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To the Editor:

Thank you for the opportunity to reply to the letter from Dr Collin Brathwaite, in which he expresses serious reservations concerning our preliminary report on rapid percutaneous tracheostomy. We hasten to assure him that we are well aware of the complex and probably multifactorial mechanisms of laryngotraheal injury as listed by Stauffer and colleagues1 in their study of the complications and consequences of endotracheal intubation and tracheostomy. These "complications related to excessive cuff pressure requirements, self extubations, inability to seal the airway, agitation with frequent head motion, and nutritional status" are common to any tracheostomy technique and can best be prevented or minimized by the use of optimal surgical skill and expertise in the postoperative management of the tracheostomy.

The percutaneous procedure that we developed was based on the ever-increasing application of the Seldinger technique for gaining percutaneous access to major arteries and veins with less risk of producing trauma and tissue devitalization and therefore less risk of infection. We have at no time recommended hyperextension of the neck in the blunt trauma victim without obtaining prior cervical spine clearance. Extension of the neck is, however, the recommended position for both tracheostomy and emergency cricothyroidotomy in order to render the cricoid cartilage and tracheal rings palpable. More than two thirds of the original 200 patients in whom this technique was employed were operated on at their bedside without transferring them to an operating room; in none of them was there any doubt about the stability of the cervical spine.

The jaws of the original model of our tracheostome have since been modified and are less sharp, thus reducing the risk of trauma to the cannula cuff. We would like to emphasize that the cannula cuff must be completely emptied by aspiration with a syringe prior to its insertion into the stoma, and its outer surface must be liberally lubricated with lidocaine jelly or K-Y jelly. We have seldom encountered laceration of the cuff during cannula insertion if these precautions were taken. The cannulas accompanying the percutaneous tracheostomy kit are standard Portex 7.0-, 7.5-, or 8.0-mm-inner-diameter tracheostomy cannulas and are no more pliable than other makes. The specially designed plastic cannula obturator supplied in the kit facilitates its insertion between the blades of the tracheostome.

We emphasize once again that patients with bull necks, thyroid or other neck tumors, or extensive edema of the subcutaneous tissue, in whom percutaneous tracheostomy is contraindicated because of the difficulty in palpating the tracheal rings, constitute only a small fraction of the candidates for tracheostomy.

The excellent tracheal healing and low rate of infections in our experience speak for the advantage of this technique. We urge Dr Brathwaite to try this procedure again, and feel sure that his misgivings will be allayed.

Finally, we would like to emphasize that the procedure of percutaneous tracheostomy is not intended to replace existing methods for the establishment of a free airway and optimizing the patient's ventilation, but rather should be considered as a convenient, safe, and practical alternative.

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REFERENCE


Use of Pulmonary Artery Catheterization in Patients with Acute Myocardial Infarction

To the Editor:

The utilization of pulmonary artery catheterization (PAC) is a controversial issue, and the study by Zion et al.1 and the editorial by Dallen, which appeared in the December 1990 issue of Chest,2 are recent additions to this controversy. Zion et al state that there is a difference in mortality between the groups of patients who undergo PAC and those who do not, but they do not feel that the excess mortality is attributable to PAC. Dallen writes that this study and a previous study by Gore et al.3 show that PAC is not beneficial in patients with acute myocardial infarction. While this may be true, I think that these studies do not address a more important issue, which is the type of physiologic information obtained by means of PAC and how physicians use this information.

Ibieri et al.4 in a recent survey of physicians' knowledge of PAC, found that current physician knowledge is extremely variable and conclude that deficiencies in PAC knowledge may lead to inappropriate therapeutic decisions and increased patient morbidity. Shoemaker5 states in a recent editorial that if appropriately used, PAC can decrease mortality and hospital costs. He also describes the "red-top syndrome," which is when a patient undergoes PAC before surgery and is admitted to the ICU with the red plastic top of the cardiac output port still in place. The red-top syndrome and utilization of fiberoptic pulmonary artery catheters without using the continuous mixed venous saturation capability are not uncommon.

Shoemaker's study was done with surgical patients, and similar studies need to be done in other patient populations. I think we need studies describing how this technology is used and how this procedure and utilization of the information obtained from this procedure are taught in our training programs, because even a good procedure if inappropriately used will do more harm than good. The studies by Zion et al.1 and Gore et al.3 do not address this issue, and it would be of interest to study the catheterization practices of the physicians using PAC in these studies. We may need to reevaluate the accreditation procedures for PAC so that this technology is used appropriately.

