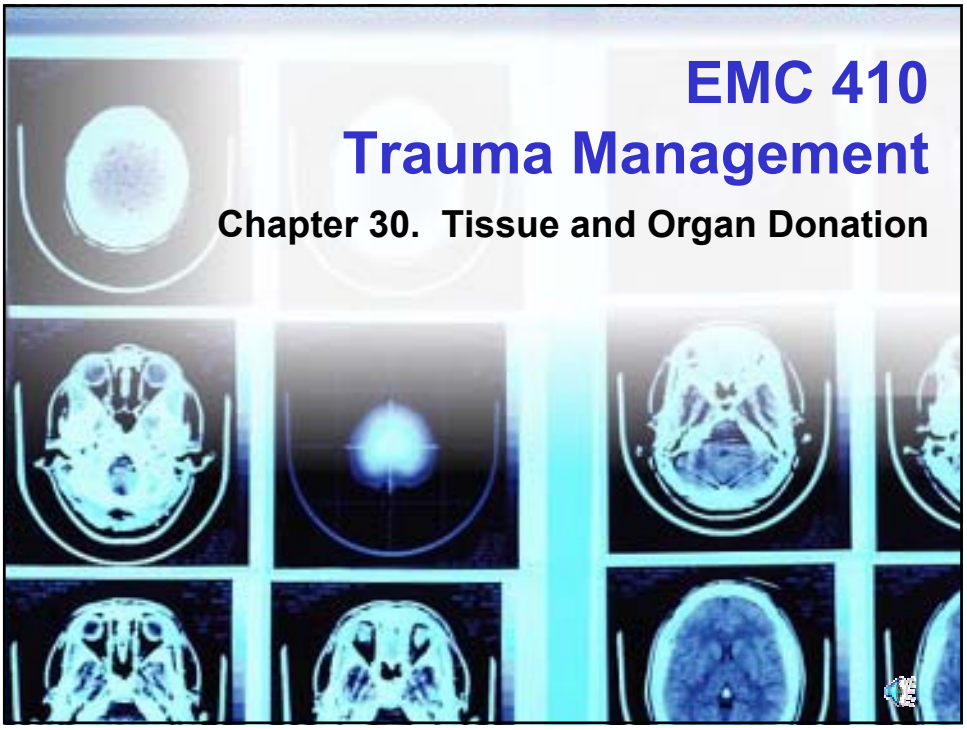


EMC 410
Trauma Management
Chapter 30. Tissue and Organ Donation

Unit Objectives

- **Upon completion of this chapter, you should be able to:**
  - Discuss the historical progression of organ donation.
  - Explain the role of immunology and histocompatibility.
  - Define brain death.
  - Discuss donor evaluation and management.
  - Describe the role of out-of-hospital professionals in the donation process.
  - Explain the inequities between supply and demand.
  - Describe some emerging technologies in tissue and organ donation.

Historical Perspective

- Dates back to ancient times
- Animal experimentation and discovery of rejection in 1900s
- First cadaver transplant of kidney in 1940s
- Donor/recipient matching and steroids in 1960s
- Cyclosporine discovered in 1978
- First heart-lung transplant in 1980s
- First long-term use of artificial heart in 1984
- Ventricular assist devices (VAD)
- 1990's - 2000 heart transplants per year
- Improved long-term survival

The Role of EMS

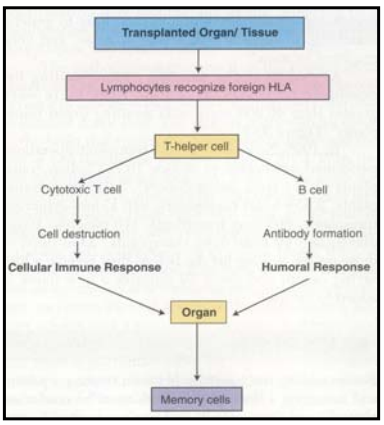
- Patients in the field should be treated without regard for organ donation
- Cardiac death patients may be suitable for tissue donation
- Brain dead patients may be suitable for tissue and/or organ donation
- Collect HPI, PMH and notify procurement team

Immunology and Histocompatibility

- **Objective is to decrease the immune response**
  - Tissue and organ matching
  - Immunosuppressive therapy

Immunology and Histocompatibility continued

- **Immunology**
  - Donor organ and tissue recognized as foreign
  - Humoral immune response and antibodies may result in hyperacute rejection
  - Cellular immune response may result in either acute or chronic rejection
- **Immunosuppressive therapy**



Immunology and Histocompatibility continued

- **Histocompatibility**
  - Goal is to match donor's tissue to recipient
  - ABO red cell system
  - HLA system

Legislative Impact

- **Uniform Anatomical Gift Act of 1968**
  - Clarifies consent process
  - Adopted by all states
  - Eliminates witnessed signature
  - Prohibits revocation of donor's wishes
  - ***Requires*** hospitals to inquire about wishes on admission

Legislative Impact continued

- **Uniform Determination of Death Act**
  - Recognizes death as either a determination of irreversible cessation of circulatory and respiratory functions or irreversible cessation of all functions of the entire brain, including the brain stem.

