

Cardiogenic shock and cardiac arrest in STEMI: The Northern Saskatchewan perspective

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INTRODUCTION

Despite the gains in care of ST-segment elevation myocardial infarction (STEMI), the outcomes of STEMI complicated with cardiac arrest (CA) and/or cardiogenic shock (CS) remain suboptimal

Each STEMI-system of care has unique patient- and systems-level processes with impact on ischemic times, treatment patterns and outcomes. We describe characteristics and outcomes of STEMI complicated by CA/CS in Northern Saskatchewan

OBJECTIVES

Why Northern Saskatchewan?

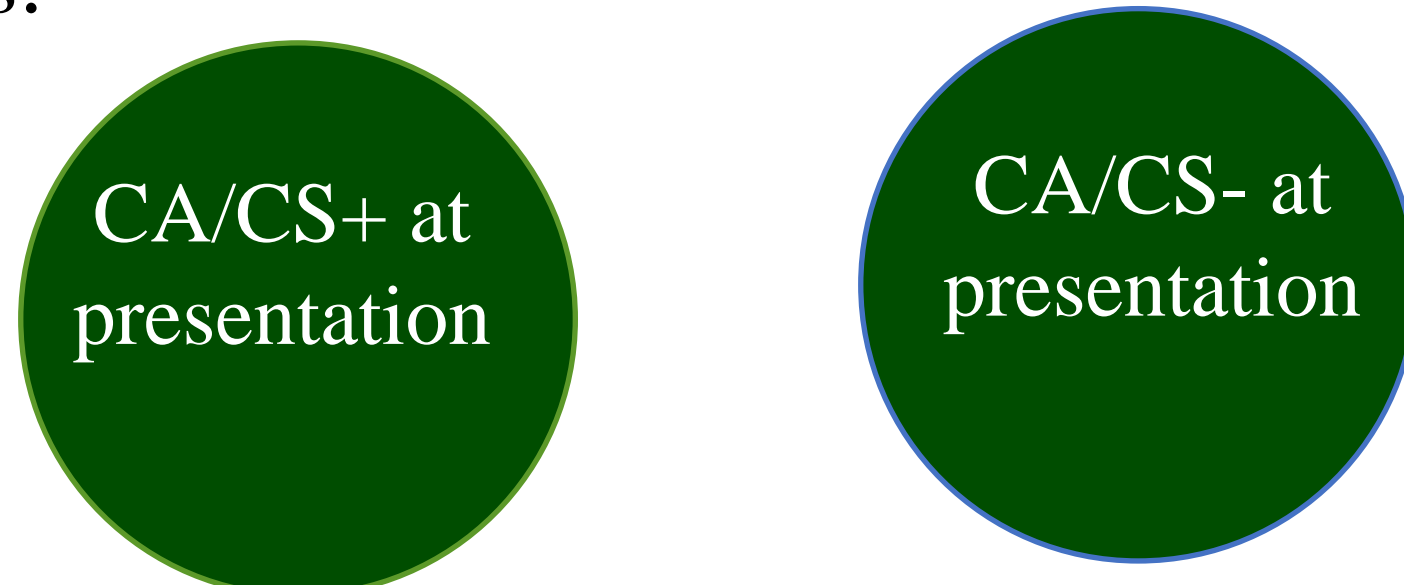
In the Northern Saskatchewan population, a single percutaneous coronary intervention (PCI) hub supports multiple non-metropolitan regional spokes. The geographical diversity therefore poses unique challenges in the management of STEMI complicated by CA/CS

Additionally, patients presenting with acute myocardial infarction in Northern Saskatchewan are suggested to have greater clinical comorbidity; this, may potentially compound adverse clinical

