Use of Oxygen Analyzers Should Be Mandatory

To the Editor—Dr. Feingold is correct that advice from a sensational television show and fear of looking bad in court are not good reasons for using oxygen analyzers. But there are other, compelling reasons to do so.

Incorrect settings of gas flows are not the only cause of hypoxia. Other causes include inaccurate or leaking flowmeters, rebreathing secondary to low fresh gas flows, failure of the oxygen source on a machine not equipped with an oxygen safety failure valve, delivery of a gas other than pure oxygen through the oxygen flowmeter, and failure of systems designed to ensure a safe oxygen–nitrous oxide mixture. Observation of the color of the blood or skin are unreliable methods of detecting hypoxia, as are monitoring of heart rate and blood pressure.

In addition to detecting hypoxia, oxygen analyzers can warn of inadvertent increases in oxygen that lead to patient awareness or damage to the lungs or eyes. When used with closed system techniques, they provide much information about the patient’s uptake of oxygen and other gases.

An oxygen analyzer can achieve its purposes only if it is used. This condition can be met if anesthesia personnel appreciate its role in enhancing patient safety. Our experiences over the past 5 years are that it is possible to keep these devices functioning properly without undue effort. We have found that having specific places on the anesthesia record for noting oxygen percentages and alarm settings helps to remind people to use them.

It is true that the analyzers presently available could stand improvement. We hope that the manufacturers of analyzers and anesthesia machines take note of Dr. Feingold’s excellent suggestions. In the meantime, how many tragic cases of hypoxic death or brain damage can we tolerate while waiting for the perfect device?
Plasma-Sulfate-Conjugated Catecholamines during Anesthesia

To the Editor:—Recent reports in the Journal have examined the effects of anesthetics on adrenergic response during surgery.\(^1\)\(^2\) Responses were evaluated by measuring variations in concentrations of plasma norepinephrine and epinephrine. However, the methods used in these studies measured only free plasma catecholamines, whereas, in humans, 70–80% of total plasma catecholamines are sulfate conjugated.\(^3\) Thus, we performed a study in seven ASA class I or II patients (aged 25–69 years) to delineate variations in sulfate-conjugated catecholamines during anesthesia.

In all cases, induction was achieved with thiopental, 5 mg/kg, and succinylcholine, 1 mg/kg, followed by nitrous-oxide-halothane for maintenance. Radial artery blood samples were obtained simultaneously before induction of anesthesia (T1) (20 min after intraarterial insertion of catheter), 1 min after tracheal intubation (T2), and 1 min after skin incision (T3) for measurement of total and free norepinephrine (NE) and epinephrine (E) levels, using a radio-enzymatic assay method. Sulfate-conjugated catecholamines were calculated from these data by subtraction.\(^3\)

As noted in other studies, free NE increased during nociceptive stimulations (table 1); free E levels decreased. Total NE and E levels did not change. The percentage of sulfate-conjugated NE decreased significantly, while the percentage of sulfate-conjugated E increased.

Sulfate-conjugated catecholamines are usually thought to be of minor importance in the regulation of circulation in humans except in some situations.\(^4\) The role they play in anesthetized patients currently is under study.

**Table 1.**

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total NE pg/ml</td>
<td>982 ± 174</td>
<td>1,031 ± 180</td>
<td>1,033 ± 190</td>
</tr>
<tr>
<td>Free NE pg/ml</td>
<td>185 ± 32</td>
<td>275 ± 48†</td>
<td>305* ± 74</td>
</tr>
<tr>
<td>Sulfate-conjugated NE in per cent</td>
<td>79.9 ± 3</td>
<td>71.2* ± 3.7</td>
<td>69.3* ± 2.3</td>
</tr>
<tr>
<td>Total E pg/ml</td>
<td>517 ± 188</td>
<td>441 ± 168</td>
<td>366 ± 171</td>
</tr>
<tr>
<td>Free E pg/ml</td>
<td>64 ± 15</td>
<td>29† ± 4</td>
<td>32† ± 6</td>
</tr>
<tr>
<td>Sulfate-conjugated E in per cent</td>
<td>82.4 ± 4.1</td>
<td>89.5† ± 2.1</td>
<td>89.6† ± 2.3</td>
</tr>
</tbody>
</table>

Values are mean ± SE.
* \( P < 0.01 \) versus T1 (analysis of variance).
† \( P < 0.05 \).

References