0059

Non invasive ultrasonic chordal cutting

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Objective: Chordal cutting targeting leaflet tethering has been described to improve the efficiency of annuloplasty during ischemic mitral regurgitation surgery. Histotripsy is an ultrasound based technique for tissue fragmentation through the cavitation generated by a very intense ultrasonic pulse. In this study we investigate the feasibility of using histotripsy for chordal cutting to avoid cardiopulmonary bypass and invasive surgery in infarcted heart.

Methods: Experiments were performed in vitro in explanted sheep heart (N=10) and in vivo in sheep beating heart (N=5, 40+/-4kg). In vitro, the mitral valve basal chordae was removed, fixed on a holder in a water tank. The ultrasound pulses were emitted from the therapeutic device (1-MHz focused transducer, pulses of 8µs duration, peak negative pressure of 17 MPa, repetition frequency of 100Hz) placed at a distance of 64mm. In vivo, we performed sternotomy and the device was applied on the thorax cavity which was filled out with water. We analysed MV coaptation and chordae by real time 3D echocardiography. The animals were sacrificed at the end of the procedure, for postmortem anatomical exploration of the heart.

Results: In vitro, all the basal chordae were completely cut. The mean procedure time was 5.5 (+/-1.7) minutes. The diameter of the chordae was the main criteria affecting the duration of procedure. In the sheep, central basal chordae of anterior leaflet were completely cut. The mean procedure time was 22 (+/-9) minutes. By echography, the sectioned chordae was visible and no mitral valve prolapse was found. All the postmortem anatomical exploration of hearts confirmed the section of the basal chordea. No additional lesions were objectified.

Conclusions: Noninvasive ultrasound histotripsy succeed to cut mitral valve basal chordae in vitro and in vivo in beating heart. If positive, this will open the door of completely noninvasive technique for MV repair especially in case of ischemic or functional MR.

0028

What are the predictive performance and limitations of the Euroscore II?

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Purpose: The logistic Euroscore (Euroscore I) has been shown to lack accuracy when applied to contemporary patients. The Euroscore II has therefore been recently proposed to improve the prediction of operative mortality, but external validations are scarce. We compared the predictive performances of the Euroscore I and II in our institution.

Methods: The Euroscore I and II were was computed in 5114 consecutive patients who underwent cardiac surgery over a 5-year period. Discrimination was assessed using the c-index and calibration by comparing predicted and observed mortality. Besides the overall population we also specifically studied elderly patients (age ≥80) and patients with a body mass index (BMI) <25.

Results: Mean age was 63±14 years. Mean Euroscore I was 6.8±8.7%, mean Euroscore II 4.6±6.7% and 30-day mortality 4.8% (245 patients). C-index and comparisons between predicted and observed mortality are detailed in Table 1 for the overall population and for subgroups according to age and BMI.

Conclusion: Euroscore II has indeed a better predictive performance than the Euroscore I. Its discrimination and calibration are however less satisfying in patients with BMI<25 or aged ≥80. BMI should thus be taken into account, and in the elderly, other variables such as frailty may help to estimate more accurately surgical risk.

Abstract 0028-Table: Predictive properties of the Euroscore I and II

	Overall population	Age< 80	Age≥80	BMI<25	BMI≥25
c-index Euroscore I	0.75	0,77	0,60	0,75	0,80
c-index Euroscore II	0,80	0,81	0,66	0,78	0,83
p (calibration) Euroscore I	<0,001	0,001	<0,0001	0,007	<0,0001
p (calibration) Euroscore II	0,38	0,39	0,12	0,04	0,73

0029

Is the Euroscore II reliable to estimate operative mortality of valvular surgery?

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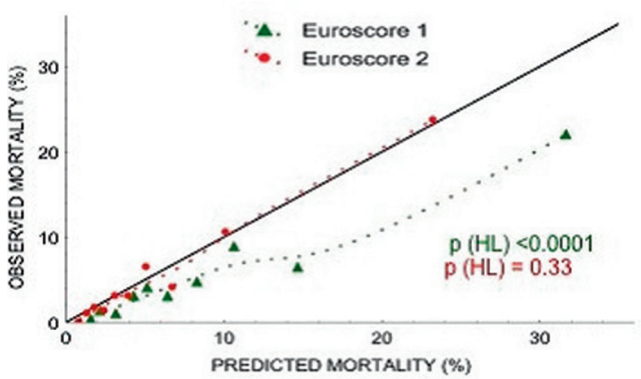
Purpose: Concerns have been raised regarding the reliability of the logistic Euroscore (Euroscore I). The Euroscore II has been recently described to achieve a more accurate prediction of operative mortality. However its performance has not been specifically studied in valvular surgery.

Methods: The predictive performance of the Euroscore I and II was compared in 2931 consecutive patients who underwent valvular surgery in our institution between 2006 and 2010. Discrimination was assessed using the c-index and calibration by comparing predicted and observed mortality.

Results: Mean age was 64±16 years, mean Euroscore I 8.8±9.9% and mean Euroscore II 5.9±7.5%. Half of the patients underwent more than a single valve procedure. Mortality at 30 days was 5.5% (160 patients). C-index was 0.77 (95% CI 0.74-0.81) for the Euroscore I and 0.81 (95% CI 0.77-0.84) for the Euroscore II. The overall comparison between predicted and observed mortality showed a significant difference for the Euroscore I (p<0.0001), whereas no difference was found for the Euroscore II (p=0.33). The Euroscore I overestimated operative mortality, in particular in patients at intermediate and high risk for surgery (Figure).

Conclusion: The Euroscore II achieves a good predictive performance in the estimation of 30-day mortality after valvular surgery. Calibration is markedly improved as compared with the Euroscore I. These results support the use of the Euroscore II for valvular surgery.



Abstract 0029-Figure: Calibration plot for the Euroscore I and II