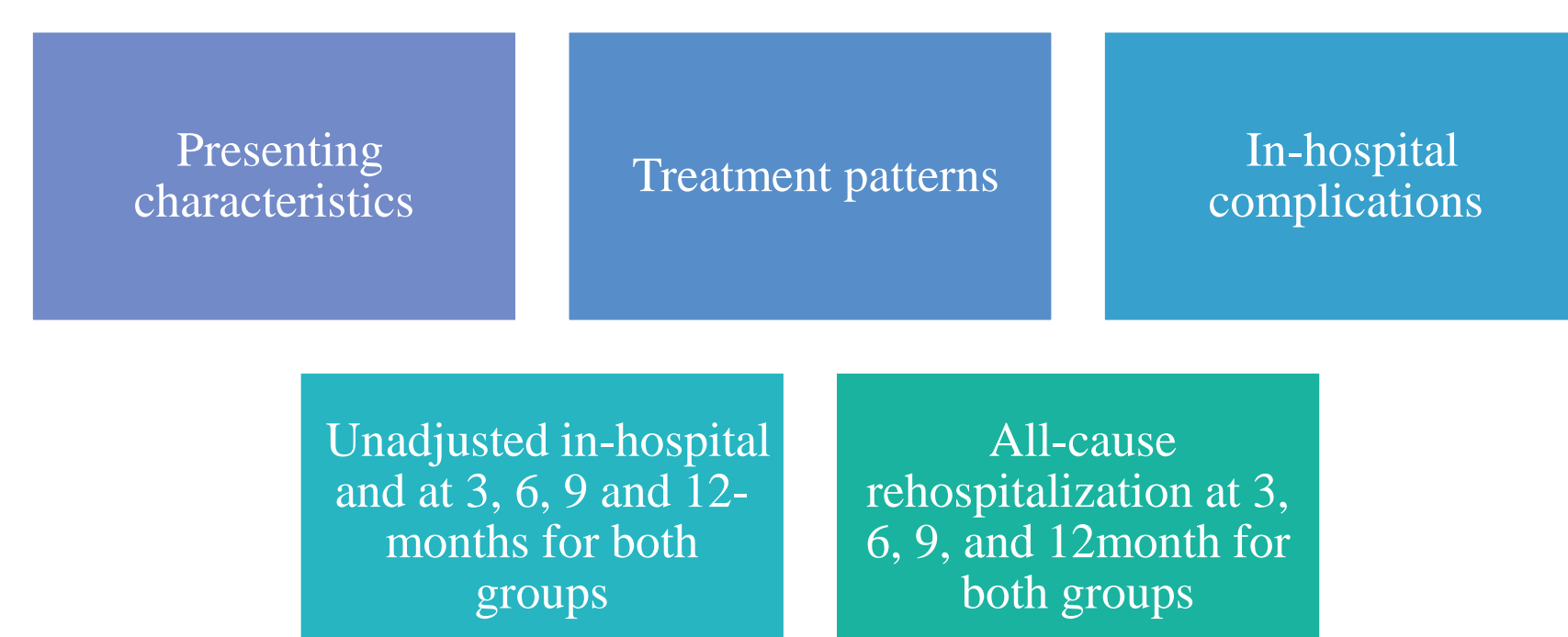
METHODS

564 consecutive STEMI presentations from Northern Saskatchewan who presented to Royal University Hospital (RUH) between March 15th, 2019 – March 30th, 2021, were evaluated

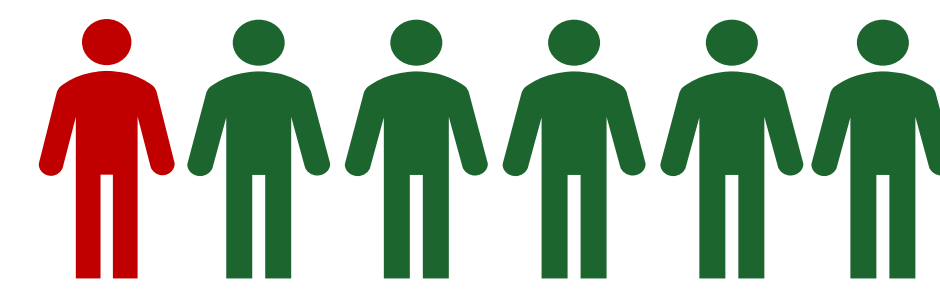
Patients were then characterized into one of two groups:



We then described a variety of patient characteristics such as:



RESULTS



One in every 6 STEMI cases from Northern Saskatchewan is complicated by CA/CS

Pre-Hospital

No statistically significant differences in risk factors between groups

| Variables | CS/CA+ (n=128) | CS/CA- (n=436) | P |
|------------------|----------------|----------------|-------|
| Diabetes | 25.0% | 29.6% | 0.312 |
| Hypertension | 40.6% | 60.1% | 0.840 |
| Smoker | 41.4% | 40.1% | 0.797 |
| Cocaine use | 3.1% | 2.5% | 0.710 |
| IVDU | 0.0% | 1.6% | 0.149 |
| Prior CHF | 4.7% | 2.1% | 0.105 |
| Prior CVD | 9.4% | 5.7% | 0.145 |
| Prior MI | 5.6% | 15.8% | 0.948 |
| Prior PCI | 12.5% | 17.0% | 0.221 |
| Prior CABG | 2.3% | 3.4% | 0.532 |
| History of A-fib | 4.7% | 4.6% | 0.966 |
| Prior COPD | 5.5% | 6.7% | 0.626 |
| Dialysis | 0.8% | 0.5% | 0.661 |
| PAD | 1.6% | 2.1% | 0.718 |

