

exercise-associated increase in PAWP adjusted for the change in cardiac output ($\Delta\text{PAWP}/\Delta\text{CO}$) greater than 2 mmHg/L/min is a clinical predictor for HF outcomes and predicts exercise capacity. Although there is speculation that CMD may play a role in the development of early HFpEF, there is limited evidence that directly links CMD as assessed by an invasive coronary physiology study (ICPS) with HFpEF as measured by an exercise RHC.

METHODS AND RESULTS: This study was an exploratory, retrospective cohort analysis. The study population included patients experiencing unexplained cardiovascular symptoms including chest pain and dyspnea who were referred to our institution for a RHC with exercise who had also undergone an ICPS. Patients were classified hemodynamically based on a $\Delta\text{PAWP}/\Delta\text{CO} \leq$ or > 2 with exercise. Coronary physiology interventions included Doppler flow assessment after administration of intracoronary adenosine and acetylcholine, where coronary flow reserve (CFR) and the index of microvascular resistance (IMR) were quantified during hyperemia. To date, we identified a cohort of 20 patients who met the study's inclusion criteria. Of these, 19 completed a RHC exercise study from which 9/19 (47%) had a $\Delta\text{PAWP}/\Delta\text{CO} > 2$. Characteristics of the patients are shown in Table 1. The mean index of microvascular resistance (IMR) for patients with abnormal exercise hemodynamics was 32.6 versus 20.9 ($p=0.08$).

CONCLUSION: Among patients undergoing an ICPS, a relatively high proportion of these patients exhibit a $\Delta\text{PAWP}/\Delta\text{CO} > 2$ mmHg/L/min. We have also observed that in patients with an abnormal PAWP response, the mean IMR values were higher compared with patients with a normal PAWP response. Our observations support the indication that CMD may play a role in the development of early HFpEF. This relationship needs to be further characterized in a larger cohort.

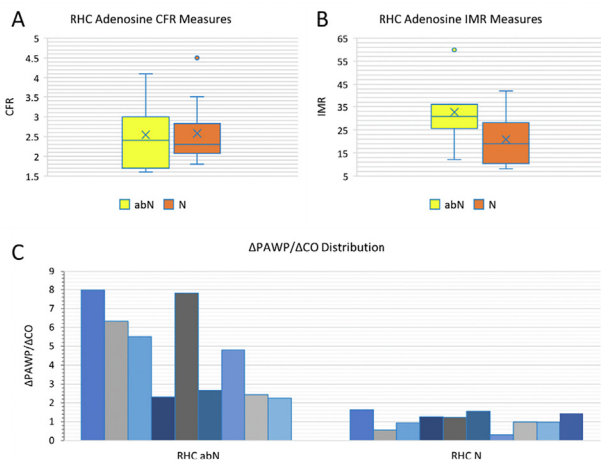


Figure 1. A) The coronary flow reserve (CFR) for patients with abnormal exercise hemodynamics was 2.54 versus 2.58 ($p=0.98$). B) The index of microvascular resistance (IMR) for patients with abnormal exercise hemodynamics was 32.6 versus 20.9 ($p=0.08$). C) 19 patients completed an exRHC study from which 9/19 (47%) had a $\Delta\text{PAWP}/\Delta\text{CO} > 2$.

P055

ONE-YEAR OUTCOMES IN PATIENTS WHO UNDERWENT CORONARY INTRAVASCULAR SHOCKWAVE LITHOTRIPSY FOR HIGHLY-CALCIFIED CORONARY LESIONS

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BACKGROUND: Intravascular lithotripsy (IVL) has been shown to have excellent angiographic and short-term clinical results in patients with heavily calcified lesions who require percutaneous coronary intervention in both randomized and observational studies. However, there is limited data regarding the long-term outcomes in real-world patients. We conducted a follow up of a high-risk IVL cohort at a tertiary care centre to help better define outcomes over a 1-year period post IVL.

METHODS AND RESULTS: We conducted a retrospective cohort study of 50 consecutive patients who underwent IVL between September 1, 2019 and January 31, 2020. One-year outcomes were available for 47/50 patients; 3 patients who did not survive their index hospitalisation (for reasons unrelated to IVL) were excluded. The primary outcome was need for target vessel revascularization (TVR) at 1 year from index procedure. Secondary outcomes included cardiovascular mortality, myocardial infarction (MI), and freedom from angina. The mean age of the cohort was 71.5 years and 38% of patients were female. Fifty-three percent of patients presented with non-ST elevation ACS as the indication for initial IVL. Twenty-six percent of patients underwent IVL for lesions of the left main coronary artery, and 26% underwent IVL for in-stent restenosis (ISR). Of a total of 47 patients (61 lesions), 4% of patients (3% of lesions) required TVR within 1 year; 96% of patients who underwent IVL remained free from repeat intervention on the same vessel. Two (4%) suffered mortality at one year from non-cardiovascular causes. Eighty-five percent of patients remained free from angina at 1 year. One patient suffered an MI within 1 year; the culprit vessel had not previously been treated with IVL.

CONCLUSION: IVL is associated with favorable results out to 1 year with very low rates of TVR. This suggests that IVL is an effective and durable modality for treatment of highly calcified coronary lesions in high-risk patients, including those requiring IVL for the indication of ACS or ISR.