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Use of Pulse Oximeter in New $\text{SpO}_2$-oriented Technique for Bronchopulmonary Lavage

To the Editor:

We report a new method of bronchopulmonary lavage in which we used arterial oxygen saturation measured with a pulse oximeter ($\text{SpO}_2$) as a guide to determine the volume of lavage fluid to be drained. This technique enables us to perform bronchopulmonary lavage safely with a larger infused tidal volume, which consequently improves the efficiency of the lavage markedly.

A 52-year-old, 53-kg woman suffered from alveolar proteinosis. The patient, who had previously undergone bronchopulmonary lavage 18 times during a six-year period, was scheduled for right lung lavage. The technique for previous lavage was so-called volume-controlled unilateral lung lavage, which we had chosen because it seemed safest among several lavage techniques. The operating room monitors consisted of a pulse oximeter, precordial and esophageal stethoscopes, blood pressure cuff, electrocardiograph, and capnometer. A radial artery catheter was inserted for blood gas sampling and blood pressure monitoring. Anesthesia was induced with fentanyl, 300 μg, and midazolam, 20 mg. Vecuronium, 12 mg, was given, and the patient's trachea was intubated with a 37F double-lumen endobronchial tube (Bronchocath; Mallinckrodt, Athlone, Ireland). Degassed, warmed isotonic saline, 1,100 ml (which approximated the sum of the patient's right lung functional residual capacity and tidal volume), was infused into the right lung. The outflow lavage fluid was then drained gradually by gravity until the $\text{SpO}_2$ had decreased to 90 percent. At that instant, the inflow lavage solution, in a volume equal to that of the outflow fluid, was introduced. Filling and drainage with the same technique were repeated until the lavage effluent cleared.

The clinical results with the $\text{SpO}_2$-oriented lung lavage technique were compared with those with the conventional technique. The infused tidal volume was $230 \pm 22$ ml (mean $\pm$ SEM) for a previous conventional lavage and $621 \pm 18$ ml for lavage with the new technique. The total lavage fluid volumes delivered were 16,400 ± 1,970 ml and 11,700 ml, respectively. The total effluent volumes were 14,300 ± 1,850 ml and 9,620 ml, respectively. Frequencies of lavage were 45 ± 6 times and 18 times, respectively. Durations of the procedure were 139 ± 23 min and 104 min, respectively. The lowest arterial $\text{Po}_2$ values recorded were 35 mm Hg and 61 mm Hg, respectively.

Thus, $\text{SpO}_2$-oriented bronchopulmonary lavage was more efficient because the infused tidal volume was greater. Consequently, the total lavage fluid volume was smaller and the duration of the procedure was shorter than with the conventional technique. We believe that the $\text{SpO}_2$-oriented bronchopulmonary lavage technique is more efficient and safer than the conventional techniques.

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REFERENCES

Pulmonary Embolism Due to an Indwelling Central Venous Catheter

To the Editor:

I read with interest the report by Cervia et al., which appeared in the December 1990 issue of Chest. They described a case of septic pulmonary embolism due to a central venous catheter. Although it is unusual for central catheters to be associated with recognized pulmonary emboli of any type, the true incidence of this syndrome, as well as that of catheter-induced thrombosis (CIT), is probably underdiagnosed.

During a 35-month period (January 1988 to November 1990), a prospective infection control surveillance study was performed in our intensive care unit. Forty-five episodes of catheter-related bacteremia were recorded, and one patient (2.2 percent) developed a septic pulmonary embolism secondary to subclavian septic CIT.

It is remarkable that CIT is usually silent, although it has frequently been demonstrated after systematic radiologic evaluation. Pulmonary thromboembolism from asymptomatic CIT has been previously reported. Moreover, pulmonary embolism from asymptomatic CIT is not an unusual postmortem finding.

We conclude that the appearance of multiple pulmonary infarcts in patients with prolonged central venous catheterization should prompt an investigation for the presence of CIT. This syndrome is probably underdiagnosed in the seriously ill population, and early identification may improve its prognosis.

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REFERENCES
1 Cervia JS, Caputo TA, Davis SD, Murray HW. Septic pulmonary embolism complicating a central venous catheter. Chest 1990; 98:1526