CA/CS+ group had statistically significant difference in response time between symptom onset to First Medical Contact (FMC) and Percutaneous Coronary Intervention (PCI)

Median 1.2 v 2.1 hours (p=0.02)

CA/CS+ Group has a significantly faster time from symptom onset to FMC

CA/CS+ group also had faster times from FMC to primary PCI
Median 1.1 v 1.8 hours (p= 0.002)

During Hospital Stay

No statistically significant differences between groups in:



Myocardial Infarction territory

Anterior MI in 38.5% of CA/CS+ group vs. 31.8% of the CA/CS- group



Reperfusion strategies

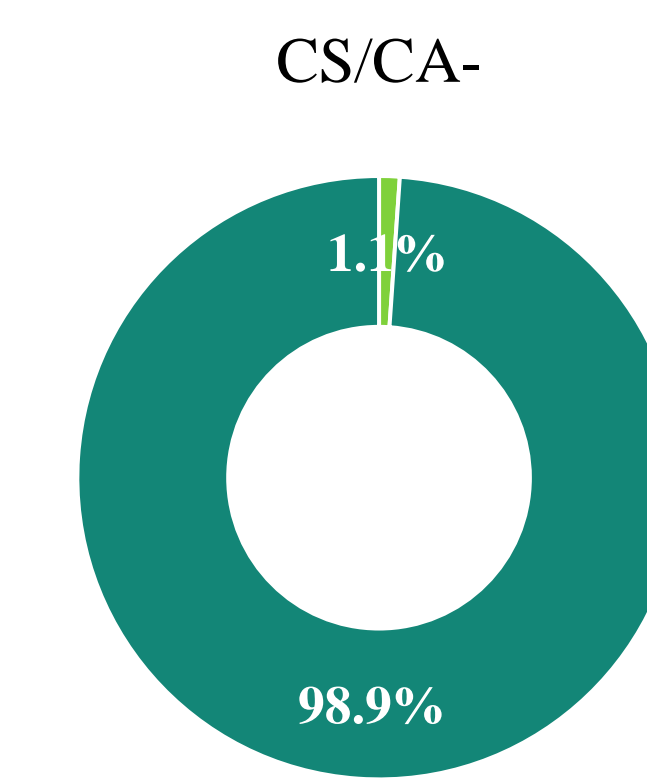
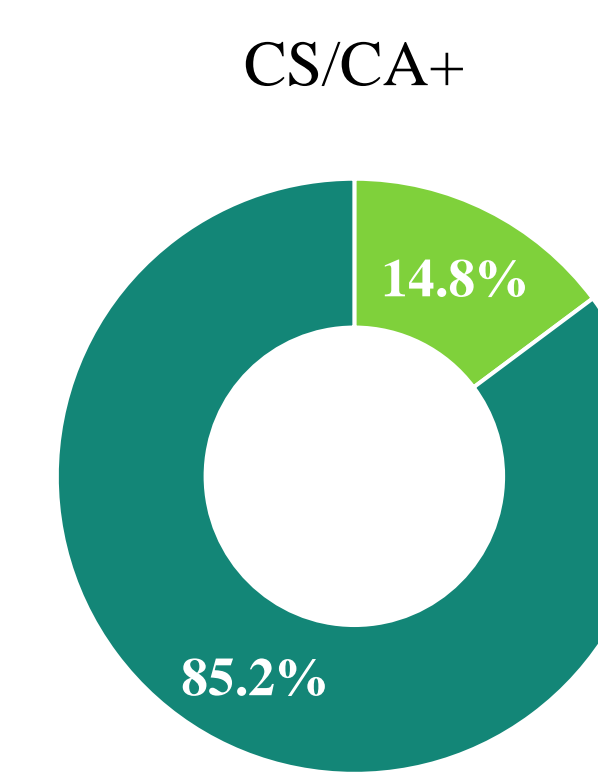
Primary PCI in 90.4% (CA/CS+) vs. 82.4% (CA/CS-)
Rescue PCI in 25.8% (CA/CS+) v 21.3% (CA/CS-)



Non-infarct related stenosis burden (>70%)

59.6% (CA/CS+) vs. 53.8% (CA/CS-)
2 vessel, 3 vessel significant for CS/CA+ patients

