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Blood Transfusion Rates as a Primary Outcome Measure: The Use of Predetermined Triggers and Display of Clinical Indications in Providing Accurate Comparative Transfusion Rates

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To the Editor:

We read with interest the paper by Kamath et al.[1] on the efficacy of saline-coupled bipolar sealing devices in simultaneous bilateral total knee arthroplasty (TKA). The use of bipolar sealing and conventional electrocautery was compared in 71 consecutive patients who underwent bilateral TKA. Unfortunately, it must be noted that there are discrepancies in the reported transfusion rates. It was stated in the results section of the abstract that patients treated with the bipolar sealer were 35% less likely to require a transfusion when compared with patients treated with conventional electrocautery. The same percentage (35%) was presented in the conclusion section of the article. In contrast, the authors state that in their discussion that the blood transfusion rates were 33% lower in the experimental bilateral group when compared with the control group. The results section of the article and Table 2 claim that 55% (16 of 29) of patients in the experimental cohort required a blood transfusion, while the rate was 83% (35 of 42) in the control group. Therefore, the difference in transfusion requirements between the two groups would be 28% and not the 35% or 33% stated elsewhere in the paper.

The need for blood transfusion was determined in the study based upon clinical need as determined by the surgeon and medical co-management team. This included consideration of pertinent medical comorbidities (e.g., strong history of cardiac disease), clinical symptoms such as lethargy, and hemodynamic parameters such as tachycardia and/or hypotension refractory to initial fluid resuscitation. In general, patients without cardiac history were not transfused for a haemoglobin level greater than 8 g/dL. Fixed, predetermined transfusion triggers were not employed, allowing the need for transfusion to appear vague in nature. As stated as a limitation, the staff and surgeons were not blinded and therefore there was a possibility of bias in the decision making process but the authors state that the criteria for transfusing symptomatic patients was used consistently.

It is interesting to note that patients who were treated with the bipolar sealing device when compared with patients in the control group had: matched demographics, similar preadmission haemoglobin level (13.5 g/dL vs. 13.3 g/dL), similar estimated blood loss (100 mL) and nonsignificant increased haemoglobin decline (4.2 g/dL vs. 4.8 g/dL), yet finished with the significantly less transfusion requirements.[1] It is unclear why there should be a significant difference in transfusion rates when other parameters were similar. One potential explanation for this could be age. It is known that transfusion requirement after major joint arthroplasty is greater in the elderly.[2] We note that the control group probably contained a greater number of more elderly patients compared with the experimental group (63.4 ± 17.9 vs. 59.1 ± 4.1), and it would be interesting to know the ages of those that required transfusions as a possible explanation to account for the differences between the two groups. Another possible explanation could be the contribution of dilutional anaemia, and it would be useful to know if there were any differences in the perioperative use of intravenous fluid between the two groups.

The overall transfusion requirements found in this study are different to those experienced in our clinical practice. An analysis of bilateral TKA performed at our institution is presented in Table 1. A saline-coupled bipolar sealing device was not used in any of the cases. Our centre employs a fairly restrictive transfusion policy and is governed by a team of senior intensive care specialists who

Table 1. Preoperative Patient Characteristics and Perioperative Haemodynamic Values*

Variable	SWLEOC (n = 36)	Kamath et al.[1]	
		Control group (n = 42)	Bipolar sealer group (n = 29)
Age (yr)†	69.9 ± 2.8	63.4 ± 17.9	59.1 ± 4.1
Body mass index (kg/m^2)‡	31.0 (32.0–27.0)	32.4 (29.2–38.9)	35.0 (31.4–42.9)
ASA classification§	2.0 ± 0.38	2.58 ± 0.55	2.59 ± 0.5
Male sex	17 (47.2%)	16 (38%)	14 (48%)
Preadmission haemoglobin (g/dL)†	13.8 ± 3.7	13.3 ± 0.5	13.5 ± 0.4
Transfusion required	6 (17%)	35 (83%)	16 (55%)
Units of blood transfused‡	0 (0–0)	2 (2–2)	1 (0–2)
> 2 Units of blood transfused	2 (6%)	8 (19%)	2 (6.9%)
Estimated blood loss (mL)‡,‖	50 (50–100)	100 (42.5–150)	100 (75–200)
Discharge haemoglobin (g/dL)‡	10.1 (9.6–10.9)	9.4 (8.7–10.1)	9.1 (8.7–9.4)
Haemoglobin decline (g/dL)†	3.4 ± 4.0	4.2 ± 0.5	4.8 ± 0.4
Operative time (min)†	154.1 ± 10.5	174 ± 8.7	196 ± 15.5

The table is displayed with the same units and descriptive statistics as the original paper.
ASA: American Society of Anesthesiologists, SWLEOC: South West London Elective Orthopaedic Centre.
*The values of patients who underwent bilateral total knee arthroplasty under the care of five surgeons at the SWLEOC over 2-year period (2014.6.1–2016.5.31). Values are presented as †mean ± 95% confidence interval, ‡median (interquartile range), §mean ± standard deviation.
‖Intraoperative blood loss is reported as categorical values (minimal, < 100 mL, < 200 mL, < 500 mL). The upper limits were used for calculation and the minimal category was given a value of 50 mL for calculation.

work as perioperative physicians. In general, transfusion is avoided in patients with a haemoglobin level > 8 g/dL and used in all patients with a haemoglobin level < 6 g/dL. For those in between, the decision to transfuse is based on patient factors such as comorbidity and cardiorespiratory risk, ongoing blood loss, and symptoms related to anaemia. Haemoglobin levels between 8–10 g/dL, but who experience symptomatic anaemia despite an adequate circulatory volume. The transfusion protocol is similar to the protocol presented in the Levine et al.[3]

Our transfusion rate was much lower at 17% compared with 55% and 83% rates reported by Kamath et al.[1] respectively (Table 1). Whilst stringent parameters are at odds with an individual patients needs based on the clinical picture, it would seem prudent that studies which use transfusion rates as the primary outcome should set fixed parameters. In cases where the parameters were not followed due to clinical need, a summary of indications could be included which would allow a clearer picture and explain results such as those found by Kamath et al.[1]

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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