

■ CORRESPONDENCE

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A Device to Allow Connection of a High-volume Intravenous Infusion to an *In Situ* Intravenous Infusion

To the Editor:—Trauma patients often arrive in the operating room with standard intravenous administration sets (not a "blood giving set") connected directly to a large-bore intravenous cannula and without extension sets "in line" to allow the insertion of stopcocks or connection of alternate tubings. A useful method to rapidly connect fluid-warming devices or blood tubings into such existing intravenous administration sets *via* the standard Y-ports on the set is by using a blunt 15 GA cannula, for several reasons: Because hypothermia is a concern and blood loss is ongoing, it is highly desirable to rapidly connect a high-flow blood-warming unit *via* the existing intravenous cannula. Whenever sets are disconnected from the cannula hub, to allow direct connection of alternate or warming unit tubing, fluid flow is interrupted and the risk of dislodging the established cannula exists. Additional intravenous access is often difficult to establish because of vasoconstriction in the hypovolemic and cool trauma patient, making the potential loss of a single existing intravenous site a serious concern. Large-bore cannulae are typically placed before arrival to the operating room in the largest accessible and "best" available veins of our trauma patients, making these the preferred sites to rapidly administer warmed fluid and blood.

I found that the 15 GA Lever Lock cannula (#303368, Becton-Dickenson, Franklin Lakes, NJ) can be inserted into all brands of standard Y-ports (Fig. 1), if the port is first centrally punctured (pre-slit) once with an 18 GA hypodermic needle. The 15 GA cannula exhibits a short- and large-bore lumen that allows rapid infusion, without increasing flow resistance significantly. A waiting blood warming unit can be connected almost instantly and run immediately, without disturbing the intravenous cannula site. The preexisting administration set is closed completely at the roller clamp above the connection site, to ensure all flow is directed toward the patient. The Lever Lock grasps the standard Y-port's head, as shown, although I would always assume that tension on the tubing might dislodge this and any other non-Luer locking connection. I highly recommend this procedure for trauma or obstetric situations, when patients pres-

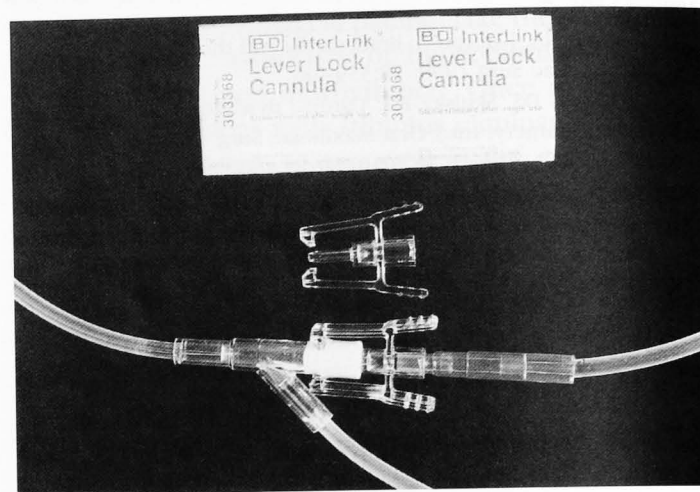


Fig. 1. The Lever Lock cannula is clear plastic and shown individually and shown connected to a standard Y-port, as suggested. The label of the Lever Lock cannula package also is shown.

ent acutely without blood-giving sets or extensions in place. At the end of the procedure, disconnection is efficiently accomplished and standard Y-ports have been found to seal effectively. Finally, the use of the system can expediently increase hygiene during routine surgeries by eliminating the "bloody-spillage/contamination" associated with direct cannula connection/disconnection of fluid warming units after entering/leaving the operating rooms, respectively.

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A Source of Nitrogen in the Breathing Circuit during Closed System Anesthesia

To the Editor:—When using closed circle system anesthesia and an anesthesia gas monitor, one may decide to return the exhaust gases of the monitor to the circuit to maintain a totally closed system. When we did this as a part of a study of closed system oxygen and isoflurane or desflurane using POET II or IQ anesthetic gas analyzers

(Criticare Systems, Waukesha, WI), we found that the circuit nitrogen concentration gradually increased more than we would have expected from excretion of nitrogen from the body stores.

