

LETTERS TO EDITOR

Valsalva maneuver aids blind central venous catheterization

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Citation: Samanta S, Haldar R. Valsalva maneuver aids blind central venous catheterization. *Anaesth Pain & Intensive Care* 2013;17(1):100-101

To the Editor,

Central venous catheterization (CVC) is routinely being practised in wards and emergency departments for central venous pressure monitoring, administration of ionotropes, hyperosmolar drugs, parenteral nutrition and chemotherapy. Ultrasonographic (USG) guidance and therapeutic beds for achieving Trendelenburg position provide valuable help in vessel access and performing this procedure safely. But at many locations and institutions these facilities may not be available, and use of the blind technique in supine position becomes mandatory. Blind technique is associated with significantly higher complication rate and a lower success rate. On the basis of normal human physiology, we opine that in such situations, the use of Valsalva maneuver (VM) to aid CVC increases the success rate. We illustrate this by two cases, where expected difficult CVC was simplified using VM.

Case 1: A 15 years old male, diagnosed with aplastic anemia, required CVC for antithymocyte globulin administration. He had a cyst on left side of the neck and right sided skin excoriation due to a previously placed CVC in the right internal jugular vein (IJV). A platelet count of 20,000/mm³ in the patient prevented us from trying the blind subclavian approach. IJV cannulation on the right side was not attempted due to previous scar. USG machine and therapeutic bed were not available. After aseptic preparation and local anesthetic infiltration, the patient was asked to perform VM which made the external jugular vein (EJV) prominent. While the patient maintained VM, the EJV was punctured and the guidewire was threaded effortlessly through the EJV. A repeat VM helped guide the CVC over the guidewire.

Case 2: A 48 years old, obese, female patient of enterocutaneous fistula, with short neck required CVC for parenteral nutrition. In the absence of USG, a therapeutic bed and prominent anatomical landmarks,

we anticipated difficulty. After aseptic preparation and local anesthetic infiltration, the patient was asked to perform VM. After a test puncture with a pilot needle, the needle for passage of guidewire was inserted into right IJV just lateral to carotid pulsation, followed by successful guide wire placement. The central catheter was then placed following a repeat VM.

IJV cannulation is a common technique for blind external landmark guided CVC, wherein inadvertent

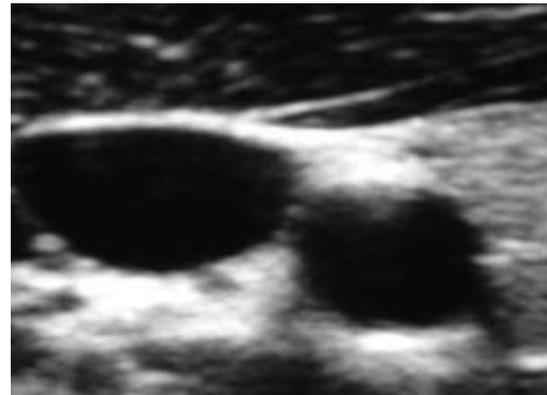


Figure 1: IJV cross section before VM.



Figure 2: IJV cross section after VM.

carotid artery puncture, nerve injury and airway compromise are frequently encountered complications. Trendelenburg position, hepatic compression, positive intra thoracic pressure and VM^{1,2} increase the cross sectional area of central veins significantly (> 20%) and reduce their collapsibility in spontaneously breathing patients³ as shown in Figure 1 and 2. Moreover, VM opens the valves in the larger veins (especially EJV) by distending them. Increased diameter of IJV and EJV

combined with opening of the venous valves makes needle placement, passage of guidewire and catheter easier,⁴ thereby reducing the complications. Feasibility of performing VM in both intubated and ventilated patients (passive VM), as well as in spontaneously breathing patients (active VM) allows this technique to be used in a wide range of patients. Clinicians should thus be aware of this simple technique to enhance the success rates of CVC in wards and emergency settings.

REFERENCES

1. Lobato EB, Florete OG Jr, Paige GB, Morey TE. Cross sectional area and intravascular pressure of the right internal jugular vein during anesthesia. effect of Trendelenburg position, positive intrathoracic pressure, and hepatic compression. *J Clin Anesth* 1998; 10:1-5. [Medline]
2. P. Cowlshaw, P. Ballard. Valsalva Manoeuvre For Central Venous Cannulation Anesthesia 2007;62:640
3. Bellazzini MA, Rankin PM, Gangnon RE, Bjoernsen LP. Ultrasound validation of maneuvers to increased internal jugular vein cross section area and decreased compressibility. *Am J Emerg Med*. 2009 May;27(4):454-9. doi: 10.1016/j.ajem.2008.03.034. [Medline]
4. Suzuki T, Takeyama K, Hasegawa J, Nishiyama J, Takiguchi M. Valsalva maneuver prevents guide wire trouble associated with 22-g safe guide. *Tokai J Exp Clin Med*. 2001;26(3):113-8. [UnboundMedline] [Medline]

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Accidental intra arterial injection of diclofenac sodium and their consequences: report of two cases

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Citation: Samanta S and Samanta S. Accidental intra arterial injection of diclofenac sodium and their consequences: report of two cases. *Anaesth Pain & Intensive Care* 2013;17(1):102-103

Dear Editor,

Diclofenac is a nonsteroidal anti-inflammatory drugs (NSAID) used as an analgesic reducing moderate pain in intra operative and post operative, commonly used along with general anesthesia cases for analgesia purpose. Several commercial preparations are available. Accidental intra-arterial injections of anesthetic drugs cause arterial spasm with variable poor results.[1] There are some drugs which are given unintentionally or intentionally without any bad consequences.[2] Controlled study helps in identification of the pathophysiology underlying such arterial spasm following such intra-arterial injections, but have logical limitation.[2] Unintentional use of intra-arterial route has not been reported for its adverse effects with diclofenac sodium. We report two cases of unintentional intra-arterial injection of different preparation of diclofenac with two different outcomes.

