Chapter 22

Organ-Preserving Therapy After Brain Death

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Introduction

Appropriate management of the brain-dead patient who is considered for multiple organ donation can be a challenging but rewarding experience. With the increasing success of all solid organ transplants, the number of potential recipients who would benefit has increased exponentially. In order to maximize the number of suitable organs, knowledgeable and careful management of the potential donor is imperative. This chapter will attempt to define the role of the caregiver, review the general management strategies, and emphasize the factors, specific to each different organ as they relate to care of the donor patient.

Identification of Donors

Although approximately 90% of all organ donors originate from intensive care units, 25% are not recognized as potential donors for 48 h or more or until the time of death. As the incidence of complications increases progressively with time, 20% of potential donors die within 6 h of admission and 50% die within 24 h if not appropriately supported. Although early identification of the donor and subsequent communication with the family remains a difficult proposition for many physicians, it remains the single most effective method to obtain consent for organ donation. Legislative efforts of various kinds cannot replace the communication between the primary care physician and the family of the brain-dead patient. The suggestion of organ donation gives the family a chance to make their own decision and may result in some feeling of satisfaction in an otherwise tragic situation.

General exclusionary criteria for organ donation include:

- Malignancy (except primary brain tumor)
- Untreated septicemia
- Acquired immunodeficiency syndrome
- Viral hepatitis and encephalitis
- Intravenous drug abuse
- Significant history of drug abuse or homosexuality
In the past several years, the arbitrary age limit for using specific organs for transplantation has increased. At the present time, the majority of transplant centers would consider any donor up to 60 years of age for heart, lung, liver, and pancreas donation. Kidney donation would be considered up to the age of 70 years.

**Evaluation of Donors**

Evaluation of the potential donor consists of a thorough history taking and physical examination. In many institutions this evaluation is reviewed by a donor organ coordinator, thereby not inconveniencing the attending physician. Previously held donor exclusionary criteria, including cardiac arrest, chest and abdominal trauma, and requirement for high-dose inotropes, no longer immediately exclude donors. Further work-up and evaluation often result in successful procurement and subsequent function of these organs after transplantation.

Some particular organs have unique characteristics which are important in the evaluation process. A fixed serum creatinine value >2 mg/dl (177 μmol/l) is the limit at which donors are excluded for kidney donation. If, however, the creatinine value decreases with aggressive resuscitation, kidneys can be used for transplantation in the majority of cases. Similarly, decreasing serum transaminase levels will usually result in the liver being used for transplantation.

In evaluating a patient as a potential heart donor, the primary electrocardiographic abnormality precluding use of the organ is the presence of pathological Q-waves. Chest trauma, high levels of inotropes (e.g., dopamine), and cardiac arrest do not necessarily preclude the use of the heart for transplantation. Echocardiography prior to procurement and physical examination both prior to and during the organ procurement procedure determine the extent of myocardial injury. In general, most donor hearts with a normal echocardiogram and no significant abnormalities observed by palpation at the time of cardieectomy function well following transplantation. Older donors (males > 40 yrs and females > 45 yrs), especially with associated risk factors, will often require coronary angiography.

Patients being considered as lung donors should have an arterial $P_{O_2}$ > 350 mmHg determined at an inspired oxygen concentration of 100%. Peak airway pressure should be <30 cmH$_2$O and the chest X-ray should show no evidence of major pulmonary contusion, atelectasis, or infiltration. Often these X-ray abnormalities are responsive to various lung expansion procedures. Bronchoscopy is the standard method to assess the trachea and bronchi as well as to obtain aspirates for Gram stain, culture, and sensitivity.

There are no contraindications to the use of the pancreas for transplantation except a history of diabetes. Approximately 40% of pancreas donors exhibit hyperamylasemia.

**Medical Management of the Multiorgan Donor**

Prior to the actual declaration of death, the medical management of neurologically injured patients consists of methods which lower intracerebral pressure. Patients are generally hypovolemic during this phase. Once death is imminent or declared, the overall