



EDITORIAL

Carotid Artery Cannulation for Resuscitation during Hypovolemic Shock: A Boon or Bane?

Yuvaraj Kotteeswaran, MD, DNB, PDCC^{1*}, Saravana Babu, MS, MD, DM, FICACC, FTEE² and Todd McDonald, MD, FRCPC, PhD¹

¹Department of Anesthesia and Pain Management, Thunder Bay Regional Health Sciences Centre, Thunder Bay, ON, Canada

²Division of Cardiothoracic and Vascular Anesthesia, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India



***Corresponding author:** Dr. Yuvaraj Kotteeswaran, Staff Anesthesiologist, Thunder Bay Regional Health Sciences Centre; Assistant Professor, Northern Ontario School of Medicine, Thunder Bay, ON, Canada, Tel: +1(647)-244-0157, Fax: +1(807)-684-5906

A 20-year-old healthy male presented to the emergency room with a penetrating injury to the anterior abdominal wall. On examination, he was in hypovolemic shock with no palpable peripheral pulses. Focused assessment with sonography in trauma (FAST) revealed free fluid in the abdominal cavity. He had two episodes of cardiac arrest in the emergency department where the initiation of cardiopulmonary resuscitation was able to restore spontaneous circulation. Infusions of norepinephrine and epinephrine at 0.1 mcg-1 kg-1 min were commenced through the central venous catheter in the right internal jugular vein.

Surgical consultation advised the exploration of the abdomen urgently and repair of the injured organs. His heart rate was more than 130 beats per minute with unrecordable pulse oximetry and non-invasive blood pressure. Surgical findings revealed four areas of small bowel injury, a mesenteric tear and a large expanding retroperitoneal hematoma due to injury to the retroperitoneal blood vessels. To assess the efficacy of resuscitation, multiple attempts to secure the radial and brachial artery cannulation under ultrasound guidance was unsuccessful. Femoral artery was not accessible due to proximity to the surgical area. Since carotid pulsations were felt, we scanned the left carotid artery (CA) with a linear ultrasound probe, which showed a clear round pulsatile structure without

any calcification or atheromatous plaques. To provide guidance for the ongoing resuscitation, we cannulated the left CA using a 20-G cannula under ultrasound guidance in a single attempt (Figure 1A). First recorded CA blood pressure was 50/30 mmHg, and we increased the norepinephrine and epinephrine infusions to 0.25 mcg-1 kg-1 min. Peripheral pulses were still not palpable even though CA mean arterial blood pressure improved to more than 60 mmHg (Figure 1B). Arterial blood gas analysis showed the persistence of severe metabolic acidosis and hyperkalemia. Surgical repair of the injured organs and blood vessels was done and the patient was shifted to the intensive care unit. His hemodynamics deteriorated further and succumbed to multiple organ dysfunction.

Carotid cannulation for haemodynamic monitoring during massive hypovolemic shock due to trauma is less reported in the literature. However, it is common practice to use CA cannulation for shunt and measuring stump pressure during carotid endarterectomy and deployment of transcatheter aortic valves [1,2]. Also, the CA cannulations were performed safely to establish cardiopulmonary bypass during aortic and redo-cardiac surgeries [3,4]. The peripheral arterial blood pressures may be underestimated in hypovolemic shock due to redistribution of blood flow to the major vital organs and it may not reflect the real central perfusion pressures

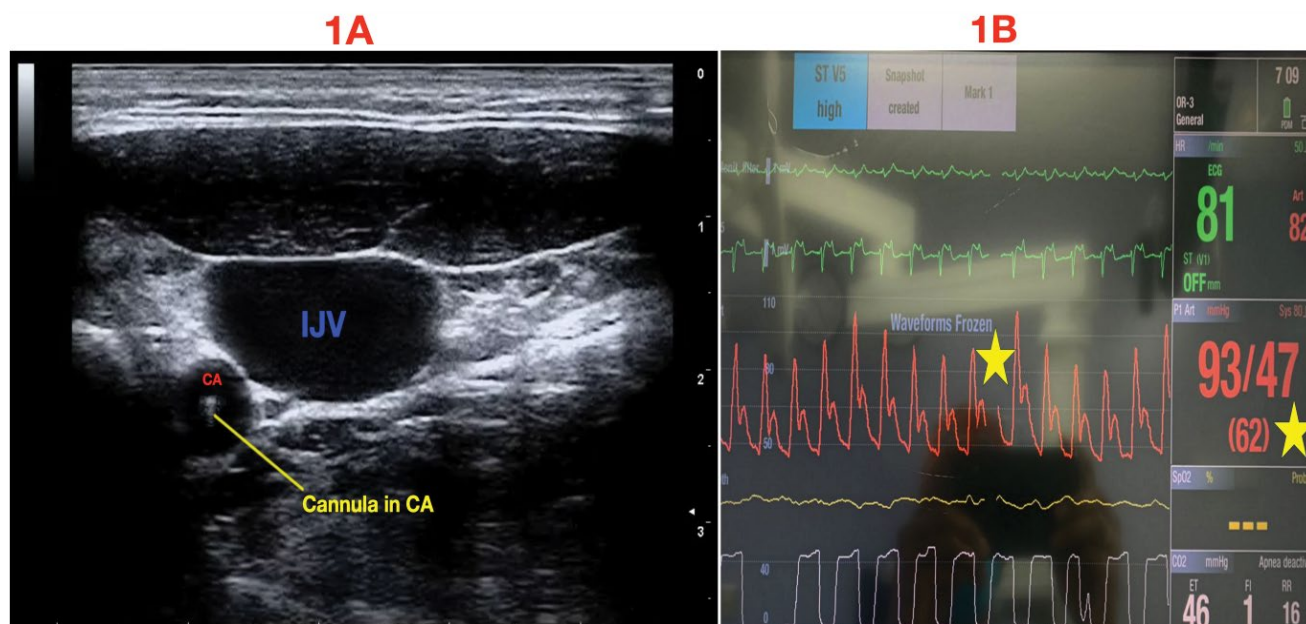


Figure 1: (A) Ultrasound image showing cannula in the left carotid artery; (B) Multipara monitor showing invasive carotid artery pressure tracing and carotid arterial blood pressure (yellow star).

CA: Carotid Artery; IJV: Internal Jugular Vein

[5]. Therefore, in the setting of severe hypovolemia and high inotropic support, the measurement of central arterial pressure may be more reliable. The major concern in CA cannulation for hemodynamic monitoring is the dislodgement of an atheromatous plaque and the development of stroke. Since our patient was young and without any atheromatous plaque in CA, we proceeded with CA cannulation to monitor the initial resuscitation. Our case demonstrates the necessity of CA cannulation to monitor resuscitation during major hypovolemic shock when peripheral arterial cannulation is not feasible.

Declaration of Interest

None.

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Institutional Ethics Committee Approval

Not applicable.

CTR (Clinical Trial Registry) Approval

Not applicable.

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