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401. BLOOD TRANSFUSION

Retrospective Study of Blood Transfusion Utilization in Surgical Patients in a Quebec, Canada Health Region: Do We Overestimate the Surgical Risk

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Introduction

Blood transfusions were initially developed in the 20th century to support emergency surgery on injured soldiers. Their access and use have since revolutionized our ability to perform elective surgeries. However, there is a misconception that surgical procedures continue to be a primary user of blood transfusions, such that many surgeons have become reliant on blood units being reserved for their patients. A high-risk surgery is currently defined as a 48-hour risk of requiring a transfusion in at least 2-4% of cases (*Blood* 2012,120:2954-2963). Patients meeting that risk category must have a blood group determination and cross-match before elective surgeries. While data from the ACS-NSQIP US database reported a decrease from 5.5% to 4% in transfusion rate for general surgery procedures between 2012 and 2018, rates remain elevated, included a risk of 6.6% for hemorrhoid ligation (*Transfusion* 2021,61:3119-3128).

The present study sought to evaluate the rates of use of transfusions during and immediately following surgery in a Canadian setting. Given improvement in surgical techniques, the regulated training of surgeons, and a universal healthcare access favoring the concentration of more complex surgical cases to regional centers, it was suspected that the need for blood products may be overestimated.

Study design

We conducted a retrospective study of the use of pRBC transfusions in all surgeries performed during a 24-month period in a single Quebec health region. Region 12 has a mix of urban and rural communities with a total population of almost half a million inhabitants. All types of surgeries are performed, with the exception of cardiac surgery, neurosurgery, and transplantation. The region includes 5 operating theaters, a larger regional center with 8 operating rooms and 4 smaller centers with 2-5 rooms. The current recommendation is for all patients undergoing surgery to have a group determination and cross-match before all major surgeries.

Results

Between January 2018 to December 2019, a total of 34 934 elective and emergency surgeries were performed. 172 patients received a total of 546 pRBC units (0.49% of surgeries). 395 units were transfused either during surgery or during the first 24 hours post-operatively. During the same period, a total of 10 982 blood units were transfused in the health region for all indications. Only 4.9% were given to surgical patients.

Table 1 demonstrates transfusion rates by surgical specialty in Health Region 12. Major surgeries such as thoracic and vascular surgery, and urologic and ENT oncology are centralized to the urban regional center. 9% of vascular surgeries required blood transfusions (half being elective procedures), followed by thoracic surgery with 2.8% of surgeries (half also being elective procedures). All other types of surgeries had a < 1% utilization of blood transfusion, independent of hospital.

34 cases (0.1%) required 3 or more blood units during surgery. Only 3 of 9 patients who received more than 5 blood units during the first 24 hours of surgery survived 30 days post-operatively.

Of the 172 patients who were transfused, alloantibodies were found in only 7 patients, of which 4 were significant. All four were already known in the national database, even though two were not detected during the pre-operative cross-match.

Conclusions

The 48-hour surgical blood transfusion risk in our region is significantly lower than that reported in recent data. Surgical subspecialization and the concentration of more complex cases in higher volume centers may explain the reduced operative blood transfusion risk. In the present study, only vascular and thoracic surgeries qualified as high-risk, representing only 1.4%

of all surgeries performed in the region. Therefore, pre-operative complete cross-matching could be avoided in more than 98% of surgeries, resulting in significant savings in specialized technical time, which is of particular importance at a time of personnel shortages.

Disclosures No relevant conflicts of interest to declare.

Table 1. Transfusion rates by specialty and hospital type

| Surgical Specialty | Regional hospital | | | Local hospitals | | | Total | |
|--------------------|-------------------|-----------|-----------|-----------------|-----------|-----------|--------|-----------|
| | Cases | Tf T (%) | Tf 3+ (%) | Cases | Tf T (%) | Tf 3+ (%) | Cases | Tf T (%) |
| Vascular | 244 | 22 (9) | 4 (1.6) | | | | 244 | 22 (9) |
| Thoracic | 248 | 7 (2.8) | 2 (0.8) | | | | 248 | 7 (2.8) |
| General | 2 710 | 33 (1.2) | 5 (0.2) | 4 703 | 23 (0.5) | 3 (0.06) | 7 413 | 56 (0.75) |
| Urology | 2 342 | 24 (1.0) | 7 (0.3) | 1 651 | 0 | | 3 993 | 24 (0.6) |
| Obst-Gynecology | 2 731 | 11 (0.4) | 6 (0.22) | 2 400 | 7 (0.29) | 2 (0.08) | 5 131 | 18 (0.35) |
| Orthopedic | 4 162 | 24 (0.58) | 2 (0.05) | 6 986 | 20 (0.29) | 2 (0.03) | 11 148 | 44 (0.39) |
| ENT & Max-Facial | 3 968 | 1 (0.03) | | 2 789 | 0 | | 6 757 | 1 (0.01) |

Figure 1

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