Significant increase in the need for mechanical circulatory support during PCI

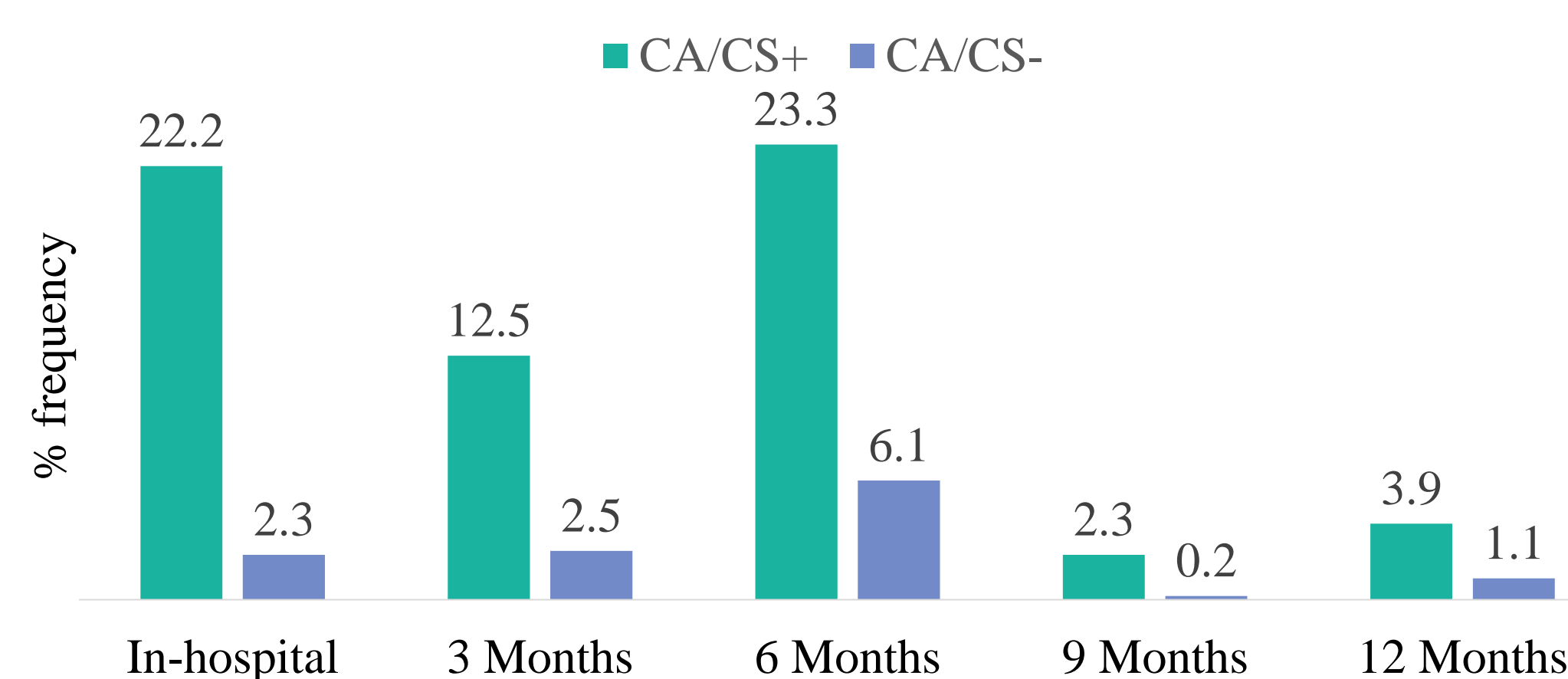


■ Needed MCS during PCI (14.8%) ■ Needed MCS during PCI (1.1%)
■ Did not need MCS during PCI (85.2%) ■ Did not need MCS during PCI (98.9%)