Our first case was a 39 year old, obese (body mass index 32) gentleman, with black complexion posted for

removal of retroperitoneal tumor (sarcoma) under general anesthesia. Lower thoracic epidural insertion for analgesia was tried but failed due to difficult anatomy. Induction of anesthesia was done with propofol, fentanyl (in view of obstructive sleep apnea) and vecuronium. In view of expected major blood loss post induction arterial line was inserted for real time blood pressure monitoring and blood gas analysis. Intubation and intra operative course was uneventful. He was given intra-arterial alcohol (benzyl alcohol) based preparation of diclofenac (Volicad[™], Cadila[®]) 100 mg in the late intraoperative period for postoperative pain relief. Following recovery from anesthetic effect he complained of pain in his right hand. Rapid search of the cause revealed diclofenac injection unintentionally through a tri-way with 10 cm extension line attached to right radial artery. Bluish discoloration was noted on two fingers in radial artery distribution noticed 45 minutes after injection. Treatment initiated with intra arterial heparin 2.5000 IU and intravenous preservative free lidocaine 80 mg. He developed gangrene (Fig 1)



Fig 1: Bluish discoloration of the hand after intra arterial diclofenac injection.

after 2 days of accidental injection and had undergone amputation of distal part of his affected finger but on radiological examination his brachial arterial cross section area and flow was normal.

The second patient was a 19 year old young adult posted for craniotomy for meningioma. In view of major neurosurgical procedure and highly vascular meningioma, arterial line inserted in left radial. Intra operative course was uneventful. He was extubated in full conscious status. Aqueous based preparation of diclofenac (Voveron™, Novatis®) was given accidentally through intra-arterial cannula in the postoperative period by nurse posted in post anesthesia care unit. This time the patient complained of burning sensation along arterial course. Immediate heparin and lignocaine administered in arterial line and radial artery Doppler shown normal arterial pulse waves. and remain uncomplicated even after 7 days follow up with Doppler study.

Many case reports have been published on upper limb

catastrophy after unintentional arterial injection. [3] We consider, benzyl alcohol, preservative used in nonaqueous preparation of diclofenac (Volicad™) may be the cause of vasospasm due to endothelial edema and capillary endothelial dysfunction in the first case. [4] Vasospasm, intravascular thrombosis, chemical endoarteritis are the proposed pathophysiological mechanism.[5] Complications of intra-arterial injection of non aqueous agents (phenytoin, propofol) [6] and highly alkaline drugs (thiopentone)[1] are known for years, on the contrary drugs like atropine, vecuronium, fentanyl have been used without untoward effects.[7] Membrane soluble drugs are known to cause more complications. Multiple theories are postulated for the cause of arterial spasm, or hypoperfusion which is the final common pathway for limb ischemia. Iatrogenic complications are prone to occur in postoperative setting when patient is recovering from anesthesia. Intentional induction using IA route was reported in children from operation theatre, in emergency situation, where intravenous access was difficult.[8] Though guidelines are not available, case reports and review reported that water soluble drugs and drug's with pH closer to arterial blood pH may be used through IA route. Different preparation of the same analgesic diclofenac never been reported to the best of our knowledge. In conclusion although aqueous preparation with preservative free of diclofenac administration didn't match the results of nonaqueous preparation of same drug, definitive statement regarding its safety during intra arterial injection and causative agent for arterial spasm couldn't be formulated. Any way intention intra arterial diclofenac of any preparation should be avoided at any cost.

REFERENCES

1. Stone HH, Donnelly CC. The accidental intraarterial injection thiopental. *Anesthesiology* 1961;22:995-1006
2. Ahmed F, Ghouri .Accidental intrarterial drug injection via intravascular catheters placed on the dorsum of the hand. *Anesth & Analg.* 2002;95:487-491
3. Lindfors NC, Vilpponen L, Raatikainen T. Complications in the upper extremity following intra-arterial drug abuse. *J Hand Surg Eur* 2010;35:499-504
4. Knill RL, Evans D. Pathogenesis of gangrene following intra-arterial injection of drugs: a new hypothesis. *Can Anaesth Soc J.* 1975 Nov;22(6):637-646
5. Sen S, Chini EN, Brown MJ. Complications after unintentional intra-arterial injection of drugs: risks, outcomes, and management strategies. *Mayo Clin Proc* 2005;80:783-795.
6. Bernard G, Fikkers, Eveline W. Intra-arterial injection of anesthetic drugs. *Anesth & Analg* 2006;103:792-794.
7. Nicolson SC, Pasquariello CA, Campbell FW. Intra-arterial injection of pancuronium and fentanyl: an alternative. *Crit Care Med* 1988;16:915
8. Joshi G, Tobias JD. Intentional use of intra-arterial medications when venous access is not available. *Paediatr Anaesth* 2007;17:1198-1202.

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