

Paediatric anaphylaxis management: training staff to draw up the correct dose of epinephrine

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Editor—Paediatric anaphylaxis is a potentially life-threatening emergency that requires the immediate administration of the correct dose of epinephrine.^{1–3} During local simulation training sessions, we observed that staff struggled to calculate and draw up the correct volume of epinephrine-containing solutions, despite either knowing the dose required or reading the dose on an algorithm.^{2,3} We set up a training programme to improve knowledge of paediatric anaphylaxis management and to improve confidence and competence in correctly drawing up epinephrine.⁴

Training was provided for anaesthetists, anaesthetic assistants, and Post Anaesthesia Care Unit (PACU) staff, using the 'tea trolley' method.⁴ Two training anaesthetists prepared a theatre trolley with educational materials on the top, and refreshments on the bottom, and took the trolley around the theatre suite looking for a theatre with a stable patient. The first training anaesthetist took over the care of the patient in theatre, freeing up the listed anaesthetist to attend a 5–10 min training session with the second training anaesthetist in their anaesthetic room, ideally together with their anaesthetic assistant. Training was divided into three domains: paediatric anaphylaxis management algorithm; calculating the correct dose of epinephrine for i.m. and i.v. administration; and drawing up the correct dose of epinephrine for each administration route. Staff participating were asked to self-rate their confidence in each domain before and after training using a five point Likert scale, and rewarded with tea and cake!

Of 59 multidisciplinary staff received training, despite all participants having a valid Paediatric Life Support (PLS)

certificate or equivalent, confidence scores before training for managing anaphylaxis and administering epinephrine were low. After training, all participants significantly improved their confidence scores in the following domains: management of paediatric anaphylaxis ($P=0.0001$); calculating the dose of epinephrine required ($P=0.0001$); and actually drawing up the correct volume of epinephrine-containing solutions to administer ($P=0.0001$) (Fig. 1). The respective P -values were calculated using the unpaired t -test.

One month after training, 26 multidisciplinary staff (anaesthetists, anaesthetic assistants, and PACU staff) were randomly selected and, after giving verbal consent, asked to calculate and draw up the correct dose of epinephrine to be given i.m. for a 4-yr-old child. Treatment was based on the Advanced Paediatric Life Support (APLS) guidelines where dosage is based on age rather than weight. To achieve competence, staff needed to verbally confirm the correct dose and draw up the correct volume of 1:1000 epinephrine solution into a 1 ml syringe for a 4-yr-old child. Results were as follows: 15 staff members had previously received the 'tea trolley' training and 80% of these (12/15) were able to correctly perform this task within 30 s; 11 staff members had not previously received the 'tea trolley' training and 9% of these (1/11) were able to correctly perform this task within 30 s. The difference between the ability of the two groups to be able to both calculate the dose and draw up the correct volume of epinephrine was significant ($P<0.0001$ by unpaired t -test) (Fig. 1).

This 'tea trolley' training method provided multidisciplinary training in the workplace during the normal working

