Reply from the authors

Editor—We thank Dr Roberts and colleagues for their interest in the work of the NAP4 project team. 1 The authors suggest that a 3 mm internal diameter (ID) (Arndt airway) cricothyroidotomy cannula placed using a Seldinger technique might offer ‘the best of both worlds’ in terms of ease of access (compared with a surgical approach) and ease of ventilation (compared with a narrow ≤ 2 mm ID cannula). The list of advantages and disadvantages of small- and large-bore devices has been described elsewhere. 2

It is worth clarifying several points. First, the authors perhaps overemphasize the difficulty of expiration when using a narrow-bore cannula and high-pressure source ventilation. While breath-stacking can occur, this is not inevitable: in an estimated 86%, the upper airway provides an expiratory route, 3 enabling safe repetitive high-pressure source inspirations. In those cases where the upper airway does not provide a clear airway, the cannula can be used for low-flow oxygen insufflation and a larger airway inserted. Secondly, the authors suggest that expiration may take place via the 3 mm ID of the Arndt airway: previous evidence suggests that the smallest airway that expiration can be achieved through is 4.0 mm and this is obvious evidence suggests that the smallest airway that may take place via the 3 mm ID of the Arndt airway: pre-inserted. Secondly, the authors suggest that expiration for low-flow oxygen insufflation and a larger airway does not provide a clear airway, the cannula can be used for low-flow oxygen insufflation and a larger airway inserted. Secondly, the authors suggest that expiration may take place via the 3 mm ID of the Arndt airway: previous evidence suggests that the smallest airway that expiration can be achieved through is 4.0 mm and this is discussed in detail in a recent publication. 4 5 Finally, the authors state that even without a cuff, the Arndt airway enables effective ventilation of the lungs: in Craven and Vanner’s model, the use of a larger uncuffed device was associated with effective ventilation only if there was no expiratory route via the upper airway. 6 If upper airway resistance was low, ventilation was preferentially to the upper airway rather than the lungs, thus effective ventilation via an uncuffed tube may require active closure of the partially obstructed upper airway.

Despite these comments, the Arndt airway may well be worth investigating further. It is recognized that most UK anaesthetists (particularly trainees) have a preference for Seldinger over surgical techniques during emergency access to the trachea 7 and while other Seldinger devices are available [for instance, the Cuffed Melker Emergency cricothyrotomy device, which is inserted similarly to the Arndt airway and has IDs of 3.5, 4.0, 4.0 mm (uncuffed), and 5.0 mm (cuffed); Cook Medical, Bloomington, IN, USA], there are few adult-length devices in the 2–4 mm range.

NAP4 has identified a high failure rate of emergency cannula cricothyroidotomy among anaesthetists dealing with high-risk cases. The topic is discussed in detail in the full report of the project in the chapter Management of the ‘can’t intubate can’t ventilate’ situation and emergency surgical airway. 8 The reasons for failure were numerous and disparate and we cannot be sure whether this is because of poorly designed or malfunctioning equipment, use of equipment not designed for this purpose, poorly used equipment, poor insertion technique, or use of the wrong method of ventilation after insertion. There were examples of each reported to NAP4. It is worth re-emphasizing that almost all the emergency cannula cricothyroidotomies were done in extremis, while many of the surgical airways were performed by specialist surgeons in a more controlled setting while the anaesthetists maintained an adequate airway. We do not know how well the anaesthetists who failed at cricothyroidotomy would fare when performing an open surgical airway in the patient in extremis. Optimum training in cricothyroidotomy insertion and ventilation, use of equipment specifically designed for this purpose, and regular practice with such equipment seem logical initial goals to pursue in trying to minimize this failure rate. Further examination of the equipment used for cricothyroidotomy is also required and we hope that Roberts and colleagues will examine the performance of the Arndt cannula in more detail. Other novel developments, such as ‘active expiration’ via a narrow-bore cannula (e.g. the Ventrain system, Dolphys, Eindhoven, Netherlands), might also be explored. 9

Conflict of interest

None declared.

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