P056

USE OF A DIGITAL APPLICATION TO OPTIMIZE THE CLINICAL TRAJECTORY OF PATIENTS IN A TAVI PROGRAM

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BACKGROUND: We used a digital application available on smartphones which helps health care professionals educate, engage and monitor patients through surgery outside the walls of the hospital. The aim of this study was to evaluate the impact of digital application use on patient’s clinical trajectory, on patient’s reported outcomes and on the reduction of health service utilization in a transcatheter aortic valve implantation (TAVI) program.

METHODS AND RESULTS: This platform was introduced in the TAVI program at the Montréal Heart Institute (MHI) in December 2020. Patients were engaged in the digital program at their visit to the clinic. They received notifications and health surveys 2 days before the procedure to ensure they were ready for the procedure and then daily for 7 days to follow their clinical trajectory. Based on their answers, patients either received self-education and self-management tips or were redirected to the program’s nurse coordinator. Follow-up surveys and Kansas City Cardiomyopathy Questionnaire (KCCQ12) were sent to patients at 1, 3, 6 and 12 months to evaluate their functional recovery. 227 patients underwent a TAVI procedure at the MHI from December 2020 to November 2021. 99 patients (44%) accepted to use the application and formed the digital application group. The two groups (digital application group and non-digital application group) were comparable in terms of age (76 years old (72. 81) vs 77 years old (71.82)), STS (Society of Thoracic Surgeons’ risk model) score (6.1% vs 6.7%), vascular complications (8.1 vs 7.8%) and post procedure pacemakers (10.1% vs 10.9%). In the digital application group, 93 % recommended the application, 95% said it helped them feel more confident before the procedure and 84% felt more confident after the procedure. Digital application use helped to reduce emergency visits by 33.5% (7.9 vs 11.9%) and readmission rates related to the procedure by 50.1% (7.9% vs 15.9%) in the month following a TAVI procedure.

CONCLUSION: Patients were largely satisfied with the digital application which helped to guide them before and after their cardiac intervention and helped to reduce health services utilization by avoiding hospital readmissions and emergency visits following a TAVI procedure. Our findings also suggest that digital application to optimize patient’s clinical trajectory is feasible in an aging population.

**P057
WHAT HS-TROPONIN LEVEL BEST CORRELATES WITH A PROGNOSTICALLY SIGNIFICANT CK-MB INCREASE POST-ELECTIVE PERCUTANEOUS INTERVENTION?**

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BACKGROUND: In patients undergoing percutaneous coronary intervention (PCI), the cut-off value for high-

sensitivity troponins (hs-cTn) has been set at over 5 times the 99th percentile upper reference limit (URL) by expert opinion in the 4th universal definition of MI. However, in contrast to post-procedural CK-MB isoenzyme elevation, for which a negative prognostic impact has been well documented when >3 times the URL, there is less evidence documenting the significance of post-PCI hs-cTn rise in relation to CK-MB. Some authorities have suggested using a threshold between 35 and 70 times the URL to differentiate non-significant myocardial injury from MI, but these thresholds have not been validated. We studied the incidence of type 4a MI and myocardial injury and the association between hs-cTn and CK-MB elevation.

METHODS AND RESULTS: Following the adoption of hs-cTn (Troponin I, Siemens) at our institution, we studied consecutive patients who underwent a non-urgent PCI with post-procedural hs-cTn and CK-MB measurements. All patients were either admitted from home or had normal pre-PCI hs-cTn. Primary outcomes were the incidence of type 4a MI, of myocardial injury (defined as hs-cTn elevation >5 times the URL without other criteria of ischemia) and the rise of CK-MB >3 times the URL. Out of 214 patients undergoing PCI, significant hs-cTn elevation occurred in 52% of patients, among whom 15% had type 4a MI and 37% had myocardial injury, with a mean hs-cTn of 5530 and 955, respectively. Among 33 patients with type 4a MI, 39% had prolonged chest pain, 52% had ECG changes and 79% had an angiographic complication. Risk factors for periprocedural type 4a MI were female sex (OR 2.5), intervention on a chronic total occlusion (OR 3.6), higher number of stents and longer total stent length. In patients with CK-MB >3 times the URL, mean troponin was 9320. Receiver operating characteristic curve (AUC = 0.98) showed that a hs-cTn value of 1830 for men, the equivalent of 34.5 times the URL, and 2535 for women, 74.6 times the URL, best correlated with a CK-MB elevation of >3 times the 99th percentile URL.

CONCLUSION: More than half (52%) of patients undergoing elective PCI have peri-procedural myocardial injury according to the current definition. The high sensitivity of hs-cTn likely leads to overdetection of myocardial injury. Our study supports the suggested use of a higher hs-cTn threshold to define prognostically significant myocardial injury, between 35 to 75 times the 99th percentile URL.

Table 1. Sensitivity, specificity, negative and positive predictive values of hs-cTn values for CK-MB > 3 times 99th percentile of upper reference limit (URL)

	hs-cTn > 5x URL	hs-cTn > 35x URL	hs-cTn > 70x URL
Sensitivity	100	88	75
Specificity	53	95	98
NPV	100	98	97
PPV	21	70	82

Data are given as %