Abnormal hb-levels associate differently with type 1 and type 2 myocardial infarction in patients visiting the emergency department with chest pain

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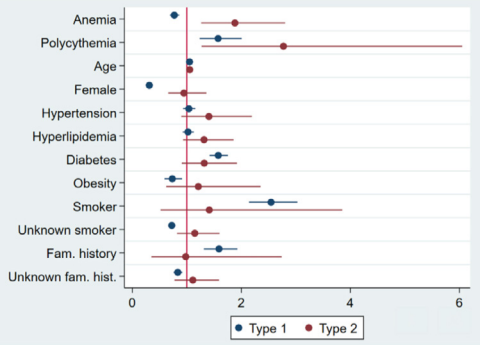
Background: Previous studies have found an association between myocardial infarction (MI) and abnormal haemoglobin (Hb) but it is unknown whether Hb-levels are associated with type 1 and type 2 MI in unselected patients with chest pain visiting the emergency department (ED).

Purpose: To investigate the association between abnormal Hb-levels and type 1 and type 2 MI in patientens visiting the ED with chest pain.

Methods: The study population comprised all consecutive patients visiting four urban ED:s for chest pain between 2013–2016 with available data on Hb. Clinical data from the ED visit were cross-referenced to compulsory national registries retrieving information on previous diagnoses and treatments to identify history of cardiovascular disease (defined as previous MI, stroke or peripheral vascular disease), hypertension, hyperlipidaemia and diabetes mellitus. Patients were categorized depending on the exposure (Hb-level) to anaemia, normal and polycythaemia. The primary outcome (type 1 and type 2 MI) was identified in the Swedish Web-System for Enhancement and Development of Evidence-Based Care in Heart Disease Evaluated According to Recommended Therapies (SWEDEHEART). Relative risk ratio (RRR) was calculated using multinomial logistic regression, with 95% confidence interval (CI) using no infarction as reference. The robust sandwich estimator was used to estimate standard errors. Adjustments were made for risk factors according to HEART-score.

Results: A total of 64 606 patient with chest pain were included with a mean (SD) age of 56 (19) years and 48% were women. Anaemia was present in 10 204 (15.8%) and polycythaemia in 1598 (2.5%). Overall, type 1 MI occurred in 2 296 patients and type 2 MI in 145. The risk for type 1 MI was higher in both anaemia (RRR 1.8, 95% CI 1.6–2.0) and polycythaemia (RRR 1.6, 95% CI 1.3–2.0) compared to normal Hb. For type 2 MI the risk was markedly higher for both low and high Hb compared to normal (RRR 4.0, 95% CI 2.8–5.6) and (RRR 3.0, 95% CI 1.4–6.9). Taking age, gender and risk factors into account, patients with anaemia had a lower risk (RRR 0.8, 95% CI 0.7–0.9) for type 1 MI compared to patients with normal Hb whereas patients with polycythaemia still had a higher risk (RRR 1.6, CI 1.2–2.0). For type 2 MI, the risk remained higher for both low (RRR 1.9, 95% CI 1.3–2.8) and high Hb (RRR 2.8, 95% CI 1.3–6.2) compared to normal.

Conclusion: Abnormal Hb-levels in chest pain patients in the ED were significantly associated with an increased risk of type 1 or type 2 MI, however when accounting for risk factors, in a differential pattern. These novel findings indicate that Hb-level may be important when assessing patients for MI symptoms in the ED, however, further investigations are needed to establish the definite predictive value.



Adjusted results type 1 and type 2 MI