Legislative Impact continued

- **National Organ Transplant Act**
  - Developed recovery and transplant system
  - Prohibited buying and selling of organs

Legislative Impact continued

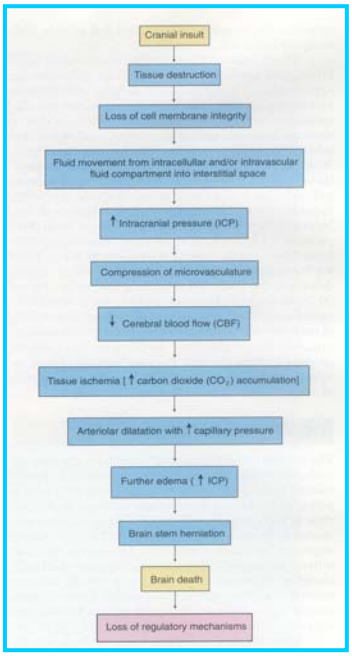
- **Omnibus Budget Reconciliation Act**
  - Requires any hospital receiving Medicare or Medicaid to approach potential donor families
  - Transplant hospitals must become member of the Organ Procurement and Transplantation network

United Network for Organ Sharing

- UNOS is contracted to maintain the organ recovery and transplantation network
- Prioritizes based on matching, medical urgency, waiting time and location

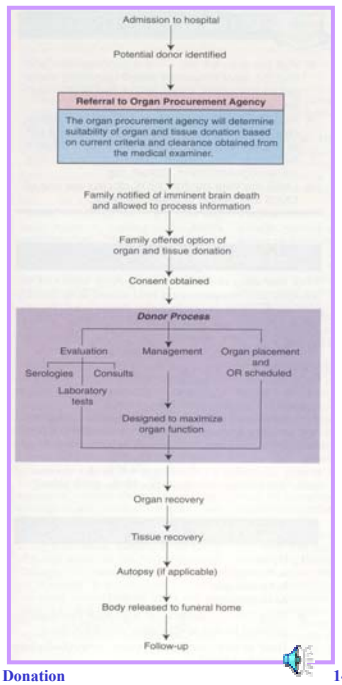
Brain Death

- **Must be documented by two attending level physicians**
- **Progression**
  - Fluid movement and ICP
  - Ischemia and further ICP
  - Catecholamine release
  - Hyperthermia
  - Herniation
  - Vasodilation
  - Hypotension
  - Loss of respiratory drive
  - Diabetes insipidus
  - Hypothermia
  - Coagulopathies



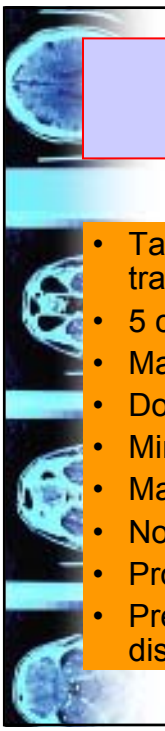
Donor Evaluation

- **Donor Evaluation Organ donor**
  - Brain dead
  - Vital signs maintained by ALS measures
- **Tissue Donor**
  - Cardiac death has already occurred



Donor Evaluation continued

- **Detailed medical and social history and physical exam**
- **Diagnostic studies**
- **Organ inspection during surgery**



Donor Management

- Tachycardia, hypertension and hyperthermia are usually transient and should be managed conservatively
- 5 cc/kg crystalloid boluses to maintain CVP of 8 mm Hg
- Maintenance IV fluids at 2 cc/kg/hr
- Dopamine/dobutamine if needed
- Minimal drug therapy
- Maintain body temperature
- Normalize electrolytes
- Prophylactic antibiotics
- Prevention of hypoxia, diabetes, and acid base disturbances

Supply and Demand

- Increased public awareness and support
- Increased demand without increased supply
- 40,000 in U.S. waiting for organ transplants
- 12,000 die annually from brain death alone, but only 1 of 3 are donors