NELA Scores Overestimate Mortality in an Australian Regional Hospital

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Background

Emergency cases account for 85% of surgical deaths. (1) Of these, the emergency laparotomy is the most common procedure performed, resulting in a 30-day mortality rate of 5 to 20% reported around the world. (2, 3) The urgent nature of these cases results in limited preoperative optimisation and significant variation in patient management and outcomes. Therefore, it is essential to identify high-risk patients so they may be managed with care tailored to their individual needs to provide the best opportunity for survival. (4)

A number of different audits have been developed in response to the high prevalence, high cost, and variable outcomes of emergency laparotomy patients. Locally, there is the Australia and New Zealand Emergency Laparotomy Audit (ANZELA) (5), and state-based audits, such as the Victorian Audit of Surgical Mortality (VASM) (6). In an international setting, there is the National Emergency Laparotomy Audit (NELA). (3) This was a large study of over 38 000 patients which led to the creation of a well validated scoring system that uses clinical variables to estimate a patient's risk of mortality within 30 days following an emergency laparotomy.

The NELA score is used to inform perioperative decision making and aid in identifying the high-risk patient. This allows for the implementation of targeted perioperative care pathways to ensure that those patients at the greatest risk of mortality are managed efficiently and appropriately for their level of risk. (7) The ultimate goal of this is to reduce mortality and achieve the best outcomes for our patients.

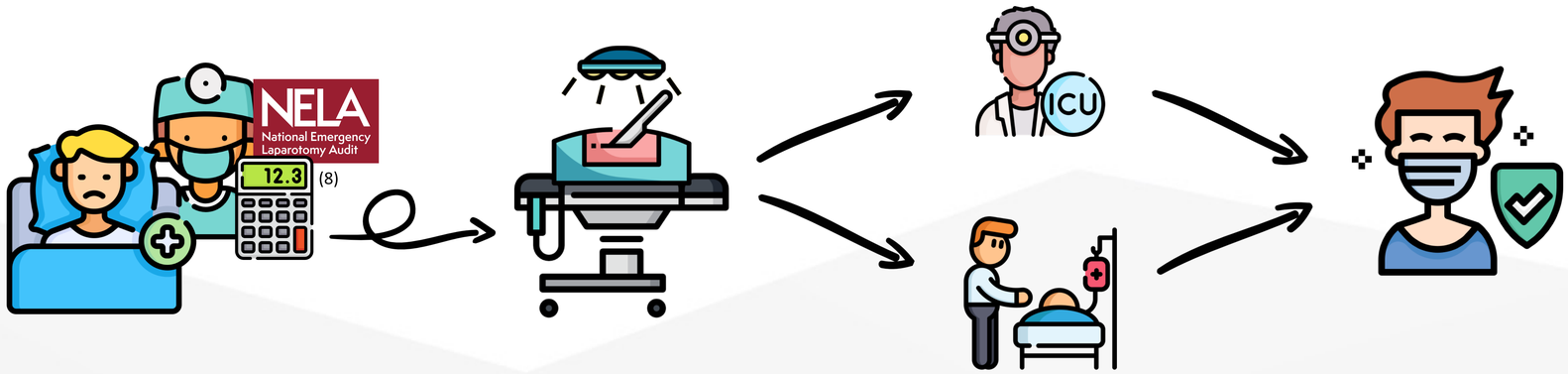
The NELA score accurately distinguishes high from low-risk emergency laparotomy patients. (4) However, it is not currently known whether the NELA score accurately determines how high risk these patients are. This means that we currently do not know whether the NELA score is well calibrated to the Australian population.

The NELA score helps us as clinicians to give patients meaningful information about their surgery and its risk. Further, it influences the allocation of hospital resources, including funding, staff allocation and bed availability. Therefore, it is essential that this score is precise.

Aim & Hypothesis

To determine whether the NELA score is well calibrated to the population of emergency laparotomy patients at University Hospital, Geelong (UHG).

It is hypothesised that the NELA score does not precisely predict mortality and is therefore not well calibrated to the population of emergency laparotomy patients at UHG.



