



Title	Aqcostic quantification and colour kinesis: evaluation of left atrial and left ventricular function in real time
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S-C-5

Intracoronary Beta-Radiation for Restenosis Prevention: First Hong Kong Experience

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Background: Intracoronary beta-radiation brachytherapy has emerged as a viable treatment option in preventing recurrent restenosis in patients with in-stent restenosis (ISR) and de novo lesions. **Method and Results:** The objective of this prospective surveillance registry trial is to determine the safety and efficacy of the Novoste™ Beta-Cath™ system (Strontium 90/Yttrium 90) 40mm source train in preventing recurrent restenosis. 21 patients underwent percutaneous coronary intervention (PCI) followed by β -radiation brachytherapy. The mean age was 61.8 ± 9.2 years. (48-76 years) 47.6% of the patients were diabetic. Vessels treated were 12 LAD, 3 left circumflex, 5 right coronary arteries and 1 ramus intermedius. 20 ISR lesions and 5 de novo lesions were treated. Excimer Laser Coronary Angioplasty was used in 4 cases, cutting balloon in 1 and new stents implanted in 5 patients. Device success and procedural success was 100%. Active dose of 18.4 Gy for vessel size ≥ 2.5 to <3.5 mm, 23.0 Gy for vessel size ≥ 3.5 to ≤ 4.0 mm, 25.3 Gy for vessel size >4.0 mm was delivered to the injury zone with a minimum margin of 7mm on each edge. The technique of sequential positioning was used in 5 cases where the injury lengths were longer than 26mm. The mean dwelling time was 223.9 ± 30.7 seconds. Fractionation of treatment due to reduced coronary flow was not required. Off-line Quantitative Coronary Angiographic (QCA) analysis was done using the CSSA II QCA system. Mean pre-procedure reference diameter was 3.13 ± 0.76 mm. Minimal Luminal Diameter was increased from 0.28 ± 0.34 mm to 2.77 ± 0.61 mm. Mean diameter stenosis was reduced from 87.1% to a final residual stenosis of 13.2%. Geographic miss was noted in 1 patient. No angiographic complication was noted. There was no in-hospital morbidity and mortality. All patients received aspirin for life and clopidogrel for 6 months. Mean follow up period was 9.7 weeks (1-16 weeks). No major adverse cardiovascular event was recorded. 2 patients underwent early elective coronary angiography at 3 months because of chest pain. The vessel was patent in 1 patient with negligible luminal loss. The other patient developed diffuse ISR again, but refused coronary artery bypass surgery and hence underwent another PCI. **Conclusion:** Intracoronary beta-radiation brachytherapy using the Novoste™ Beta-Cath™ system can be performed safely with high device and procedural success rate. The ultimate success of this treatment modality has yet to be determined by 6-month angiographic follow up and long-term clinical follow up.

S-C-6

Acoustic Quantification and Colour Kinesis: Evaluation of Left Atrial and Left Ventricular Function in Real Time

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Background: Acoustic quantification (AQ) and color kinesis (CK) emerged as recent but powerful echocardiographic tools to evaluate cardiac function quantitatively in real time. We aim to study the potential role of AQ and CK in the assessment of left atrial (LA) function and hence its correlation with left ventricular (LV) function.

Methods: We enrolled 108 patients (mean age 67 ± 15 years, 82% male, 79% recent myocardial infarction) for echocardiography studies during cardiac rehabilitation. AQ and CK were performed using harmonic imaging at the apical 4-chamber and short axis view to evaluate left ventricular and atrial function. These results were correlated with conventional assessments of LV systolic and diastolic function.

Results: LV ejection fraction (LVEF) measured by AQ was significantly lower than that by M-mode (41 ± 14 vs $52 \pm 19\%$, $p < 0.001$), but are strongly correlated ($r = 0.74$, $p < 0.001$). Interestingly, the LV peak-emptying rate calculated by AQ accurately predicted LVEF measured by both AQ ($r = 0.88$, $p < 0.001$) and M-mode ($r = 0.60$, $p = 0.002$). In the assessments of LA function, a low LA peak-emptying or filling rate was independently associated with LA enlargement ($r = -0.70$, $p < 0.001$). The fractional area change (FAC) in the LA positively correlated with both peak LA emptying ($r = 0.69$, $p = 0.001$) and filling rate ($r = 0.77$, $p < 0.001$). In addition, we demonstrated a strong correlation between LA peak-emptying and filling rates with LVEF measured by M-mode ($r = 0.75$, $p < 0.001$), by AQ ($r = 0.67$, $p < 0.005$), or LV peak emptying rate ($r = 0.71$, $p < 0.001$). In subgroup analysis, those patients with poor systolic function as defined by LVEF $< 40\%$ by AQ had a significantly lower LA peak emptying (3.0 ± 0.9 vs 6.2 ± 2.9 ESA/s, $p = 0.01$) and filling rate (2.3 ± 0.8 vs 5.7 ± 3.4 EDA/s, $p = 0.02$) than those with LVEF $> 40\%$. On the other hand, the LA peak emptying rate ($r = 0.51$, $p = 0.09$), peak filling rate ($r = 0.52$, $p = 0.09$) and FAC ($r = 0.52$, $p = 0.08$) only correlated weakly with transmitral pulse-Doppler derived parameters.

Conclusion: AQ and CK are useful adjunct diagnostic tools to assess both LA and LV function. In particular, the LA peak-emptying and filling rates appeared to be powerful predictors of the LA and LV systolic function.