Returns of micro bubble air contrast: A technique to improve ultrasound visibility of continuous catheter

Dear Editor,

Recently ultrasound application in regional anesthesia practice has increased a lot and more practitioners are performing ultrasound-guided for pain interventions. The continuous catheter placement for regional blocks is also being used. However, optimal needle or catheter visibility is a concern.[1] Even the experienced regional anesthesiologists face the difficulties in locating the tip of the catheter.[1] This problem has been addressed by putting "cornerstone reflectors" along the echogenic needle as far as the tip, so that the ultrasound beam can be reflected back even with more acute angle of insertion.[2] Presently, few options are available in market, some having a stylet, that increases the ultrasound visibility. However, these technologies increase the cost factor, and it may not be affordable by all and specifically in resource constraint settings.

Interfascial plane continuous modalities by using conventional Tuhoy needle with epidural catheter is not uncommon in clinical practice; however, it's sono-visibility is always been a challenge and so the catheter tip location, which is very much important to deposit the bolus drug. To overcome this problem, we have started using the "*Microair bubble contrast*". After placing the catheter, we maintain a negative pressure over the syringe plunger that creates a number of micro air bubbles along the whole length of catheter [Figure 1a]. visible under ultrasound as alternate hypoechoic and hyperechoic bands. The oscillating hyperechoic dots or a long hyperechoic band is visible depicting the whole catheter and then the catheter tip is positioned appropriately at desired level [Figure 1b].

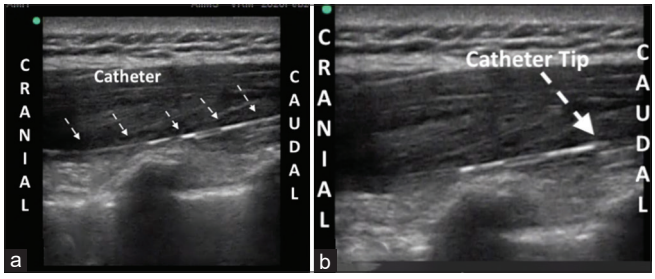

Figure 1: (a): Catheter placed in erector spinae plane with visible air contrast. (b): Catheter tip visible as hyperechoic band

The air bubble contrast has been used previously in trans-cranial Doppler, echocardiography, and perineural catheter placement.[1,3,4] Micro air bubble contrast term coined by Liu Y,[3] proposed for air bubble introduction into the needle, so that it can be seen as hyperechoic dots in the needle shaft. However, we did not introduce any air, rather we maintained negative pressure, so the water column inside the catheter was aspirated and air inside the catheter became hyperechoic and the movement of micro air bubble could be seen inside the catheter. This avoided the inadvertent chance of air embolism and image distortion by air artifact. Agitated air-water contrast has also been used in cadaveric study by Daga *et al*.[5] to delineate fascial plane. However John *et al*.[4].did not find any advantage of air test for perineural catheter tip localization when used by novice regional anesthesiologists. The authors used 1 ml of air to localize the tip, which they later infer as image distorting element, that created the hyperechoic artifacts in the catheter vicinity and thus caused difficulty in localization. In our cases, we did not face such problem of image distortion. From our experience we believe that the same "*micro bubble air contrast*" can be used for better catheter visibility and thus better localization of the catheter, which can also be created by negative pressure.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Debesh Bhoi, Thamizharasan Datchinamourthy, Reshma Kalagara, Poonam Rani

Department of Anaesthesia, All India Institute of Medical Sciences, New Delhi, India

Address for correspondence: Dr. Debesh Bhoi, Department of Anaesthesiology, Pain medicine and Critical Care, Room No. 5012, 5th Floor, Teaching Block, All India Institute of Medical Sciences, New Delhi - 110 029, India.
E-mail: debeshbhoi@gmail.com

References

1. Chin KJ, Perlas A, Chan VW, Brull R. Needle visualization in ultrasound-guided regional anesthesia: Challenges and solutions. Reg Anesth Pain Med 2008;33:532-44.
2. Hebard S, Hocking G. Echogenic technology can improve needle visibility during ultrasound-guided regional anesthesia. Reg Anesth Pain Med 2011;36:185-9.
3. Liu Y, Mei W. Enhanced needle visibility by micro air bubble contrast in ultrasound-guided nerve block. Anesthesiology 2018;128:1238.
4. Johns J, Harrison TK, Steffel L, Howard SK, Kim TE, Kou A, *et al*. A pilot *in vitro* evaluation of the "air test" for perineural catheter

tip localization by a novice regional anesthesiologist. J Ultrasound Med 2014;33:2197-200.
5. Daga V, Narayanan MK, Dedhia JD, Gaur P, Crick H, Gaur A. Cadaveric feasibility study on the use of ultrasound contrast to assess spread of injectate in the serratus anterior muscle plane. Saudi J Anaesth 2016;10:198-201.

Access this article online

Quick Response Code:

Website: https://journals.lww.com/joacp

DOI: 10.4103/joacp.JOACP_228_20

How to cite this article: Bhoi D, Datchinamourthy T, Kalagara R, Rani P. Returns of micro bubble air contrast: A technique to improve ultrasound visibility of continuous catheter. J Anaesthesiol Clin Pharmacol 2022;38:509-10.

Submitted: 08-Mar-2021 **Accepted:** 30-May-2021
Published: 12-April-2022