Studies from Swan-Ganz catheterization with determination of pulmonary wedge pressure and calculation of left ventricular end diastolic pressure would have given the data needed to confirm or disprove their theory. In addition, thermodilution studies with the catheter in place to determine cardiac output would have been valuable to substantiate their hypothesis.

If Swan-Ganz catheterization showed elevated pulmonary arterial pressures signifying pulmonary hypertension, a more likely explanation of dyspnea would be recurrent pulmonary emboli. These could arise via collateral venous channels or recanalization of the ligated inferior vena cava.

By their own admission, in the three of four cases where lung scans were done an intermediate probability for pulmonary embolus was present. The present state-of-the-art mandates the performance of pulmonary arteriography—the gold standard—to confirm or deny the presence of pulmonary emboli. This would be particularly true in patients with a history of emboli where there is high clinical suspicion of recurrent emboli. Only an absolutely negative ventilation/perfusion lung scan rules out pulmonary thromboembolism; in all other cases pulmonary angiography should be performed.

Ellis F. Singer, M.D., F.C.C.P.,
Clinical Professor of Medicine,
Robert Wood Johnson School of Medicine,
University of Medicine and Dentistry,
Piscataway, New Jersey

Despite lung scan results, the clinical impression was that none of these patients had pulmonary emboli and, therefore, pulmonary angiography was not deemed warranted. Two of the patients had positive smoking histories, one of whom also had evidence of obstructive lung disease by pulmonary function testing which may have accounted for abnormalities on the lung scans.

Todd D. Miller, M.D., and
Bruce A. Staats, M.D., F.C.C.P.,
Mayo Clinic,
Rochester, MN

Resuscitation in the Elderly

To the Editor:

I can think of no better illustration of the critical issue of high-tech healthcare so elegantly discussed by Dr. Cohn1 than a case report found in the same issue of Chest.2 In this report, a 95-year-old woman collapsed at a nursing home and it appeared that extremely vigorous measures were taken to resuscitate her. Resuscitation of all individuals, regardless of age or quality of life, will no doubt result in enormous expenditures both in terms of services offered by paramedics and emergency departments who perform the resuscitation, and also from the cost of caring for survivors of resuscitation in intensive care units. As Dr. Cohn suggests, it is crucial to include the elderly in studies on the effects of high-tech healthcare. Both prehospital and in-hospital resuscitation should be a part of this effort.

Robert Hoffman, M.D., F.C.C.P.,
Assistant Professor of Medicine,
Pulmonary Division,
University of Pittsburgh School of Medicine,
Pittsburgh

REFERENCES
1 Cohn L.H. The paradox of high-tech healthcare. Chest 1988; 93:964-67

Digoxin-Like Immunoreactivity

To the Editor

Using radioimmunoassays, digoxin-like immunoreactivity has been found in the blood,1,4 urine,3 and amniotic fluid2 of human subjects not receiving cardiac glycosides. In some studies, digoxin-like immunoreactive substances (DLIS) have also been shown to have digitals-like bioactivity.4 High levels of DLIS have been found in the blood of patients with chronic renal failure,4 in cord blood1 and in the blood of pregnant women.3 However, the clinical relations of urinary DLIS have not been determined. Accordingly, our purpose is to report on the findings in a heterogenous population of human subjects whose urine was examined for DLIS.

Urine specimens submitted to a hospital laboratory for chemical analysis were selected at random for digoxin assay. Urine samples of healthy, ambulatory subjects were also assayed. Whenever DLIS was detected, the case was reviewed to ensure that cardiac glycosides had never been administered. Urine samples were derived from a heterogenous population, of both sexes, ranging from 1 to 93 years of age. In 40 patients, urinary creatinine concentration was also measured and in 30, a 24-hr urine collection was obtained and creatinine clearance was calculated.

Digoxin levels were determined by radioimmunoassays. Assays

To the Editor:

We thank Dr. Singer for his careful critique of our article. However, we disagree with several points. 1) We agree that D (A+ a)O2 increased in all four cases with exercise, but in only one patient did the value exceed the upper limit exercise value of 30 mm Hg. 2) These patients did have varying degrees of edema, but the emphasis of our article is that flow through the venous collaterals was relatively normal at rest but inadequate during exercise, a well-recognized phenomenon occurring in other vascular beds, including the arterial circulation to the lower extremities and coronary arteries. 3) Swan-Ganz catheterization would have allowed determination of elevated pulmonary artery pressures, but knowing pulmonary wedge and LVED pressures would provide no additional information to distinguish recurrent pulmonary emboli from impaired venous return to the heart as the limiting feature of these patients’ exercise intolerance. There was no evidence for pulmonary hypertension on either physical examination or electrocardiogram in any of the patients. In the only patient who underwent an echo-Doppler study, a technique that has been shown to reliably measure RV pressure, RV pressure was only 30 to 35 mm Hg. 4) Determination of cardiac output by thermodilution during exercise can be quite inaccurate relative to the Fick technique. Varas et al measured exercise cardiac outputs by the Fick technique and found them to be reduced in their patients. We measured cardiac output in one patient using acetylene rebreathing, a well-accepted technique, and found it to be decreased below normal values for the given level of exercise, confirming the findings of Varas et al. 5) Pulmonary angiography was not performed to further investigate the intermediate probability lung scans. We therefore cannot exclude the possibility of recurrent pulmonary emboli. However, none of the patients presented clinically with historic evidence for acute pulmonary emboli. Absence of findings on physical examination and electrocardiogram to suggest right ventricular hypertrophy, along with normal diffusing capacities, would make chronic recurrent pulmonary emboli very unlikely. Additionally, if recurrent emboli were the responsible factor for these patients’ clinical dyspnea, abnormal gas exchange should have been a prominent finding. Again, we emphasize that these findings were not observed.

Robert Hoffman, M.D., F.C.C.P.,
Assistant Professor of Medicine,
Pulmonary Division,
University of Pittsburgh School of Medicine,
Pittsburgh

REFERENCES
1 Cohn L.H. The paradox of high-tech healthcare. Chest 1988; 93:964-67

Digoxin-Like Immunoreactivity

To the Editor

Using radioimmunoassays, digoxin-like immunoreactivity has been found in the blood,1,4 urine,3 and amniotic fluid2 of human subjects not receiving cardiac glycosides. In some studies, digoxin-like immunoreactive substances (DLIS) have also been shown to have digitals-like bioactivity.4 High levels of DLIS have been found in the blood of patients with chronic renal failure,4 in cord blood1 and in the blood of pregnant women.3 However, the clinical relations of urinary DLIS have not been determined. Accordingly, our purpose is to report on the findings in a heterogenous population of human subjects whose urine was examined for DLIS.

Urine specimens submitted to a hospital laboratory for chemical analysis were selected at random for digoxin assay. Urine samples of healthy, ambulatory subjects were also assayed. Whenever DLIS was detected, the case was reviewed to ensure that cardiac glycosides had never been administered. Urine samples were derived from a heterogenous population, of both sexes, ranging from 1 to 93 years of age. In 40 patients, urinary creatinine concentration was also measured and in 30, a 24-hr urine collection was obtained and creatinine clearance was calculated.

Digoxin levels were determined by radioimmunoassays. Assays