SGLT-2 Inhibitor administration post percutaneous coronary intervention: a systematic review

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Background

- Myocardial infarction (MI) remains the leading cause of death in the United States
- Post-infarct heart failure remains a challenge indicating the need for novel agents that promote myocardial recovery
- Sodium Glucose Co-Transporter 2 (SGLT2) inhibitors are a novel class of antidiabetic medications that have many cardiorenal benefits
- The use of SGLT2 inhibitors result in improved cardiac function through the following proposed mechanisms (Figure 1)
  - Natriuresis
  - Reduction of albuminuria
  - Reduction in sodium/hydrogen exchanger and calmodulin-dependent protein kinase II activity
  - Regulation of autophagy and the inflammasome
- Regular use of SGLT2 inhibitors results in improved blood pressure control due to a blockade of the renin-angiotensin-aldosterone system.
- SGLT2 inhibitors have also been shown to prevent hospitalization and cardiovascular deaths in patients with heart failure.
- Recent studies have evaluated the potential benefits of SGLT2 inhibitors on post-MI myocardial recovery

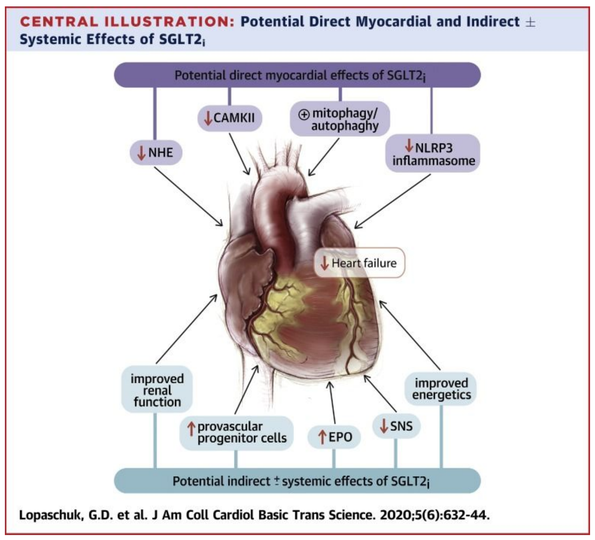

Figure 1: Direct and indirect myocardial effects of SGLT2 Inhibitors [1]

Purpose

The purpose of this study was to systematically review the available literature and identify studies which investigated the use of SGLT2 inhibitors in patients who had recently undergone percutaneous coronary intervention (PCI) post-MI.

Methods

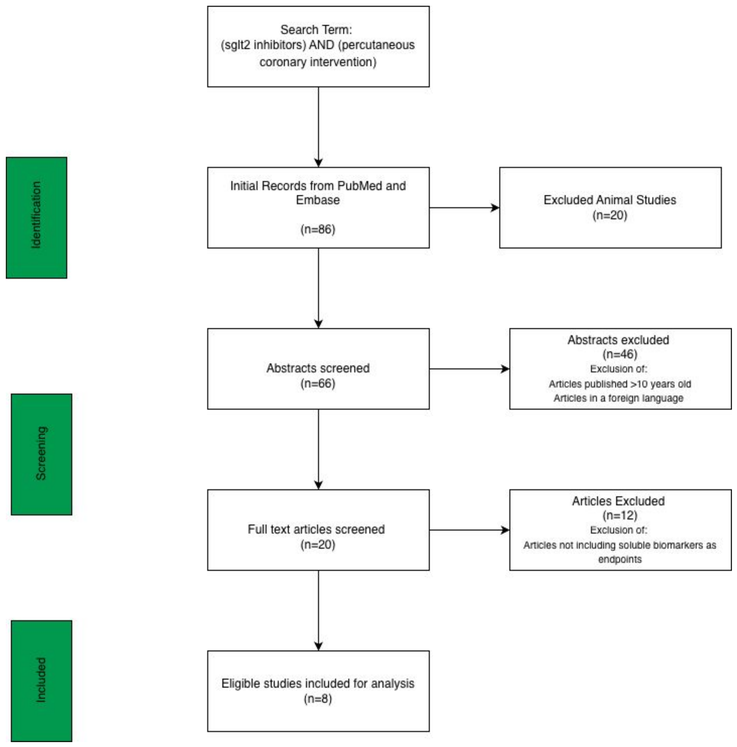

Figure 2: Screening strategy

- A total of 86 studies resulted from the initial search terms after the removal of duplicates
  - Inclusion criteria included:
    - soluble cardiac, metabolic or inflammatory biomarkers were either the primary or secondary study endpoint
    - post-PCI patients with or without Type 2 Diabetes Mellitus (T2DM)
  - Exclusion Criteria included any articles that were animal studies or more than 10 years old

Results

- The main endpoints assessed were:
  - brain natriuretic peptide (BNP)
  - c-reactive protein (CRP)
  - tumor necrosis factor-alpha (TNF-a)
  - interleukin-6 (IL-6)

Lead Author	Year	Patient Population	N	Intervention	Outcome
Lewinski	2022	Patients aged 18–80 years with a confirmed acute large MI	237	Oral empagliflozin 10 mg	BNP percent change from baseline at 6 months
Khani	2024	Non-diabetic and non-heart failure patients with ST-elevation MI who underwent primary PCI	53	Oral empagliflozin 10 mg	CRP at discharge
Sardu	2023	Patients with stable IHD	111	SGLT-2 Inhibitor use	CRP, BNP at 6 and 12 months
Li	2025	Patients with AMI and undergoing emergency PCI	44	Oral empagliflozin 10 mg	CRP at 1 month
Ye	2024	Patients with CAD and and T2DM	35	Dapagliflozin 10mg	CRP post discharge
Paolisso	2022	AMI patients undergoing PCI using SGLT2 inhibitors	98	Unnamed SGLT2 Inhibitor	CRP at discharge
Benedikt	2023	Patients aged 18–80 years with a confirmed acute large MI	191	Oral empagliflozin 10 mg	CRP at 6 months
Dayem	2023	Non-diabetic patients with anterior ST-elevation MI who underwent successful PCI	50	Dapagliflozin 10mg	BNP at 12 weeks

Figure 3: Studies included in analysis

- Patients who received an SGLT-2 inhibitor had significantly lower BNP levels at three, six, and twelve months post-PCI
- CRP, TNF-alpha, and IL-6 were significantly lower at discharge and up to twelve months post-PCI in patients treated with SGLT-2 inhibitors
- Diabetes status did not seem to affect whether SGLT2 inhibitor treatment resulted in an improvement in biomarker levels post-PCI.

Conclusion

- SGLT2 inhibitors result in a significant reduction in cardiac and inflammatory biomarkers following PCI.
- These benefits might apply to all patients undergoing PCI irrespective of diabetic comorbidities.
- Future studies are needed to better understand the mechanisms underlying the cardioprotective effects of SGLT2 inhibitors.

References

1: Lopaschuk, G. D., & Verma, S. (2020). Mechanisms of Cardiovascular Benefits of Sodium Glucose Co-Transporter 2 (SGLT2) Inhibitors: A State-of-the-Art Review. JACC. Basic to translational science, 5(6), 632–644. https://doi.org/10.1016/j.jacbts.2020.02.004