the polyvinylchloride inflation tubing that runs along the inner wall of the tube. This could account for our inability to deflate a cuff postoperatively after an uneventful preoperative testing. The carbon dioxide laser settings that significantly increase the risk of polyvinylchloride deformity or melting include a continuous mode, a smaller spot size, and a higher power setting (>20 W). On the other hand, Mallinckrodt has noted experimentally that deformity could occur with a power as low as 10 W using a 0.48-mm spot over 25 s.* Clearly, more than a stray laser beam would be necessary to accomplish this. The laser used in our first patient was set to the continuous mode, a power of 11 W, 46 s, and a spot size of approximately 0.7 mm. Laser settings for the second patient were not recorded.

Although we do not know the cause for our difficulties, certain modifications in the Laser-Flex tracheal tube would address probable contributing factors. Enlarging the lumen of the inflation tubing, even slightly, would significantly reduce the resistance posed by the injection and aspiration of saline. Another improvement would be to enlarge the opening of the inflation tubing into the cuff itself, presently only a tiny slit.

The requirement that aspiration of saline from the cuffs of the Laser-Flex tracheal tube be done in a slow, gentle manner cannot be overemphasized. However, as we have described here, it may be impossible to deflate the cuff and exsufflate the trachea despite apparent satisfactory technique and no other obvious explanations.

* Nye D: Personal communication.

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**In Reply:**—The Mallinckrodt Laser-Flex tracheal tube is a safe and effective laser-resistant medical device. Studies show that the Laser-Flex tracheal tube is resistant to laser exposures typical in most clinical procedures.*

More than 100,000 Laser-Flex tracheal tubes have been used in surgical procedures worldwide over the past 5 yr. Patient injuries related to product misuse are rare. The only report of a fire involved misuse of the Laser-Flex tracheal tube: The cuffs apparently were not inflated with the prescribed protective saline solution.

Caution is advised in the use of lasers and tracheal tubes, because no material can claim to be completely laser proof. All materials melt, degrade, or burn when exposed to high laser power levels. This is most apparent when materials are exposed to high oxygen concentrations. The Laser-Flex tracheal tube is no exception. The stainless steel shaft becomes incandescent, perforates, and burns at power levels higher than 25 W when exposed to a single perpendicular 0.5-mm diameter carbon dioxide laser beam for more than 20 s in an environment of 98% O₂.† The polyvinylchloride cuff inflation tubes inside the stainless steel tracheal tube may melt, occlude, or break upon exposure to lower energy levels. Indeed, precautions are necessary with all tracheal tubes in the presence of lasers.

Mallinckrodt is working closely with voluntary standards organizations to develop test methods and identify safeguards for use of lasers during airway surgery. The American Society for Testing and Materials (ASTM) Committee on Anesthetic and Respiratory Equipment recently drafted a new test method for determining the laser resistance of the shafts of tracheal tubes.‡ The committee members, chaired by Gerald Wolf, M.D., also developed a recent guide for use of tracheal tubes involving the use of lasers in airway surgery.§

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† Mallinckrodt: Internal testing. 1993.
Table 1. Test Method for Determining the Laser Resistance of the Shaft of Tracheal Tubes

<table>
<thead>
<tr>
<th>Laser Duration (s)</th>
<th>Power (W) No Damage to Cuff Inflation System</th>
<th>No Damage to Tracheal Tube Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>19</td>
</tr>
</tbody>
</table>

These test conditions did not damage the cuff inflation system or the shaft of the Mallinckrodt Laser-Flex tracheal tube.

ASTM test conditions:
98% O₂ environment, 1 l/min flow.
Carbon dioxide laser: Sharpplan Laser,
Stationary 0.49-mm laser spot diameter.
Continuous-wave laser beam held perpendicular to the tracheal tube.
20 Laser Flex tracheal tubes tested: five for each test condition.
Lowest power level delivered at the tube surface before damage occurred for each duration.

work is underway by the International Organization for Standardization committees in Anesthesiology and Electro-Optics.

We used these new test methods to identify safe laser power levels with the Laser-Flex tracheal tube. The test results support the conclusion that the tube is not damaged by laser power levels used in typical clinical situations (table 1). However, tests show that high power levels or long exposures to continuous laser energy will damage the cuff inflation lines inside the tracheal tube and ultimately perforate and burn the stainless steel tube.

Complaints of potential damage to the Laser-Flex tracheal tube are rarely reported; 15 complaints involving the cuff inflation system have been reported to Mallinckrodt in the last 5 yr. On examination, only one of these complaints was confirmed to have a melted cuff inflation line inside the tracheal tube.

In the cases of difficult extubation reported by Heyman et al., lasers were reported to contact the shaft of the tube for more than 45 s. Though physical damage was not directly confirmed in these case reports, it is likely that long exposures may have led to occlusion of the cuff inflation lines.

It is important that anesthesiologists are aware of power and duration settings of lasers used during surgery on the upper airway. Damage to the tracheal tube may result if power levels approach or exceed the maximum safe levels listed above.

If difficult extubation is traced to a nondeflatable cuff, it may be necessary to pierce both saline-filled cuffs with a sharp instrument, such as a spinal needle, to ease extubation.

The information herein will be added to updated Laser-Flex product labeling and literature when standardized ASTM labeling guidelines are adopted in the near future.

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Abortion Does Not Lead to Euthanasia

To the Editor—Barnette and Wendling warn that the “devaluation of human life” is inherent in any physician-assisted death.1 They imply that the legalization of abortion constituted such a devaluation, and began a “progression of thought” that led to society’s contemplation of euthanasia. Finally, they suggest that further logical progression may lead to the mandate of euthanasia by the state.

I agree that the value of life is at issue in every euthanasia proposal, and that we must guard against taking it cavalierly—perhaps to the extent that we refuse to institutionalize euthanasia under any circumstances. However, I believe that the authors’ statements about abortion and about progression to state-mandated killing are illogical and therefore dangerous, constituting an unsubstantiated attack on abortion in the name of Hippocrates.

The authors state that “the defining issue is not the distinction between state and individual autonomy but the devaluation of human life and the inevitable progression of thought and act that results from acceptance of that concept.” They then cite Roe v. Wade as an example of the devaluation of human life, without a word to suggest it might be otherwise: “Following Roe v. Wade, concern was expressed regarding the inevitable progression from the legalization of abortion to euthanasia . . . a scant 20 yr later, we are discussing the likelihood of legalized euthanasia in America. Clearly, such a progression of thought did occur.”

When did abortion become a self-evident example of the devaluation of human life? And how does the fact that abortion was legalized 20 yr ago prove a “progression” to current discussions of

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