remaining tube in the pharynx. In addition, the tube changer we described is of such a diameter that it provides an adequate lumen through which the patient can ventilate while the tubes are being exchanged. The tube changer we described, which is commerically available,* is graduated so that its depth within the trachea and endotracheal tube can be determined and therefore, we have found that new tubes can be properly positioned without requiring an additional radiograph.

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Simplified Pulmonary Artery/Right Atrial Pressure Monitoring System

To the Editor: —Triple lumen and quadruple lumen, thermodilution, flow-directed, pulmonary-artery catheters permit simultaneous measurement of pulmonary artery (PA) pressure (PAP) and right atrial pressure (RAP) or central venous pressure (CVP). Pulmonary capillary wedge pressure (PCWP) can also be measured by inflating the balloon on the catheters. Because of physiologic noise caused by patient movement and by respiratory variations, these pressures can seldom be measured continuously. To prevent pulmonary embolism, the balloon is inflated for only a short time, thus precluding continuous reading of PCWP. We have developed a simple method which makes it possible to measure these pressures with one transducer/amplifier system. The system continuously flushes both the PA and CVP catheter lumens. Switching from measurement of CVP to PAP requires 90° rotation of a single stopcock. The mechanism is simpler and less expensive than a similar one proposed by Kotter.[1]

The system is outlined in figure 1. Stopcock 1 (a conventional 3-way stopcock) connects either the PA catheter lumen or the CVP catheter lumen to the pressure transducer. In position "A" the transducer is connected to the CVP lumen, while in the more common "B" position the transducer is connected to the PA lumen. Both lumens of the catheter are continuously flushed with two devices which can be connected to a single pressurized fluid source. Stopcock 1 can be connected to the CVP lumen by a 3-in piece of male-male pressure tubing or by using preassembled, sterile, single-use kits on which the tubing connection at stopcock 1 is bonded.

Stopcocks 2 and 3 are conventional 3-way stopcocks.

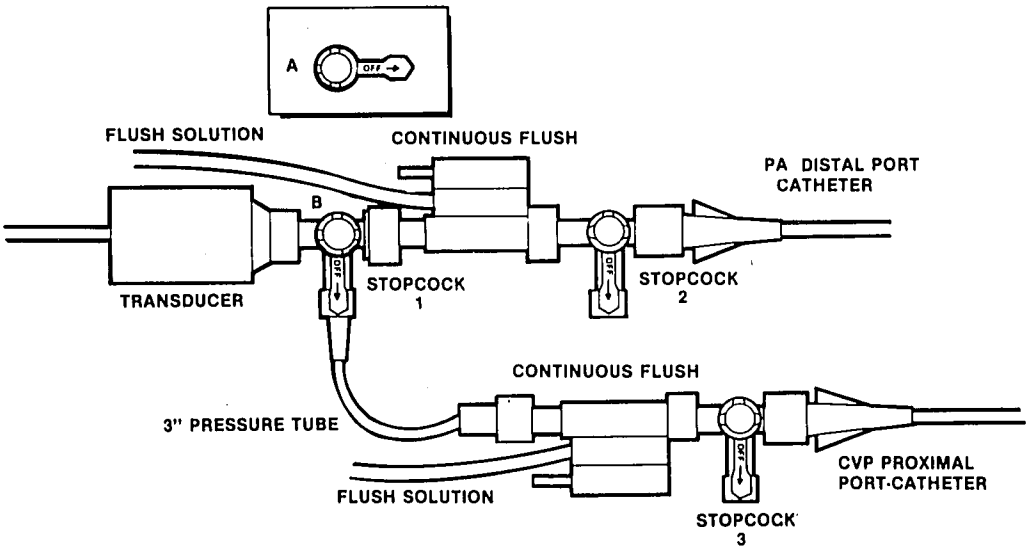

FIG. 1. Diagram of a simplified pulmonary artery/right atrial pressure monitoring system.

Mixed venous samples for blood gas analysis are drawn through stopcock 2 and this stopcock can also function as the pressure transducer "zeroing" point. Stopcock 3 is used for injection of iced saline for measurement of thermodilution cardiac output. When the side ports of stopcocks 2 and 3 are not in use, they are covered to prevent contamination. Note in figure 1 that the system is compact and connects directly to the catheter, permitting the entire system to be mounted on the arm. With a minimum number of components and interconnecting tubing it is possible to achieve optimum dynamic response[2].

The system outlined in figure 1 has the following advantages over conventional manifold systems: 1) It is simple to set up and use. Only one stopcock is required to switch between PAP and CVP. 2) It is less expensive to purchase and uses conventional disposable components. 3) Only one transducer/amplifier system is used; costs are reduced, as are errors in pressure difference measurement caused by transducer/amplifier offset or sensitivity errors. 4) Both lumens are continuously flushed, thus minimizing loss of catheter function. 5) A minimum of tubing and components between the catheter and the transducer makes it possible to achieve optimal dynamic response.

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