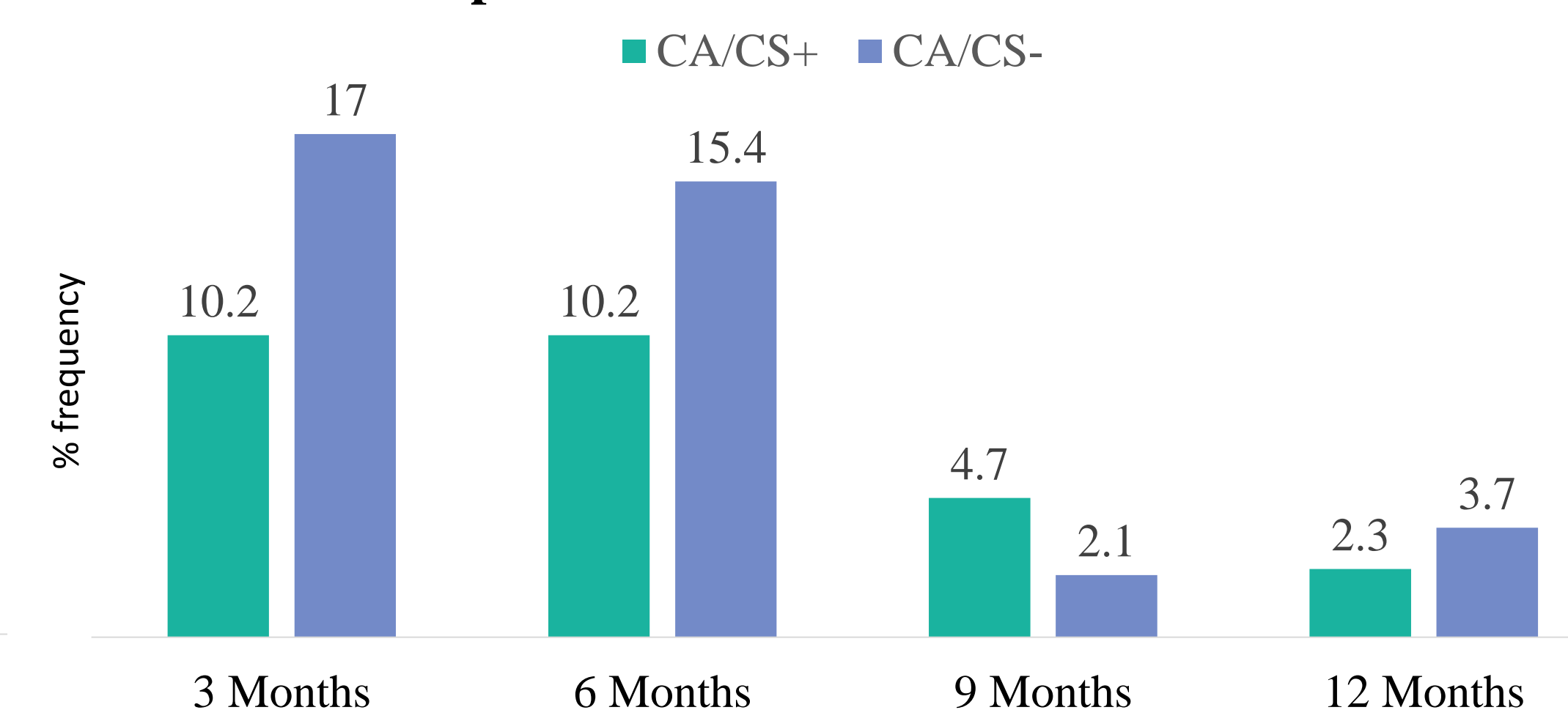
- In STEMI without CA/CS on presentation, risk of incident CA/CS in hospital stay was 2.53%
- Other arteries with significant (>70%) CAD (2 vessel, 3 vessel) higher for CS/CA+ (28%, 4.7%) vs CS/CA- (16%, 3.4%)

Post-Discharge

Unadjusted all cause mortality with and without CA/CS



Rehospitalization with and without CA/CS



CONCLUSIONS

CA/CS + frequently complicates STEMI presentations in Northern Saskatchewan. In those without CS/CA at presentation, incident CS in-hospital occurs relatively infrequently.

Baseline risk factors (both traditional and non-traditional), territory of myocardial infarction and reperfusion strategies are comparable in STEMI patients presenting with or without CA/CS

CS/CA complicating STEMI at presentation is associated with a statistically higher risk of in hospital all-cause mortality, that persists post discharge.

In Northern Saskatchewan where multiple spokes exist around a single PCI-center hub, our findings highlight the need to integrate both pre-hospital and in-hospital CS/CA pathways. Nearly 15% of CS/CA patients treated with MCS calls for the need to establish dedicated shock teams to rapidly triage the care of these high-risk patients

Future Directions



LOCATION OF FIRST MEDICAL CONTACT



SHOCK TEAMS



IN-HOSPITAL MORTALITY

REFERENCES

Berg, D. D., Bohula, E. A., van Diepen, S., Katz, J. N., Alviar, C. L., Baird-Zars, V. M., ... & Cruz, J. (2019). Epidemiology of shock in contemporary cardiac intensive care units: data from the critical care cardiology trials network registry. *Circulation: Cardiovascular Quality and Outcomes*, 12(3), e005618.

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