We learned that a major source of the nitrogen was the air added to the sample gas before it is exhausted from the anesthetic gas

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analyzer. The vacuum pump maintains fine regulation of the desired 50 or 150 ml/min aspiration rate by drawing largely from the sample port and partly from air inside the monitor. The air is added after the sample is analyzed. When the "Auto Cal in Progress" is activated, circuit gas is sampled more rapidly for 15–20 s, and a higher exhaust gas flow also occurs.

Exhaust gas volume also exceeds sample gas volume with the Raman scattering analyzer (RASCAL II, Ohmeda, The BOC Healthcare Group, Edison, NJ). The exhaust gas contains air during regular use and argon during the calibration procedure. Sampling from the patient is interrupted during calibration. The RASCAL II has a single nominal aspiration rate of 210 ml/min.

In a small survey of 3 POET II, 3 POET IQ, and 2 RASCAL II monitors used daily in our operating rooms, we obtained the following data. With the POET monitors, exhaust exceeded sample flow rate by 4–19 ml/min at the 50 ml/min setting and 9–19 ml/min at the 150 ml/min setting. With the two RASCAL II monitors, the exhaust exceeded

sample flow rate by 16 and 23 ml/min. When sampling oxygen only with the POET analyzers, nitrogen concentration of the exhaust gas ranged between 9.3% and 19% at the 50 ml/min setting and 11% and 18% at the 150 ml/min setting. With the RASCAL IIs, the exhaust gas nitrogen values were 5.9% and 11%.

The monitors functioned at or very near manufacturer's specifications. However, returning the monitor exhaust to the circuit constantly adds air to the circuit. With the RASCAL II, a small amount of argon also is added during its calibration cycle.

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In Reply:—The use of air for routine calibration of an anesthetic gas monitor is common. Datex, Criticare, and Ohmeda all use a small amount of room air to maintain specified performance levels. Autocalibration occurs at 1.5-, 2.5-, 5-, 10-, 20-, and 40-min intervals after Rascal II (Ohmeda, The BOC Healthcare Group, Edison, NJ) startup. Subsequent autocalibrations are initiated only at 80-min intervals. The Rascal II displays the message "CALIBRATING" on the screen, notifying the user of the interruption in patient monitoring during the calibration process. The Rascal II does allow the clinician to postpone calibration at any point in the anesthetic. Nominally, 42 ml of room air is aspirated during the brief, 12-s calibration cycle. Only in the first three autocalibrations is argon used in the calibration process. Successful, subsequent autocalibrations do not use argon.

The Rascal II Operations and Maintenance Manual provides information on the use of room air in calibration. Ohmeda welcomes the comments of Stevens *et al.* in recognizing the potential sources of nitrogen in the breathing circuit and the need to monitor nitrogen in low flow situations.

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Spinal Meningitis Masquerading as Postdural Puncture Headache

To the Editor:—We report a case where vigilance by our Anesthesia Pain Management Clinic aided in prompt diagnosis and treatment of a patient with unrecognized spinal meningitis. A 39-yr-old healthy man underwent uneventful outpatient extracorporeal shockwave lithotripsy with combined spinal epidural anesthesia (27-gauge Whitacre spinal needle through 18-gauge Tuohy needle, Becton Dickinson, Franklin Lakes, NJ). Two days after surgery, the patient experienced a bilateral, occipital-temporal headache that worsened with an upright position. The patient was evaluated by his primary care physician

and referred to the pain management clinic for an epidural blood patch with a presumptive diagnosis of postdural puncture headache. Further evaluation at the pain management clinic revealed acute development of photophobia and severe headache (6/10 on a verbal pain scale) while supine that worsened when upright (9/10). Vital signs were remarkable for a tympanic membrane temperature of 38.5°C. Physical examination was remarkable for an ill-appearing man with a positive Kernigs sign of meningeal irritation. The patient's spinal needle puncture site was nonerythematous and nontender. A