography Guidance and Evaluation of Myocardial Septal Myectomy with a Novel Device

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Abstract: Hypertrophic obstructive cardiomyopathy represents a significant clinical problem. The objective with this investigation was to address if echocardiography guide and monitor myocardial septal myectomy with a novel device. An experimental porcine model was used. The findings were that echocardiography can successfully be used to guide a novel procedure for minimally invasive surgical myectomy. Moreover, echocardiography can be used to hemodynamically monitor this procedure. Finally, echocardiography can be used to evaluate the result of the myectomy.

1 INTRODUCTION

Hypertrophic obstructive cardiomyopathy with dynamic left ventricular outflow tract obstruction often leads to progressive heart failure, and also sudden death in some patients (Maron, 2013). Surgical intervention with myectomy has, in the past, been the primary strategy for treatment (Maron, 2011). Alcohol septal ablation has in recent years been introduced as a less invasive alternative (Alam, 2006). The efficacy of this procedure has been questioned (Yacoub, 2005). We performed the first test ever of a novel surgical device for minimally invasive surgical myectomy (Septulus). The objective was to address following questions; 1) Could echocardiography guide this procedure? 2) Could echocardiography be used to hemodynamically monitor the procedure? 3) Could echocardiography be used to evaluate the result of the myectomy?

2 METHODS

An experimental porcine model was used. Two adult pigs were anesthetized and minimally invasive surgical myectomy was performed with the Septulus, introduced into the left ventricle from the apical approach. Echocardiography examinations were performed with CX-50 cardiac ultrasound system with S5-1 probe (Philips Medical Systems,

Best, The Netherlands). The porcine equivalent of parasternal long-axis was used to visualize septum and the left ventricular outflow tract.

3 RESULTS

Both the Septulus and the septal portion of the left ventricle could successfully be imaged in both pigs (figure 1). The procedure was successfully guided by the echocardiography images. Moreover, stroke volume could be calculated from pulsed Doppler recordings obtained in the left ventricular outflow tract (figure 2). The results from the myectomy could be recorded post-operatively (figure 3).

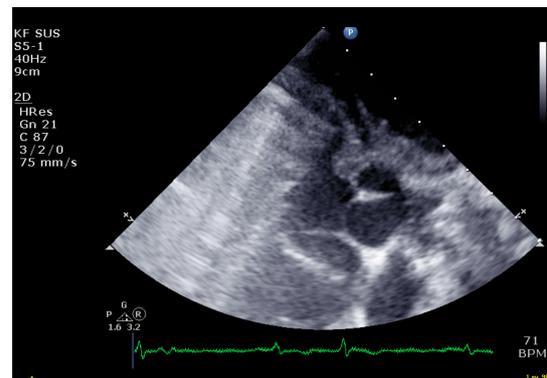


Figure 1: Shows the device at the septum.

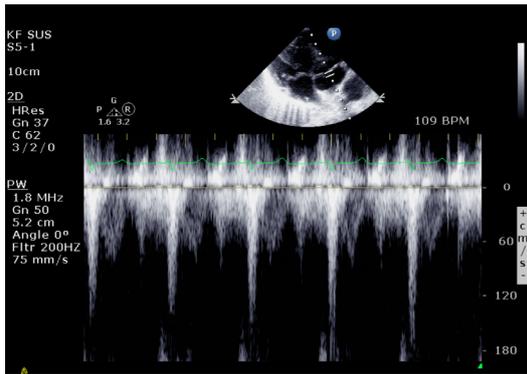


Figure 2: Shows Doppler recordings.

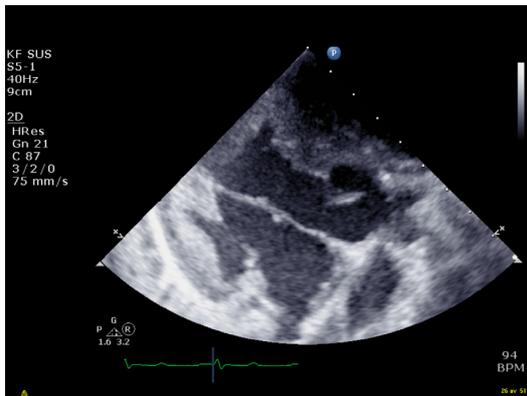


Figure 3: Shows the results from the Myectomy post-operatively.

4 CONCLUSION

Echocardiography can successfully be used to guide a novel procedure for minimally invasive surgical myectomy. Echocardiography can be used to hemodynamically monitor this procedure. Echocardiography can be used to evaluate the result of the myectomy.

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