An indigenous modification to ensure closed blood sampling

Sir,

Arterial cannulation is performed for invasive pressure monitoring and repeated blood gas sampling in peri-operative and critical care settings.[1] Frequent blood sampling through the open arterial catheter system, re-injection of blood into the artery, and the residual blood within the three-way stop-cock port of a conventional open loop system can cause microbial contamination and subsequent catheter-related blood stream infections.[2] To circumvent these issues, commercially available venous arterial management protection devices with in-line reservoir systems and a split septum needleless device are available, which ensure re-infusion of the clearing volume of blood rather than discarding.[3] Without the need to open the three-way stop cock and with a reservoir present, a closed loop system is created. We developed a similar closed-loop sampling system using easily available accessories which we wish to report.

For the same, a conventional transducer system [Figure 1a], a needleless connector (BD QSyte) [Figure 1b], and a single three-way connector [Figure 1c] are needed. From the normal transducer where the distal end of the sample line is usually attached, a three-way connector is attached [Figure 2a]. In the middle port, we connected the needleless connector (BD Q Syte), and with the third port, we connected the distal end of the sample line [Figure 2b]. To create an in-line reservoir, a 10cc leur lock syringe in the main transducer's sampling port was attached [Figure 2c].

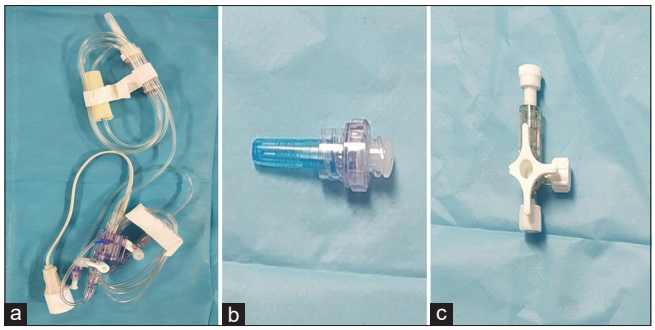

Figure 1: (a): A conventional transducer system. (b): Needleless connector (BD QSyte). (c): Three-way connector

Once attached, the entire setup is pressurized, de-aired, attached to the arterial cannula, and zeroed at the desired level. During sampling, aspiration is performed through the 10 ml reservoir syringe attached to the transducer's main port until at least 5 ml of fresh blood was drawn inside. Now, the three-way connector is turned toward the needleless connector. By connecting a 2 ml syringe in that port, around 0.4 ml of the intra-luminal fluid is aspirated, which is discarded as because of saline dilution, the representative sample might not be available. Thereafter, the blood sample is withdrawn through this port in the heparinized syringe after wiping the sampling port aseptically. After drawing the sample, the three-way connector is turned toward the main port of the transducer and the clearing volume is re-infused and flushed by pressing the plunger of the reservoir to clear blood from line. Additional 0.4 ml of the fluid through the needleless connector is again aspirated to remove the remaining blood there.

Frequent opening of the catheter system for sampling and backflow of blood into the tubing are important causes of catheter-related blood stream infections. As no part of the system during sampling is open, this modification is expected to reduce catheter contamination.[3] Moreover, this system allows needless sampling (preventing needlestick injuries) and iatrogenic anemia because of blood wastage (significant in pediatric patients).[4] Above all, this system costs a fraction compared to the commercially available device, making it

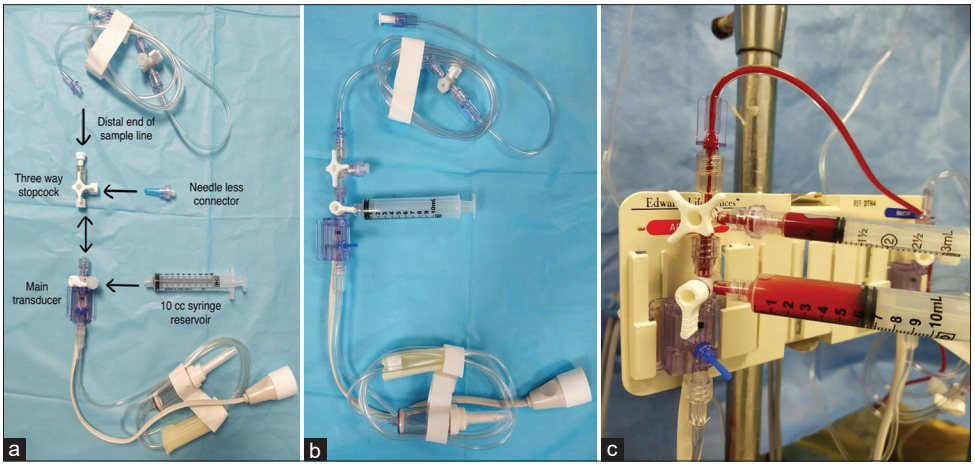

Figure 2: (a): Three-way connector attached to the distal end of the sample line. (b): Needleless connector attached to the middle port and the distal end of the sample line attached with the third port. (c): 10cc leur lock syringe as a reservoir in the sampling port of the main transducer

economical and widening its applicability. Certain prospective studies on similar systems exist,[2,5] and quantification of efficiency of our system can be the topic of future research.

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Conflicts of interest
There are no conflicts of interest.

Dhiraj Singh, Rudrashish Haldar, Ashish K. Kannaujia, Anil Agarwal[1]

Department of Anaesthesiology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, [1]Department of Anaesthesiology, Apollomedics Superspecialty Hospital, Lucknow, Uttar Pradesh, India

Address for correspondence: Dr. Rudrashish Haldar, Department of Anaesthesiology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Rae Bareilly Road, Lucknow - 226 014, Uttar Pradesh, India.
E-mail: rudrashish@yahoo.com

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