and it was therefore decided to insert a Swan-Ganz® catheter before induction of anesthesia for reduction and fixation of his fracture. The right internal jugular vein was easily cannulated with the use of an Arrow® introducer set. A catheter sheath adapter was connected to the end of the introducer, and a 7 gauge Fr. Swan-Ganz® catheter was inserted through it.

Despite the assistance of an image intensifier, it was found impossible to obtain a satisfactory placement of the Swans-Ganz catheter. The catheter therefore was removed, leaving the introducer and the catheter adapter, the side port of which was connected to an intravenous infusion.

Induction and maintenance of anesthesia proceeded uneventfully. At the end of the procedure, the patient's neuromuscular blockade was reversed and spontaneous respiration commenced while the patient was still prone. On turning the patient supine onto his bed, respiratory and cardiac arrest ensued. The patient was successfully resuscitated, with a good outcome as regards cerebral function.

A computerized tomography scan showed no abnormalities, but on the patient's return to the intensive care unit a clearly audible sucking noise was present at the site of the catheter/sheath adapter, and air could be easily aspirated out of the side port, even though the adapter was tightly screwed onto the Swan-Ganz catheter introducer.

The catheter/sheath adapter contains a plug of soft rubber with a cruciate incision that acts as a one-way valve, sealing the catheter port when a Swanz-Ganz catheter is not *in situ*. We have subsequently tried to produce incompetence in this one-way valve in several samples *in vitro*. Despite connecting the valve in all configurations to a pressure of 300 mmHg, no incompetence has been witnessed, even after insertion of a Swan-Ganz catheter anterograde and retrograde numerous times through the valve.

We believe the most likely cause of the incompetence witnessed in the valve is a fault in manufacture, although it is possible that a clot of blood was lodged in the valve, which kept it in the open position. The timing of the presumed air embolus is likely to result from the patient being turned from the prone position, thus raising the level of the valve above the heart.

We believe it important that all physicians using these catheter sheath adapters are aware of this potentially fatal hazard. An obturator is available for placement through the valve when a Swan-Ganz catheter is not *in situ*, but we believe the safest course of action when using a Swan-Ganz catheter introducer without a catheter is to remove the catheter/sheath adapter altogether.

AUBREY BRISTOW, M.B., B.S., L.R.C.P., M.R.C.S., F.F.A.C.R.S.
Visiting Assistant Professor
Department of Anesthesiology

HUNT BATJER, M.D.
Assistant Professor
Neurosurgery

VALERIE CHOW, M.D.
Resident
Department of Anesthesiology

J. ROSENSTEIN, M.D.
Resident
Department of Neurosurgery

Parkland Memorial Hospital
5210 Harry Hines Blvd
Dallas, Texas 75235

(Accepted for publication April 29, 1985.)

Anesthesiology
63:341–342, 1985

In reply:—Reports on failures of various manufacturers' hemostasis valves have been published in various medical journals over the years.[1] For this very reason, Arrow International set forth several years ago to design the safest, most efficient homeostasis valve system available from any manufacturer.

Most other manufacturers' valves originally were designed for arterial use only and consequently rely on pressure in order to provide a satisfactory seal. The Arrow® design is a mechanically closing device utilizing rubber "springs" that compress during catheter insertion and expand to close during catheter withdrawal. The hemostasis valve of the Arrow® catheter tested thoroughly and in all situations relating to their actual use were found to perform satisfactorily relative to the maximum positive and negative pressures required of this device *in vivo*.[2]

Even though Arrow International is convinced that our hemostasis valve design is the best on the market, we also believe that in no situation involving the introduction of large bore sheaths, that patient safety should be compromised. Accordingly, as the authors of the

preceding letter indicate, a 7 Fr. obturator is available in separate sterile package packs to be used with our valve sheath assembly after removal of a pulmonary artery or other indwelling catheter.* The lock-on design of this obturator provides a triple factor of safety in preventing air embolism or back-bleeding after removal of such catheters. Thus, Arrow International feels if the obturator would have been used in this situation, as recommended in the product labeling, the introducer, with no doubt, could have remained safely in the vessel.

