

An underwater scene featuring several divers swimming over a coral reef. The water is clear and blue, with sunlight filtering through. A fish is visible in the upper right. The text is overlaid on the image.

# **Diving Accidents & Barotrauma**

Jotham Keffeler RN, BSN, EMT-P, CFRN

# Barotrauma

- The physical damage to the bodies tissues caused by the difference in pressure between a gas filled space inside, or in contact with the body, and the surrounding fluids.
  - During Decent:
    - External or middle ear squeeze, inner ear barotrauma, sinus squeeze, lung squeeze, gastric squeeze, tooth squeeze.
  - During Accent:
    - Reverse middle ear or sinus squeeze in divers with colds or URI's.
    - Pulmonary barotrauma can lead to burst/ruptured lung parenchyma.
    - Air embolism- gas bubbles entering circulatory system through ruptured veins. Bubbles expand (Boyles Law) & obstruct arteries of brain/heart. **Most Serious & Feared Consequence of Diving.**

# Decompression Sickness

## “The Bends”

- Involves gases (usually nitrogen) diffusing into the tissues and gets trapped there (gas bubbles in places where there should be none).
  - Henry’s Law- more gas will dissolve in a liquid when a gas is pressurized.
  - Diver ascends too rapidly to allow diffusion. Nitrogen bubbles expand in tissues as pressure decreases.
  - Different body parts affected depending on bubble location.

# Decompression Sickness

## “The Bends”

- **Signs & Symptoms**

- **Pulmonary Barotrauma:** Hoarseness, neck fullness, chest pain, SOB, painful swallowing.
- **Air Embolus:** Sudden loss of consciousness within 10 minutes of surfacing to stroke symptoms.
- **Body:** Rash, itching, bubbles under skin, joint pain, paralysis, sensory disturbances, bladder problems (unable to urinate), chest pain, cough, SOB.
  - Symptoms usually appear within 1 hour of surfacing but can be delayed up to 6 hours.

# Treatment

- Transport to nearest Hyperbaric Chamber
- Active re-warming.
- Supplemental 100% oxygen via NRB, treat LOC with intubation as appropriate then FIO<sub>2</sub> 100% via ventilator.
- Air Embolism suspected- transport head down left lateral decubitus to prevent additional gas emboli.

# Treatment

- IV fluids initiated briskly for rehydration
- High dose steroids early in resuscitative effort
  - Solu Medrol
    - Adult 125 mg
    - Pediatric 5mg/kg
- DAN (Divers Alert Network) recommends flight transport if required 800 feet or less.
- Aeromed Protocol: Air transport at 1000 feet or less.

# Recompression Chambers

Florida Hospital Orlando (Orange)

St. Mary's Medical Center (Palm Beach)

Mercy Hospital (Miami-Dade)

Capital Regional Medical Center (Leon)

Mariners Hospital (Monroe)

