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Introduction:
Activation of the inflammatory response after cardiac arrest (CA) is a well-documented phenomenon that may lead to multi-organ failure and death. We hypothesized that white blood cell count (WBC), one marker of inflammation, is associated with one-year mortality in ICU treated CA patients.

Methods:
We used a nationwide registry with data from five academic ICUs to identify adult CA patients treated between January 1st 2003 and December 31st 2013. We evaluated the association between the most abnormal WBC within 24 hours of hospital admission and one-year mortality. We accounted for baseline risk of death using multivariable logistic regression (adjusted for age, gender and 24h sequential organ failure assessment [SOFA] score).

Results:
A total of 5,543 patients were included in the analysis. Of those patients 2,387 (43%) were alive one year after CA. We plotted WBC against baseline risk of death and through graphic examination of a locally weighted scatterplot smoothing (loess) curve found the lowest risk of death to be associated with a WBC of 12 (E9/l) (Figure 1). We used this value as a cut-off point and ran separate multivariable regression analyses, accounting for baseline risk, for patients with a WBC over or under 12. For those with a WBC under 12, an increasing WBC was associated with a reduced risk of death (OR 0.969, 95% confidence interval [CI] 0.940–0.999). For those with a WBC over 12, an increasing WBC was associated with an increased risk of death (OR 1.018, 95% CI 1.004–1.034).

Conclusion:
A WBC deviating from 12 E9/l is associated with a small but statistically significant increase in probability of death in CA patients. Mortality increases with both high and low WBCs. The lowest mortality was observed at WBC 12 which is higher than healthy population reference value (WBC 3.4 -8.2), suggesting that moderate leukocytosis after CA may not be harmful.

Image:

Association of white blood cell count with predicted mortality