

Introduction Of A Restrictive Blood Transfusion Threshold For Hip Fracture Patients – A Consecutive Cohort Study Based On Complete Follow-Up In National Databases

Trauma / Hip & Femur Trauma / Miscellaneous

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Background

There is consensus on that blood transfusion should be limited. A restrictive transfusion limit using 7.0 g/dL for any patient or symptoms of anaemia, 8.0 g/dL if the patient has chronic heart disease, and 9.0 g/dL for patients with acute coronary syndrome, has in randomized controlled trials (RCTs) shown to reduce red blood cell transfusion in hip fracture patients without increasing mortality. The mortality is very low in the RCTs which could imply that the external validity of these studies is limited and the effect of these restrictive guidelines has never been investigated in large cohort trials. Due to a desire of a more restrictive transfusion policy, the Danish National Clinical Guidelines (NCG) for transfusion with blood components was introduced in 2014 in which more restrictive transfusions limits was established. The present study report on a population based cohort before and after the introduction.

Objectives

To estimate the association of introducing the NCG for transfusion with blood components on blood transfusion proportion and mortality for hip fracture patients above 65 years.

Study Design & Methods

In a population base of 1.22 million inhabitants, all hip fracture patients are treated at four hospitals as the Danish National Health Service provides tax-supported free healthcare and general hospital care for all Danish citizens. This consecutive cohort study included patients with hip fracture in two 1-year time periods. The first time period was October 1st, 2012 – September 30th, 2013 and constitutes the control group using liberal transfusion limits. The second time period was October 1st 2015 – September 30th 2016, constituting the intervention group of adhering to the NCG using restrictive transfusion limits.

Data from the Danish Interdisciplinary Registry for Hip Fractures was collected including age, sex, Body Mass Index (BMI), Charlson Comorbidity Index (CCI), type of fracture, type of surgery, time to surgery, and death. Data was merged with data from the Danish Transfusion Database and the Regional Laboratory Database for information on red blood cell transfusion and hemoglobin. Data on medication, if reimbursed within 100 days prior to admission to hospital, was retrieved from Odense Pharmacoepidemiological Database. Cox proportional hazards models were performed for comparing the mortality risk in the liberal and the restrictive time period adjusting for age, sex, CCI, medication, time to surgery and

type of surgery were performed.

Results

2,908 patients were included, 1,494 in the liberal period (LP) and 1,414 in the restrictive period (RP). There were no major baseline differences in the two time periods concerning age, sex, BMI, CCI, type of fracture, time to surgery or medication. In the LP 42% received blood transfusions compared to 30% in the RP ($p < 0.001$). The mean (95% CI) hemoglobin (g/dL) at the first transfusion was at 9.10 (8.97;9.21) in the LP and 8.47 (8.18;8.44) in the RP ($p < 0.001$). The 30-day mortality (95% Confidence Interval (CI)) was 13% (11;14) in the LP and 9% (8;11) in the RP yielding an adjusted relative risk of 0.72 (0.57;0.91) for the RP compared to LP. The 90-day mortality was 19% (17;21) in the LP and 15% (13;17) in the RP yielding an adjusted relative risk of 0.78 (0.65;0.94) for the RP compared to LP.

Conclusions

The restrictive NCG was implemented leading to a lower transfusion proportion. The restrictive transfusion limits was associated with a decrease in overall mortality rate which was not shown to be a period effect. Thus, it seems safe to implement this guideline for hip fracture patients in all hospitals.