Minimum effective bolus dose of oxytocin during elective Caesarean delivery

Editor—We read with interest the study by Butwick and colleagues on minimum effective bolus dose of oxytocin during elective Caesarean delivery and wish to make a few comments. We appreciate that their findings indicate that adequate uterine contraction may be achieved in some patients with doses of oxytocin of 0.5–3 units but feel that this does not justify their conclusion that the routine use of 5 units oxytocin during elective Caesarean section be abandoned.

The authors study showed that supplemental oxytocin was required for 20% of patients in both the 0.5 unit group and the 1 unit group. Even in the 5 unit group, 13% of patients ultimately required further boluses of oxytocin to achieve clinically satisfactory uterine contraction. This surely indicates that a significant proportion of the patients were underdosed initially and also that there is a significant group of patients who require more than 5 units of oxytocin post-delivery to achieve adequate uterine contraction.

It is well recognized that the major risk period for massive blood loss is immediately after delivery of the fetoplacental unit. During this period, underdosing of oxytocin could potentially contribute to significant haemorrhage secondary to uterine atony. We are concerned that failure to be proactive in administering adequate doses of oxytocin during this period may put some women at risk of massive haemorrhage.

Unfortunately, we cannot predict which patients will have adequate uterine contraction with low-dose (or even no) oxytocin. If we recommend reducing the dose for all patients, we may disadvantage a subset of patients who require a larger dose to prevent serious post-partum haemorrhage.

It has been appreciated for some time that bolus dosing of 5 units oxytocin post-delivery can lead to marked cardiovascular changes which can precipitate haemodynamic collapse in those with pre-existing cardiovascular compromise. Recent work has shown that slowing the rate of delivery of the bolus of 5 units oxytocin or giving the 5 units as an infusion leads to more cardiovascular stability without increasing blood loss. We share the authors’ concern that bolus dosing of 5 units oxytocin may produce potentially serious cardiovascular side-effects but suggest that slowing the rate of delivery rather than reducing the dose may be more appropriate.

Conflict of interest
None declared.

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In summary, further studies investigating oxytocin dosing after elective Caesarean sections ought to focus on the clinical endpoint of haemorrhage and aim to seek an optimal bolus and infusion regime that will promote ongoing uterine contractility extending well into the post-partum period.

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None declared.
the half-life of oxytocin is 5–12 min and metabolic clearance rates are high. Sarna and colleagues showed that oxytocin infused at 1 unit min\(^{-1}\) produces high uterine scores, however the first assessment was made at 5 min after the start of infusion. A recent study reported the ED\(_{50}\) of oxytocin as an infusion to be 0.29 units min\(^{-1}\) but 17.5% of patients in this study required additional uterotonics due to inadequate uterine tone. On the basis of current evidence, we believe that low-dose oxytocin bolus administration followed by carefully titrated oxytocin infusion for maintaining adequate uterine tone is justified.

We found no differences in parity or number of previous CS between study groups which were reported in our paper. More stringent inclusion criteria would have reduced the external validity of our results. Careful distinction is also required for risk factors associated with post-partum haemorrhage from those specifically associated with uterine atony. A large, observational study of uterine atony after primary CS reported that the association of specific clinical risk factors and uterine atony was too imprecise for practical clinical use.

No rescue dosing was given before assessment at 2 min, therefore rescue dosing did not affect the calculation of ED\(_{50}/\)ED\(_{95}\) of oxytocin at 2 min. As stated in our paper, all patients received uterine massage. Our previous response provided supplemental data and commentary on uterine exteriorization. We acknowledged that uterine massage techniques were not standardized in our paper. An oxytocin infusion was commenced for patients who achieved adequate uterine tone during the study period. We apologize if this was incompletely described in the methods. It is likely that our oxytocin infusion (0.08 units min\(^{-1}\)) may have been subtherapeutic for the maintenance of adequate uterine tone after initial oxytocin dosing (in patients achieving initial adequate uterine tone). Therefore, we speculate that the oxytocin infusion during the study period is unlikely to have significantly affected uterine tone assessments during the study period. We understand that further work is planned to assess different oxytocin regimens (bolus vs bolus+infusion) in the postpartum period. As reported in the paper, we found no differences in estimated blood loss, postoperative haematocrit values, or i.v. crystalloid volumes between the groups. Previous studies investigating oxytocin effect during CS have used uterine tone as their primary outcome measure, and manual assessment of uterine tone after oxytocin administration is in keeping with obstetric clinical practice.

**Conflict of interest**

None declared.

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No need to ‘win with the chin’ keep ‘sniffing the morning air’

Editor—I read with interest the paper by Brindley and colleagues.1 The authors should be congratulated for their attempt to promote evidence-based instruction, but I do not agree that their study justifies the conclusion that, overall, ‘win with the chin’ was a superior teaching analogy and could replace the ‘sniffing position’ analogy. The instruction ‘please position the manikin in the best position in order to sniff the morning air, or to sniff for smoke’ (the so-called sniffing position) is not the traditional sniffing position analogy. It is a very different instruction to ‘please position the manikin in the best position in order to sniff the morning air’. I am sure that many people would consider the position required to sniff for smoke to be very different from that associated with sniffing the morning air. Furthermore, their study used only written instructions and this is highly artificial. There is no requirement for a written instruction alone that will result in novices correctly positioning a patient for intubation. The requirement is for an easily recalled phrase that will remind the trainee of the optimal position for intubation after they have had the position explained and demonstrated to them. The phrase ‘sniffing the morning air’ has fulfilled this purpose for some time for those whose first language is English. I wonder what phrase is used in other languages? The authors use a manikin for their study and point out some of its limitations; these can easily be overcome by using a human volunteer. There is no need to use a manikin to teach basic airway positioning, a human being is far more life like and I wonder why they chose to use a manikin for their study.

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None declared.

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Editor—I sincerely thank Dr Bone for his interest. Airway positioning is central to patient safety. We must get it right, and in this case, we must teach it right. This means promoting not only to evidence-based clinical practice, but also evidence-based education. Objective data, albeit imperfect, are what we have provided. With respect, the best way to contradict our findings would be with contrary objective data. Furthermore, the justification for continued use of the sniffing analogy cannot just be because it ‘fulfilled a purpose’. It needs to be shown objectively to fulfil that purpose well. That analogy was conceived over 70 yr ago, without supporting data, and several studies have questioned its efficacy. Overall, our data showed that the sniffing position was statistically no better than no instructions. Furthermore, the likelihood of atlanto-occipital extension was lower than if no instructions were given. This means, at best it may be a waste of limited educational time, and, at worst, may actually be detrimental. Our data also showed statistically superior positioning with the win with the chin analogy. Therefore, it seems reasonable to conclude that this alternate analogy could replace the sniffing analogy.

Dr Bone is an airway expert. Nobody is arguing that he should change his personal practice. We state in our manuscript: ‘even if airway experts believe that the sniffing position analogy conveys the recommended airway position our objective data show that novices disagree’. We continue ‘this is