Such acceptance may take time, particularly if the patient was entirely well prior to a critical illness. Only a few families are unwilling to accept the prognosis or demand that the patient be supported indefinitely because he or she would prefer life under any circumstances.1

8. Clinicians should inform the family that they are not obligated to provide unbeneﬁcial care if the issue arises. This principle has been supported by numerous consensus statements2 and court decisions.4 Generally, a physician who cannot in good conscience continue therapy he or she considers futile should transfer responsibility for the patient’s care to another physician in the same or another institution. If transfer is not possible, life support may be withdrawn in accordance with institutional policies.4 However, such policies are uncommon, the word “futility” remains subject to interpretation, and the recent case of Helen Wanglie suggests that the courts may require that life support be continued when a family insists that a patient would so desire.5

9. Families should be told that life support will be withheld or withdrawn as humanely and expeditiously as possible once they have accepted the recommendation to forgo further life-sustaining therapy. They should be given as much time as they want to spend with the patient and may, if they wish, be present at the patient’s death. For many ICU patients, death will come only after removal of the mechanical ventilator. Because this is the case, little is gained from a more gradual removal of supplemental oxygen, positive end-expiratory pressure, and other modalities. Whatever process is followed, families should be assured that the patient will receive sedatives and analgesics to relieve pain and suffering. Drugs are best given unobtrusively by constant infusion at doses sufﬁcient to suppress grimming and signs of air hunger.6

10. Clinicians should be as available to the family after the patient dies as they were beforehand. In particular, the attending or primary physician should be accessible by telephone or in person to answer medical questions and report the results of an autopsy or other postmortem procedure. The bedside nurse or family counselor may have been helpful to the family in the ICU and may continue to be a source of emotional support. Through such actions, the clinicians communicate their ongoing concern for the patient and his or her family.

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Lung Function and the Complications of Bone Marrow Transplantation

Bone marrow transplantation (BMT) has provided the pulmonologist with several challenges: opportunistic pulmonary infection (mainly cytomegalovirus and Aspergillus), idiopathic interstitial pneumonitis (presumably due to conditioning chemotherapy and/or total body irradiation), expiratory airflow obstruction (associated with chronic graft-versus-host disease), and diffuse alveolar hemorrhage.1

A logical question follows. If the lung is a target organ for such clinically important posttransplantation complications, does it matter whether we know the status of lung function prior to BMT?

This question has been recently addressed concerning the posttransplantation development of expiratory airflow obstruction associated with bronchiolitis obliterans. To date, pretransplantation FEV1/FVC or the existence of airway hyperreactivity has not been shown to have an association with worsening posttransplantation expiratory airflow.2

In a more general context, Crawford and Fisher in this issue of Chest (see page 1257) present an unparalleled statistical analysis of the data on 1,297 patients with hematologic malignancy who were able to complete pretransplantation pulmonary function testing (PFT). These authors conclude that, in general, abnormal pulmonary function tests that measure the efficiency of gas exchange (single-breath diffusing capacity and arterial-alveolar gradients) were associated with increased risk of death after transplantation. Measures of expiratory airflow limitation (FEV1/FVC) did not appear to have a significant association with posttransplantation complications, which is consistent with the findings of previous studies.

The mathematical elegance of this remarkable data sample, however, implies neither a practical nor a
universal interpretation. What does one tell the 35-
year-old patient with acute myelogenous leukemia
who has a TLC of 80 percent predicted, a DCO of 45
percent predicted, and an elevated alveolar-arterial
gradient? Is this patient’s pulmonary status a potential
contraindication to BMT? Is posttransplantation res-
piratory failure highly probable?

I would certainly agree with the conclusions of
Crawford and Fisher in that one cannot infer that
abnormal pulmonary function before transplantation
is a contraindication to what may be the only life-
saving option for a patient. Indeed, their data do
suggest that even patients with severe reductions in
DCO who are considered high-risk transplant recipi-
 ents (malignancy in relapse and receiving HLA non-
dentical marrow grafts) had survival rates of approxi-
mately 20 percent at the end of one year.

Concerning the patient with normal pretransplan-
tation PFT results, certainly some other combination
of events perhaps predisposes these individuals to
respiratory failure and death in a substantial number
of occurrences. The data presented do not delineate
what these variables may be, but at least the serologic
status of the donor and the recipient in terms of
cytomegalovirus infection may be of importance.

The patient with abnormal PFT results before
transplantation raises the question of whether there is
any type of active infectious or inflammatory process
occurring prior to BMT. We are not told in the current
study what percentage of individuals with substantially
reduced DCO before transplantation had abnormal
chest x-ray films or chest computed tomographic scans
and whether there was a determined risk of posttrans-
plantation lung complications. Unfortunately, pre-
transplantation PFT abnormalities have not been in-
cluded in several studies that have addressed risk for
posttransplantation pulmonary problems.\textsuperscript{3,4}
Indeed, the importance of providing transplantation was
paramount in many of these cases, but questions about
the etiology and effect of the pretransplantation ab-
normalities and gas exchange are still raised—and still
unanswered.

These data by one route or another lead to the more
pertinent question regarding prophylaxis against ins-
ults directed toward the lung. Prophylaxis may indeed
take the form of preventing Pneumocystis pneumonia
(as is commonly done), addressing the prevention of
cytomegalovirus effects on the lung (by either direct
infection or immunologic injury), and minimizing the
effects of graft-versus-host disease.\textsuperscript{5,6} In addition, the
question of prophylaxis is also very relevant concern-
ing potential protection of the lung from total-body
irradiation and conditioning chemotherapy. Are we
everally looking at extensive and expensive prophy-
laxis for all patients undergoing BMT who are at risk
of injury from these potential sources or can one
identify subsets of lung function (not necessarily
defined by PFT) that might best benefit from preven-
tive interventions? These questions remain to be
answered.

Prospective clinical studies should continue to ad-
dress the prophylactic pulmonary issues. Prudent use
of pretransplantation PFT data may help decide who
will benefit clinically from appropriate prophylactic
approaches. The contribution by Crawford and Fisher
should generate ideas and an appreciation of the
difficulty of analyzing pulmonary data in the trans-
plantation arena.

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Treatment of Pneumothorax In
Cystic Fibrosis in the Era of Lung
Transplantation

Pneumothorax is a potentially life-threatening com-
plication of cystic fibrosis (CF),\textsuperscript{1,2} occurring in 12.5
percent or more of patients older than ten years of age.\textsuperscript{3} Possible therapeutic approaches to pneumotho-
rax include simple observation, thoracostomy tube
placement, and ablation of the pleural space by
chemical or surgical pleurodesis.\textsuperscript{4} Since observation