Intra-articular tranexamic acid wash during bilateral total knee arthroplasty

To the Editor:
We read with interest the article by Zhu et al. The authors concluded that topical tranexamic acid (TXA) wash decreased the blood transfusion rate and length of hospital stay. Perioperative and total blood loss were mentioned, but the difference between the 2 was not elaborated. Perioperative includes the pre-, intra- and post-operative periods. Only the haemoglobin balance method was described for calculation of blood loss.

Generally the drop in haemoglobin level following bilateral total knee arthroplasty is 3 to 5 g/dl. However, the total drop in haemoglobin level in the TXA group ranged from 1.55 to 2.75 g/dl. As the minimum trigger for blood transfusion was a haemoglobin level of 9 g/dl, how did any patient receive a transfusion? What are the reasons for such a low haemoglobin drop in their series?

When was the postoperative haemoglobin level measured? The haemoglobin level usually continues to drop for 2 to 4 days after surgery and then plateaues. The lowest value should be considered when calculating total blood loss. Please clarify the protocol for measurement of postoperative haemoglobin level.

Drains were not used. Drains are thought to decrease haematoma collection, and in the TXA group, clamping of the drain for some time may have increased the contact time with TXA and may have increased its efficacy. Can the authors comment on this? In patients without a drain, was there any postoperative swelling, ecchymosis, or haematoma collection?

Intra-articular TXA may be absorbed systemically. The authors used a combined dose of 3 g of TXA (1.5 g for each knee). The risk of systemic toxicity with such a high dose in the absence of a drain cannot be overlooked. Did the authors check the serum TXA level? Was there any advantage of topical use over intravenous use in bilateral cases? In our opinion, the intravenous route is preferred, particularly for bilateral cases, as a single low dose of 10 to 15 mg/kg may be effective for both knees. It avoids 10 minutes of waiting period/contact time, and decrease in surgical time itself may reduce blood loss.

The authors mentioned only the functional criteria for discharge from hospital. Discharge of a patient depends on wound condition, oozing from wound, and fever. These may not have been controlled. The decision to discharge largely depends on the treating surgeon, and thus observer bias cannot be ruled out. The use of TXA is not the only cause of earlier discharge. Its effect on the length of hospital stay remains to be evaluated with further studies.

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Authors’ reply

Perioperative blood loss accounts for blood loss during surgery and within the first postoperative 24 hours. Total blood loss is measured with reference to the lowest value of haemoglobin level during hospitalisation. The haemoglobin level decreases continuously for 2 to 4 days postoperatively, although the decrease on day 1 accounts for the largest proportion.

The decrease in haemoglobin level after total knee arthroplasty is multifactorial. Surgical approach, peri-operative management protocol, and surgeon factors play important roles. These factors vary between studies. In one study, aspirin (325 mg twice daily for 4 weeks) was prescribed for prophylaxis of postoperative thromboembolic events, but the exact surgical approach was not mentioned. In addition, patient demographics also vary between studies in terms of gender ratio and race. In one study, the mean haemoglobin drop (24-hour postoperatively) was 1.25 g/dl for intra-articular TXA group and 1.91 g/dl for intravenous TXA group. In our study, transfusion rate took into account patients who were transfused intra-operatively due to a perceived large blood loss. The amount of blood transfused was corrected when calculating blood loss, so the actual decrease in haemoglobin level was relatively small.

We agree that clamping of the drain for some time may increase the contact time with TXA and its efficacy. A drain was not used in order to avoid rapid washout of the TXA. In our series, one patient developed severe postoperative swelling. No ecchymosis or haematoma was observed. Use of a drain has not shown to improve knee swelling or flexion, length of hospital stay, or haemoglobin level.

Serum TXA level was not measured, because a combined dose of 3 g of TXA (1.5 g for each knee) was considered acceptable and safe. A topical or intra-articular dose of 3 g of TXA has been used in many studies. The risk of systemic toxicity is not increased compared with either placebo or intravenous TXA, as evidenced by comparable rates of thromboembolic events.

Advantages of topical use over intravenous use in bilateral cases were outside the scope of our study. In a study comparing the effects of intravenous and intra-articular TXA in terms of blood transfusion during simultaneous bilateral computer-assisted total knee arthroplasty, no difference was noted between the 2 routes of administration. Topical TXA is superior to intravenous TXA in reducing blood loss and clinical outcome after simultaneous bilateral total knee arthroplasty.

We agree that discharge of a patient from hospital depends on a variety of clinical criteria, which may not have been controlled. Observer bias could not be ruled out in our retrospective, match-controlled study, and a causal relationship between intra-articular TXA and discharge time could not be established. Further study is warranted to evaluate the association between intra-articular TXA and shortened length of hospital stay.

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