Catheter malposition in infants: A preventable complication

Sir,

Catheter malposition is a known complication of central venous catheterisation, with incidence of less than 1% to above 60%.[1] Misplacement is more frequent after the right subclavian (SCV) than the right internal jugular vein (IJV) approach. However, catheterisation via the left IJV results in more malpositions and vascular perforations than catheter placement through the right IJV.[1]

We discuss a case of a 1-month-old baby (length 57 cm, weight 4.8 kg) undergoing decompressive craniotomy for acute subdural haematoma. A 4.5 Fr multicath (Vygon Gmb H and Co. KG, Germany) central line was inserted in the right IJV for intra-operative central venous pressure monitoring. The catheter was inserted using the anatomic landmark technique and was fixed at the 7 cm mark on the skin after confirming backflow in all the lumens. Post-central line, chest roentgenogram (CXR) showed the tip of the catheter in the right subclavian vein by about 2.5 cm [Figure 1a]. Because it was difficult to reposition the original line, we planned ultrasound (USG)-guided left IJV cannulation. The J-tip of the guidewire was directed caudally and towards the right. The catheter was fixed at the 6 cm mark on the skin. Check CXR showed the catheter going to the right innominate vein by 1 cm [Figure 1b]. The catheter was refixed after pulling it out by 1 cm, and a repeat CXR confirmed its correct placement.

Image-guided (USG) vascular access technique increases the likelihood of achieving access, especially in the obese and in the paediatric populations, where anatomic localisation may be difficult.[2] It is associated with fewer complication rates and a probable improvement in long-term venous patency rates. In paediatric patients, meticulous attention in catheter positioning is important to ensure that the lines are kept functional for longer periods. Although the USG-guided technique is useful for initial localisation of the vein, it does not guide about the length of the catheter to be inserted. Directing the J-tip of the catheter caudally increases the correct placement of the central venous catheters into the right atrium.[3] But, this is more useful in SCV than in IJV cannulation.

Overinsertion of the catheter may be the cause of misplacement in our case. This is especially important in small children where increased intravascular catheter length may result in complications like vascular erosions and pericardial tamponade. Various techniques described for guiding the depth of insertion include transesophageal echocardiography (TEE) and formulas using patient characteristics (age, height, weight). However, TEE is not feasible in such small infants and ECG-guided central venous cannulation is cumbersome. The optimal size of the catheter in our case would be 3 or 4 Fr, and the optimal length of insertion should have been 4.5 cm according to height (catheter length = height in cm/10-1) and 5 cm according to the weight (<4.9 kg).[4] This must be followed by a radiological confirmation of the position of the catheter tip.

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Rhabdomyolysis complicating non-invasive blood pressure measurement

Sir,

A 48-year-old man with difficulty in micturition, diagnosed as stricture urethra, was scheduled for anastomotic urethroplasty. The patient had sustained pelvic fracture following blunt injury to the abdomen 1 year before the day of surgery. His pre-operative assessment revealed an ASA grade I patient weighing around 76 kg. The airway assessment was a Mallampatti of class III. His blood investigations, ECG and chest X-ray were normal. On the day of surgery, the patient was kept fasting and oral diazepam 10 mg and metoclopramide 10 mg were given as pre-medication. A general anaesthetic along with an epidural was planned. The patient was brought to the operation room (OR) and connected to monitors – a pulse oximeter, non-invasive blood pressure monitor (NIBP) and ECG. The epidural was sited at the lumbar level L3-L4 and confirmed with a test dose of 3 mL 2% injection lignocaine with 15 μg injection adrenaline. The patient was then induced with injection thiopentone sodium 250 mg and injection fentanyl 100 μg. Injection vecuronium 7 mg was used for intubation. Anaesthesia was maintained with isoflurane 2% in air and oxygen mixture. Analgesia was maintained with 0.25% bupivacaine through the epidural and morphine 5 mg intravenously. The surgery lasted for 6 h as the procedure became complicated and there was increased bleeding. The blood loss was around 1 L, which was replaced with colloids and blood. The patient was haemodynamically stable. At the end of the surgery, the patient was extubated fully awake. On awakening, the patient complained of severe pain in the right upper limb where the blood pressure cuff was placed. The blood pressure was measured every 3 min during the 6-hour surgery. The patient could not lift the arm, but there was no numbness in the limb. The peripheral pulses in the limb were palpable.

To alleviate the pain, injection fentanyl 50 μg was given intravenously along with morphine 5 mg, but the pain did not seem to subside. There was a drop in blood pressure 15 min after extubation to 70 mmHg systolic. The patient was given vaspressors and fluids to treat the hypotension. An arterial blood gas sample was sent, which showed a mild metabolic acidosis pH of 7.32 bicarbonate of 18 and lactate of 3.8. The patient was shifted to a high-dependency unit (HDU) for further monitoring. In the HDU, a Doppler was done to rule out a vascular cause for the pain, and it was normal. A 12-lead ECG was done, which showed no new changes from the pre-operative findings. Because the pain still persisted, an enzyme profile was done consisting of creatine phosphokinase (CPK), CPKMB and troponin T. The CPK was 13,074, CPK MB 194.7 and troponin T 10.86. The patient was suspected to have developed crush syndrome and was treated according to the crush protocol. Injection Mannitol was given along with sodium bicarbonate infusion with monitoring of urine pH. The patient was kept in the HDU for 3 days and the CPK was followed-up everyday, which decreased from initial values of 9273, 3780 to 1576 on the third day. The urine pH also increased to 7.8 when the infusion was stopped on the third post-operative day. He was later shifted to the ward and discharged after 6 days of hospital stay.

DISCUSSION

The ASA on the standards of basic monitoring in anaesthesia recommends all patient receiving anaesthesia should have arterial blood pressure and heart rate monitored at least every 5 min. The automated NIBP is a valuable monitor in this aspect.[1] The monitor can be set at frequent and regular intervals for blood pressure measurement. The principle by...
