

Title: Characteristics and management of patients with myocardial injury after noncardiac surgery attending a postoperative follow-up clinic: A retrospective chart review

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BACKGROUND: Myocardial injury after non-cardiac surgery (MINS) is among the most common postoperative complications and is associated with short-term and long-term morbidity and mortality. While the evidence base grows, the definition of best practices for MINS management is still an evolving field. We are conducting a retrospective chart review of patients referred to a postoperative MINS clinic at a tertiary academic centre, with the objective of describing their characteristics and management.

METHODS/RESULTS: We include patients with MINS referred to the clinic and attending the clinic in person since the launch of the clinic (September 2018) to at least 3 months before the beginning of the COVID-19 pandemic (December 2019). Upon training, data are extracted from electronic medical records regarding the index surgery, the visit(s) at the clinic, and any clinical encounter after discharge from the clinic to February 2020. Baseline data of patients referred but never attending the clinic are also collected for comparison. Here we describe data from the first 50 patients who attended the clinic, of the 250 expected eligible patients.

The median time (first and third quartile [Q1, Q3]) from hospital discharge to the first MINS clinic visit was 23 days (13, 36) with 23 patients (46%) attending ≥ 2 visits. The median patient age at MINS diagnosis was 74 years (Q1, Q3: 67, 82); 28 patients (56%) were female. **Table 1** presents other relevant baseline patient characteristics, characteristics of index MINS event, and management (investigations, pharmacological and non-pharmacological interventions) since MINS diagnosis.

Between the time of MINS diagnosis and the last visit at the MINS clinic, 39 patients (78%) had ≥ 1 echocardiogram, nuclear stress test, or angiogram. 6 patients (12%) were newly diagnosed with coronary artery disease (CAD), defined as new regional wall motion abnormalities, abnormal nuclear stress tests, or $>50\%$ coronary stenosis in patients without prior history nor evidence of CAD.

The median time (Q1, Q3) from hospital discharge to end of data collection was 332 days (258, 460). During this time, 25 patients (50%) presented to the emergency department, and 16 (32%) were admitted to hospital. 5 patients (10%) presented with complaints of possible cardiovascular etiology.

CONCLUSION: Our study will provide a comprehensive snapshot of characteristics of and current practice with patients with MINS attending a MINS follow-up clinic, which will inform quality improvement initiatives and research. The data collection is ongoing and expected to complete by December.

Table 1. Baseline patient characteristics, characteristics of index MINS event, and management (investigations, pharmacological and non-pharmacological interventions) since MINS diagnosis.

Variable	Number of patients (%) (n = 50)	Variable	Number of patients (%) (n = 50)
Preoperative patient characteristics		Cardiovascular investigations⁶	
Age ¹ , years	74 (IQR = 67-82)	Patients with at least one echocardiogram performed	37 (74)
Female	28 (56)	Findings in at least one echocardiogram	
Smoking Status		Left ventricular ejection fraction <50%	3
Current smoker	17 (34)	Wall motion abnormality	7
Ex-smoker ²	23 (46)	Left ventricular diastolic dysfunction	16
Non-smoker	8 (16)	Right ventricular dysfunction	3
Unknown	2 (4)	Significant valve disease	9
Preoperative medical history		Location performed ⁷	
Coronary Artery Disease	16 (32)	Inpatient (index hospitalization)	22 (44)
Myocardial infarction	9	Outpatient (during the follow-up at the clinic)	20 (40)
Stent	5	Patients with at least one nuclear stress test performed	11 (22)
Coronary Artery Bypass Grafting	4	Findings in at least one nuclear stress test	
Diabetes Mellitus	13 (26)	Abnormal	5
Insulin use	4	Abnormal - High-risk	1
Hypertension	36 (72)	Location performed	
Dyslipidemia	28 (56)	Inpatient (index hospitalization)	0
Stroke or transient ischemic attack	5 (10)	Outpatient (during the follow-up at the clinic)	11 (22)
Peripheral artery disease	8 (16)	Patients with at least one coronary angiogram performed	3 (6)
Congestive heart failure	4 (8)	Findings in at least one coronary angiogram	
Atrial fibrillation	9 (18)	Evidence of Coronary Artery Disease	3
Venous thromboembolic disease	3 (6)	Coronary stenosis >70% (new or old)	2
Chronic kidney disease	8 (16)	Location performed	
Dialysis	0	Inpatient (index hospitalization)	3 (6)
Gastrointestinal bleed	2 (4)	Outpatient (during the follow-up at the clinic)	0 (0)
Characteristics of index MINS event		PCI and/or stenting	0
Index Surgery		Cardiac surgery consult recommended	0
Timing		Cardiovascular medication use⁸	
Elective	25 (50)	Antiplatelet agents	47 (94)
Urgent	20 (40)	Pre-operative use	22
Emergent	4 (8)	New on discharge	20
Unknown	1 (2)	Started in MINS clinic	5
Surgical Discipline		Statin	45 (90)
General	13 (26)	Pre-operative use	21
Orthopedic	24 (48)	New on discharge	19
Other	13 (26)	Started in MINS clinic	5
Peak troponin (high sensitivity Troponin I) ¹ , ng/L	89 (42-192)	Dabigatran	17 (34)
Ischemic symptoms	2 (5) ³	Pre-operative use	0
Ischemic ECG changes	3 (6) ⁴	New on discharge	6
Cardiovascular medication titration in clinic⁵		Started in MINS clinic	11
Antiplatelet agents		Beta-blocker	28 (56)
started/increased	5 (10)	Pre-operative use	9
stopped/decreased	4 (8)	New on discharge	17
change of drug in same class	0 (0)	Started in MINS clinic	2
Statins		ACEi/ARB ⁵	39 (78)
started/increased	9 (18)	Pre-operative use	28
stopped/decreased	1 (2)	New on discharge	7
change of drug in same class	1 (2)	Started in MINS clinic	4
OACs		Non-pharmacological advice in clinic⁹	
started/increased	8 (16)	Advice on smoking cessation	3 (6)
stopped/decreased	4 (8)	Advice on exercise	2 (4)
change of drug in same class	2 (4)	Advice on diet	2 (4)
Beta-blocker		Advice on weight loss	0
started/increased	3 (6)	1. Expressed as median (1st and 3rd quartiles).	
stopped/decreased	2 (4)	2. Ex-smokers quit smoking at least 90 days prior to index operation.	
change of drug in same class	1 (2)	3. Denominator is 48, i.e., for 2 patients it was unclear from medical chart	
ACEi/ARB		4. Denominator is 49, i.e., for 1 patient it was unclear from medical chart	
started/increased	4 (8)	5. OAC = oral anti-coagulant; ACEi = Angiotensin-converting-enzyme inhibitor; ARB = angiotensin II receptor blocker	
stopped/decreased	0	6. Since MINS diagnosis, i.e., during index hospitalization or MINS clinic follow-up.	
change of drug in same class	0	7. Some patients had Echo performed more than once, both as inpatient and as outpatient.	
		8. The overall counts refer to the time of last visit at the clinic.	
		9. As documented on consultation dictations	

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