Method

This was a single-centre retrospective cohort study of all patients who underwent an emergency laparotomy from July 2017 to January 2021 at UHG. Data was collected from the General Surgery Database at UHG. The data retrieved included patient demographics, NELA scores, post-operative destinations and post-operative outcomes.

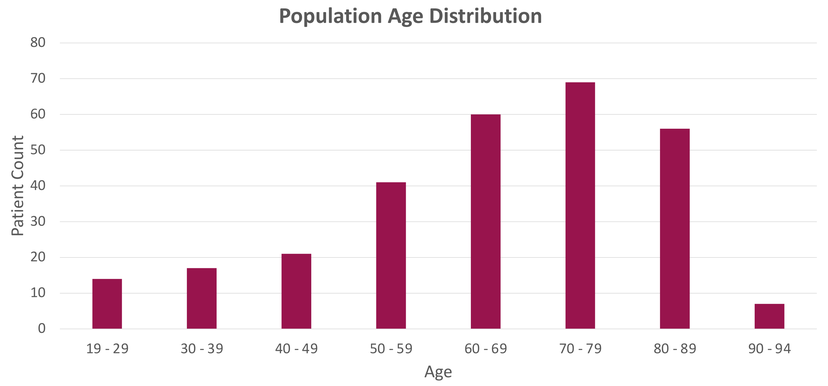
A total of 325 patients were identified. Documentation was incomplete for 40 patients, leaving 285 patients that were included in the analysis.

Statistics

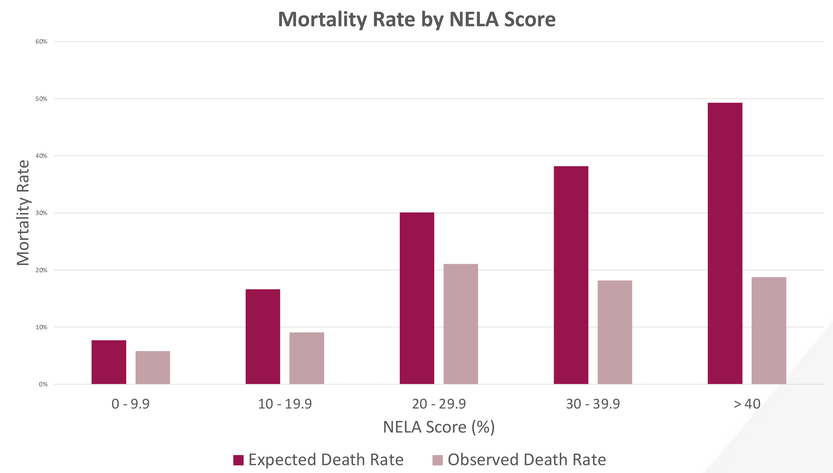
Mann-Whitney U Test	→	Median NELA Scores
Indirect Method of Standardisation (9)	→	Standardised Mortality Rate (SMR)
Byar's Method	→	Confidence Intervals for SMR

Results

Male	n = 125
Female	n = 160
Mean age	Males = 61 years Females = 68 years
Median age	68 years [range 19 to 94 years]



30-Day Mortality		
Alive	267	94%
Dead	18	6%



Median NELA Score	Dead v Alive = 20% [range 3.7% to 44.3%] v 6.4% [range 0.10% to 85%] (p <0.001)
Standardised Mortality Rate	18 observed deaths / 32 expected deaths (**57%** [95% CI 35% to 90%])

Discussion

It was determined that mortality after emergency laparotomy at UHG was approximately half the rate predicted by the patients' NELA scores. The observed mortality rate was significantly lower than expected. This is particularly evident in the high-risk groups.

NELA was originally established in 2014. At this time, the UK reported a 30-day mortality rate of 11.8%. In 2019, this had reduced to 9.6%. (2) This is attributed to changes in care processes recommended in the first NELA report. Through implementing the improvements in perioperative care recommended by the NELA, mortality rates have improved and the NELA score has become less precise. This is the most likely explanation for the poor calibration of the NELA score in the study population.

Conclusion

Mortality after emergency laparotomy at UHG was approximately half the rate predicted by the patients' NELA scores.

Reference List

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