PERFUSION TECHNIQUES

Insufficient Oxygenation: A Technique to Increase pO_2

by
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New oxygenators and new models of old oxygenators have appeared on the market during the past few years. In general, these instruments avoid many of the problems encountered with their forerunners. I have had a rare one, however, that failed to function normally.

We employ a continuous readout pO_2 monitoring device in the arterial and venous lines. This provides an immediate and accurate indication of gas exchange level, both in the patient and in the oxygenator. Occasionally, the arterial pO_2 remains at an unacceptably low level, a circumstance intractable to the usual adjustments.

In order to achieve satisfactory gas tensions, I adopted a technique used with the early filming oxygenators: recirculation. Those perfusionists with experience using the older devices, or with some new membrane oxygenators, will not find the idea unacceptably novel.

By taking a portion of the partially saturated blood and passing it again through the oxygenator, satisfactory pO_2 levels may be achieved. Although specific connection points will vary according to a perfusionist's individual setup, the general principle should be adaptable to most systems. The use of coronary perfusion adds a slight challenge.

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When necessary to increase the arterial pO_2 after normal methods have failed, I obtain two one-quarter inch connectors, a coronary perfusion line and an extra pump. My usual routine involves placing a short piece of tubing, sterile, capped and clamped, over the coronary perfusion outlet of the oxygenator. To recirculate, I remove the cap, attach the coronary perfusion line with a straight connector and attach the other end to a fast priming line which is routinely "Y"ed into the venous line. In lieu of this priming line, a cardiotomy reservoir port, for instance, may be used.

With the line in place, I remove the clamp at the coronary port, insert the line into the extra pump and start to recirculate. A flow of three to four hundred milliliters usually suffices.

The recirculating technique described helps to deliver satisfactory pO_2 values during those rare instances when proper gas exchange is not taking place. The closed circuit needs very little priming volume and does not require the perfusionist's constant attention.