Letter to the Editor

Pulse oximeter-facilitated arterial cannulation in pediatric cardiac surgery

Abstract

Arterial cannulation in pediatrics is a daily challenge for anesthesiologists, especially in cardiac surgery. Accurate localization of the small artery is technically difficult, particularly in small children and infants. This situation may be further complicated by dehydration or hemodynamic instability.

Keywords : artery-cannulation-pulse oxymeter-pedtrics

Dear Editor

Invasive blood pressure monitoring is required in cardiac surgery for three reasons: Continuous monitoring of systemic hemodynamics, Pressure depulsation in extracorporeal circulation and to ease blood sampling: blood gases, blood glucose levels, etc. [1].

Arterial cannulation in pediatrics is a daily challenge for anesthesiologists, especially in cardiac surgery. Accurate localization of the small artery is technically difficult, particularly in small children and infants. This situation may be further complicated by dehydration or hemodynamic instability [2].

Localization of the artery before catheterization is usually done by palpation or guided by ultrasounds. These two techniques are not always efficient and sometimes generate complications and a considerable loss of time [3-4].

Through this clinical case, we describe a simple and innovative technique inspired by our daily practice allowing locating the artery with the help of the pulse oximeter.

This is a 06 months old infant followed since the age of 3 months for cyanogenic heart disease. She weighs 6 kg. She was admitted to the cardiac surgery operating room for management of a tetralogy of Fallot under extracorporeal circulation.

After monitoring, the patient was sedated with 3% Sevoflurane. We took a 24 G left radial peripheral venous line. The parameters after induction and intubation were as follows: SPO2=98%, NIBP= 89/42 mmhg and HR= 126 bpm.

To cannulate the left femoral artery, palpation of the femoral pulse was too difficult and ultrasounds provided a poor view of the artery. The same problem was found on the right side.

We placed the pulse oximeter on the left big toe, the plethysmography curve appears well oscillated on the monitor.

The delicate compression at the level of the inguinal line makes the oscillations of the plethysmography curve disappear and allows us to locate precisely the artery. We successfully catheterized the artery on the first attempt.

The catheter has been securely attached and connected to the signal transducer and we obtain an invasive blood pressure curve on the monitor after purging the tubing and setting the zero.

We also place a right central jugular line with ultrasounds before allowing the surgical team to complete the management.

Postoperatively, the patient was transferred to the cardiovascular intensive care unit. She was extubated after 24 hours and transferred to the department on the third day after removal of the arterial and central line.

This arterial compression technique has been described to perform an Allen test before radial artery puncture in a sleeping patient [5]. For arterial cannulation, it can be more ergonomic and provides excellent maneuverability, allowing the operator to make finer movements and improving his own comfort.

Ultrasound increases also the success rate of cannulation at the first attempt and reduces hematoma formation. It increases the success rate of the second attempt as well. It is probably more useful for infants and young children than for older children, especially if the practitioner is experienced [6].

Improved arterial cannulation techniques may decrease the number of attempts allowing considerable time savings and avoidance of complications namely distal ischemia, tissue necrosis and local infection [7].

Further studies are needed to investigate the efficacy and risks of this technique. In our center, we have started a prospective study whose aim is to compare this technique with ultrasounds in terms of efficacy and time saving and the first results are encouraging.

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