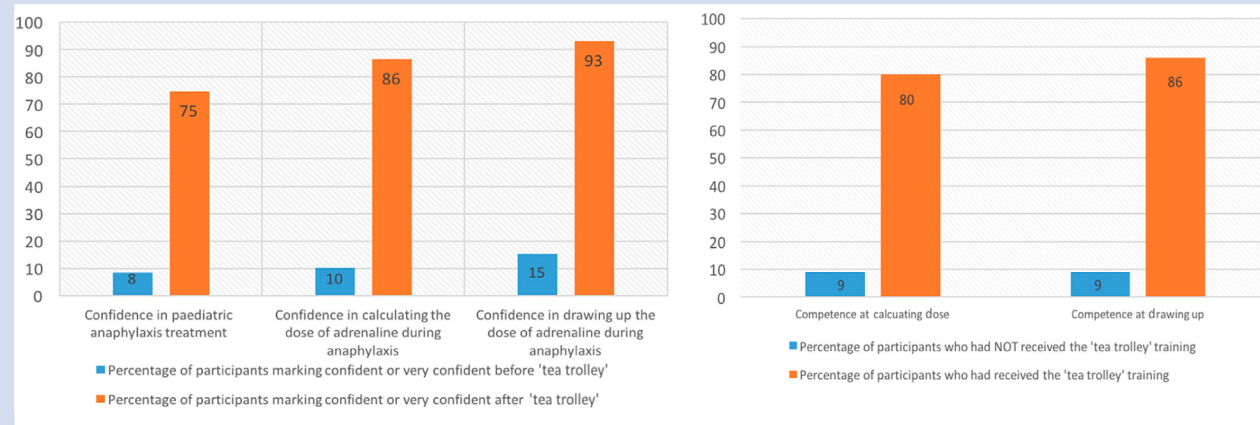


Fig 1. Confidence scores before and after paediatric anaphylaxis 'tea trolley' training and ability of a staff member to calculate and draw up the correct dose of i.m. epinephrine for a 4-yr-old child with anaphylaxis within 30 s.

day. It was provided at minimal cost, and avoided the need for study leave time, money, or both. We believe that such training will improve the safety of children in our hospital, and would be easily transferable to other departments and hospitals. Resuscitation courses such as PLS or APLS could consider such a training approach, including the practical drawing up of epinephrine-containing solutions, as part of their anaphylaxis training.

Authors' contributions

Project conception and design, delivered the training, collected data, first draft of manuscript, review of subsequent drafts, approval of final draft: M.K.

Delivered teaching, collected data, review of manuscript, approval of final draft: A.J., C.G.

Planned the project, delivered teaching, review of data, revision of drafts of manuscript, approval of final draft: R.H.

Planned the project, review of data, revision of manuscript, approval of final draft: F.E.

Agree to be accountable for all aspects of the work: all authors.

Declaration of interest

None.

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Ultrasound detection of free-floating thrombus during internal jugular vein catheterisation

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Editor—Central venous catheter (CVC) placement under ultrasound guidance is useful not only to assess the potential abnormality of vessels, but also to decrease complications such as nerve injury, infection, haemothorax, and thrombus formation. We describe ultrasound detection of a potentially lethal free-floating thrombus before internal jugular vein catheterisation. A 36-yr-old female without systemic disease was transferred to hospital after a fall to the ground. She presented with right pneumothorax, liver laceration, right internal iliac artery rupture, multiple lumbar vertebral fractures, right trochanteric fracture, haemorrhagic shock, and respiratory failure. While in the intensive care unit, multiple bone open reductions and internal fixations were performed on admission day 9 (AD9) and AD13. Catheters in the left subclavian vein and right internal jugular vein (RIJV) were removed on AD12 and AD15, respectively. Before T12–L3 spinal fusion on AD19, a free-floating thrombus (1.2×0.3×1.5 cm) was found in the RIJV during ultrasound assessment before CVC placement (Fig. 1). To avoid thrombus shedding, we changed the insertion site to the right subclavian vein after examining that vessel.

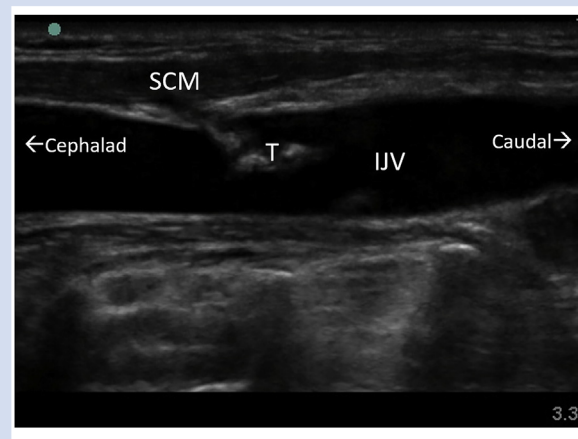


Fig 1. The longitudinal view of right internal jugular vein (RIJV) under ultrasound image. A free-floating thrombus is found within RIJV. IJV, internal jugular vein; SCM, sternocleidomastoid muscle; T, thrombus.