The authors admit that upon testing subsequent valves, they were unable to reproduce valve incompetence. We would agree with the authors that the suspected defective valve remains a mystery as to why this malfunction occurred. The 7 Fr. obturator is approximately 6″ long and is made of a soft resilient material to not only ensure that leakage does not occur but also to keep the sheath from kinking. Since this incident was not previously reported to Arrow officially, and since the suspected defective valve was never returned to Arrow for evaluation, Arrow is unable to explain why this particular valve apparently leaked.

Arrow International has always taken complaints very seriously and considers them a vital part of our product development program. This is indeed valuable feedback, and I welcome this opportunity to make sure that all of your readers understand how, by using Arrow's *recommended system,* as clearly labeled, patient safety is ensured and incidents such as these authors have reported will be eliminated.

PAUL L. FRANKHOUSER
Marketing Manager
Arrow International, Inc.
P. O. Box 6306
Hill and George Avenues
Reading, Pennsylvania 19610

* Duval A: The multi-lumen catheter—a new concept in infusion therapy. Nutritional Support Services, vol 4, no 2. February, 1984, 22.

REFERENCES

1. Horrow JC, Laucks SO: Coronary air embolism during venous cannulation. ANESTHESIOLOGY 56:212–214, 1982
2. Conahan TJ, Barberii JK, Calkins JM: Valve competence in pulmonary artery catheter introducers. ANESTHESIOLOGY 58:189–191, 1983

(Accepted for publication April 29, 1985.)

Anesthesiology
63:342–343, 1985

New Endotracheal Tube (Univent Tube®*) for Selective Blockade of One Lung

To the Editor:—Selective ventilation of one lung has been accomplished by several methods.[1,2]† We had a chance to use a new endotracheal tube (fig. 1) with a movable blocker.[3] The endotracheal tube has two compartments, a large lumen for conventional air passage and a small lumen where a movable tube (a small tube) is placed. The small tube, at the tip of which the second cuff (bronchial cuff) is attached, can be advanced up to 8 cm beyond the main body. Before intubation the bronchial cuff is deflated and the small tube is retracted into the second lumen (fig. 2). Intubation is accomplished by ordinary techniques. After intubation the tube is twisted 90 degrees toward the side to be occluded and the small tube is advanced. Inflating the bronchial cuff and capping the proximal opening of the small tube isolates one lung. Although advancement of the tube can be guided by fiberoptic bronchoscopy, blind insertion also is possible because of the characteristic rigidity and the angulation of the distal part of the small tube. The position of the small tube is confirmed with a fiberoptic bronchoscope or by direct palpation of the bronchi when the chest is opened.

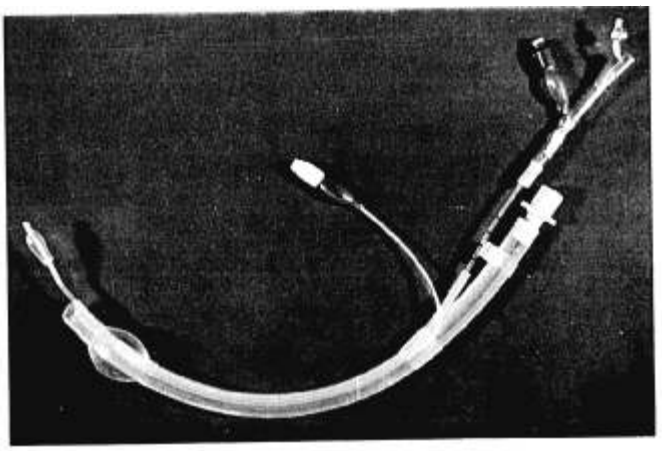

FIG. 1. The movable small tube functions as a blocker of one lung.

* Fuji Systems Corporation, 1-11-1 Ebisu, Shibuya-ku, Tokyo 150, Japan.

† Brodsky JB, Mark JBD: A simple technique for accurate placement of double-lumen endobronchial tubes. Anesthesiology Review 10: 26–30, 1983.