Inadvertent Cannulation of an Aberrant Radial Artery

To the Editor.—I wish to describe inadvertent cannulation of an aberrant radial artery.

A 67-yr-old man was scheduled for resection of an abdominal aortic aneurysm. Examination of the radial arteries revealed a good pulse in the left and a poor pulse in the volar aspect of the right wrist. A 20-gauge catheter was easily inserted percutaneously into the left radial artery. A tourniquet was placed around the right upper arm, and a large "vein" appeared on the lateral aspect of the right wrist, at the common location for a large tributary of the cephalic vein. A 14-gauge cannula was easily inserted, but was found to be intraarterial when connected to the iv tubing. The catheter was removed, and direct pressure was applied for 5 min over the site. The patient had an otherwise uneventful procedure, and a postoperative exam revealed a strong pulse at the cannulation site. The pulse disappeared when a tourniquet was placed on the upper arm. There was no history of a prior procedure, trauma, or cannulation in that area, and there was no evidence of an arteriovenous fistula.

The radial artery appears proximal to the wrist between the tendons of the brachioradialis and the flexor carpi radialis. It turns laterally at the wrist deep to the tendon of the abductor pollicis longus to reappear in the "anatomic snuffbox" between the extensor pollicis longus and the extensor pollicis brevis. An uncommon branch of the radial artery travelling superficial and lateral to the abductor pollicis longus has been described, with a frequency of 0.8%. Clinicians should be aware of this variant because potential complications of entering the artery with a large cannula intended for venous placement include arterial disruption necessitating surgical repair, arteriovenous fistula, and extensive hematoma formation in the wrist with subsequent nerve compression.

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REFERENCES

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Pollution Associated with Keyed Filling Devices

To the Editor.—Studies concerning the possible hazards of trace anesthetic gases and vapors have encouraged both scavenging these gases and vapors and improved high turnover ventilation of the air in operating rooms. These measures have lowered the average concentrations of anesthetic gases and vapors in ORs and recovery areas. Most published studies and guidelines refer to timed average concentrations of trace anesthetic vapor and gases. However, when the vaporizers are being filled, the vapor can often be smelled even when the filling instructions of the manufacturer are followed very carefully. The level at which halothane vapor can be smelled is 10 parts per million (ppm), which is five times the recommended safe level.

We decided to find out how much anesthetic vapor an anesthetist is exposed to when filling the vaporizers commonly used in our department. In four different operating rooms using the MIRAN IA trace gas analyzer, the concentration of vapor was measured 2 inches away from the nose of the person filling three Cyprane TEC 4 vaporizers, one each for enflurane, isoflurane, and halothane. The airflow of the ventilation of each room was also measured.

We found no correlation between either the peak concentration or the washout time to the room air turn-
TABLE 1. The Concentration of Vapor in Parts per Million (ppm) Measured by the MIRAN IA Gas Analyzer in Relation to the Room Air Turnover Rate (RATOR)

<table>
<thead>
<tr>
<th></th>
<th>Enflurane</th>
<th></th>
<th>Isoflurane</th>
<th></th>
<th>Halothane</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak ppm</td>
<td>Washout Time</td>
<td>Peak ppm</td>
<td>Washout Time</td>
<td>Peak ppm</td>
<td>Washout Time</td>
</tr>
<tr>
<td>6.5 per hour RATOR</td>
<td>13.02</td>
<td>40 sec</td>
<td>186.24</td>
<td>70 sec</td>
<td>3.325</td>
<td>60 sec</td>
</tr>
<tr>
<td>5.2 per hour RATOR</td>
<td>71.61</td>
<td>100 sec</td>
<td>11.85</td>
<td>60 sec</td>
<td>9.5</td>
<td>20 sec</td>
</tr>
<tr>
<td>5.7 per hour RATOR</td>
<td>67.27</td>
<td>60 sec</td>
<td>290.00</td>
<td>60 sec</td>
<td>48.375</td>
<td>60 sec</td>
</tr>
<tr>
<td>11.0 per hour RATOR</td>
<td>69.44</td>
<td>90 sec</td>
<td>84.68</td>
<td>80 sec</td>
<td>52.25</td>
<td>60 sec</td>
</tr>
</tbody>
</table>

over rate (RATOR) (table 1). We postulated that this was due to air turbulence which we do not have the instrumentation to measure.

However, we found the shape of the curve of the concentration of anesthetic vapor to be of interest. In ten out of 12 curves (83%), there were two peaks; the first peak occurred while opening the bottle containing the vapor. The second peak coincided with disconnection of the keyed filling device from the vaporizer until it was placed in the anesthetic machine drawer for storage. In six out of ten double-peaked curves, the second peak was much larger than the first. Figure 1 shows a curve with these features.

These measurements were made while the anesthetist was carefully following the manufacturer's instructions for the filling of vaporizers with keyed filling devices without spillage or obvious leaks. Even so, the peak concentrations were above the accepted safe limit for trace gases. We suggest that our results represent the lowest level of vapor pollution associated with filling vaporizers. In the clinical setting, often vaporizers are not filled carefully, liquid leaks or spills, and the keyed filling device is left to "dry out" on the anesthesia back stand. Much higher levels could be expected in these circumstances.

The manufacturers of vaporizers and anesthetic vapor have addressed the problem of filling vaporizers with an incorrect liquid by introducing keyed filling devices. In so doing, they also decreased the amount of pollution by vapors during vaporizer filling. However, the concentration curves we have seen would indicate that the surface area of the filling device is itself a cause of pollution.

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Fig. 1. Concentration of isoflurane in air during and after filling of vaporizer. 1) Open bottle of liquid isoflurane; 2) start filling vaporizer; 3) disconnect keyed filling device; and 4) place keyed filling device in drawer.
Midazolam-induced Ventricular Irritability

To the Editor:—Recently, three young adult patients, ASA Class I, scheduled for elective surgery at this facility demonstrated ventricular irritability (bigeminy and trigeminy) and tachycardia after premedication with intramuscular midazolam (Versed®). No anticholinergic or analgesic premedication was given. In each case, pre-operative ECG revealed normal sinus rhythm without ventricular extrasystole. These dysrhythmias were noted during the pre-induction period, approximately 45 min after intramuscular injection of midazolam (Versed®). This correlates well with the reported peak effect of im midazolam of 45–60 min.1

All our patients appeared well sedated, and demonstrated anterograde amnesia for the immediate preoperative period. Insertion of intravenous cannula may cause pain leading to sympathetic nervous system stimulation and dysrhythmias. In our patients, local infiltration of 1% lidocaine via 25-gauge needle preceded cannula insertion, and all patients denied pain. Each of our three patients denied excessive consumption of caffeine, alcohol, tobacco, or drug use. In no case was a history of mitral valve prolapse or dysrhythmia obtained. In addition, postoperative echocardiography was normal in two of three patients tested. In every case, cardiac disturbances resolved over 2–4 h, corresponding with the reported elimination half-life of midazolam of 1–4 h in healthy humans.2,4

Two of our three patients subsequently underwent general anesthesia (without midazolam) and did not demonstrate ventricular irritability. Except for the deletion of midazolam, the anesthetic protocol was unchanged.

It's Tuohy, Not Touhy

To the Editor:—I read with interest the letter by Harvey in the May, 1987, issue of the Journal.1 However, I was startled by the misspelling of the word “Tuohy” which appeared six times throughout the letter. I could understand how an anesthesiologist in clinical practice could make that error, as I have myself.2 That it slipped by editorial review, however, is surprising. Edward B. Tuohy (1908–1959) described his needle in 1944 and...