George Veall[1], Bahar Ebtehaj[1], Carl Ilyas[2]
[1] *Medical student, The Leeds Teaching Hospitals Trust #1, Leeds, UK*
[2]*Department of Anaesthetics, The Leeds Teaching Hospitals Trust #2, Leeds, UK*

The Incidence of Cardiac Complications Post-Emergency Laparotomy: a Retrospective Cohort Study

Introduction

Cardiac complications have been reported to be common in non-cardiac surgery (1). However, the incidence of cardiac complications following emergency laparotomy in the National Health Service (NHS) is unknown. The National Emergency Laparotomy Audit (NELA) was established to promote quality improvement across hospitals (2).

Aims: to determine the incidence of cardiac complications after emergency laparotomy and the efficacy of the NELA risk score at predicting the incidence of cardiac complications.

Methods

This retrospective cohort study used electronic records from adult patients who were recruited into NELA between December 2018 and December 2019 at St James' Hospital, Leeds, United Kingdom. Outcomes included incidence of MI and HF and all-cause mortality. MI was defined as cardiac troponin I ≥ 50 ng.l^{-1}, and HF was defined by the presence of pulmonary oedema on chest x-ray reports or the prescription of diuretics to treat pulmonary oedema. Arrythmias were excluded from this study due to poor ECG documentation.

30-day Outcome	Incidence rate
Mortality (all cause)	4%
Heart Failure	7.6%
Myocardial Infarction	2%

Table 1 – Demonstrating outcomes of 197 participant in the 30-day period after an emergency laparotomy.

References

(1) Ollila A, Vikatmaa L, Virolainen J, Vikatmaa P, Leppäniemi A, Albäck A, et al. Perioperative Myocardial Infarction in Non-Cardiac Surgery Patients: A Prospective Observational Study. Scand J Surg. 2017 Jun 1;106(2):180–6.

(2) NELA. Sixth Patient Report of the National Emergency Laparotomy Audit [Internet]. NELA; 2021. Available from: file:///Users/georgeveall/Downloads/The%20Sixth%20Patient%20Report%20of%20the%20NELA%202020%20-%20Executive%20Summary%20November%202020%20(1).pdf

NELA score and patient outcomes

In total, 197 participants had an emergency laparotomy. The incidence of MI and HF was 1.5% and 7.6%, respectively. No participants died in the 30-day post-operative period with cardiac complications. The 30-day all-cause mortality rate was 4.1%. This is shown by table 1.

Participants defined as 'high risk' by their NELA score, compared to non-high risk were shown to have an odds ratio of 6.9 (P<0.004, CI 0.603-3.256) and 1.8 (P=0.54, CI 1.373-2.591) for HF and MI respectively, this is shown by figure 1. However, the relationship between high NELA risk score and the incidence of MI or HF was not statistically significant.

Discussion

Cardiac complications appear to be low in this participant group. NELA risk score may have the potential to identify patients who are at risk of developing post-operative HF and MI. This was suggested by the increased odds ratio for the incidence of HF and MI in NELA high risk patients compared to non-high risk. However this sample size did not have sufficient power to achieve statistical significance. Further studies using a larger sample size across multiple trusts may help to achieve significance.

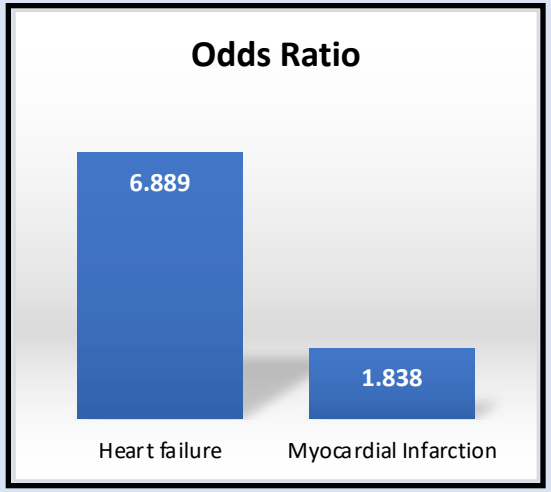

Figure 1 – Bar chart comparing odds ratio for the incidence of HF and MI in NELA high risk patients compared to non-high risk.

Conclusion

The NELA score may be effective at identifying patients at a high risk of developing HF and MI in the 30-day post-operative period. However, this needs to be established using a larger sample size across multiple NHS trusts.