



PEDIATRIC BAROTRAUMA / DECOMPRESSION /DIVE INJURY



Escambia County, Florida - ALS/BLS Medical Protocol

Decompression sickness (DCS)

Barotrauma and decompression illness is caused by changes in the surrounding atmospheric pressure beyond the body's capacity to compensate for excess gas load.

These injuries are most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA diving emergencies can occur at any depth with the most serious injuries manifesting symptoms after a dive.

It should be understood that if a patient took a breath underwater, from any source of compressed gas (e.g. submerged vehicle, SCUBA, etc) while greater than three (3) feet in depth, the patient may be a victim of barotrauma.

Barotrauma may cause several injuries to occur including: arterial gas embolism (AGE), pneumothorax, pneumomediastinum, subcutaneous emphysema, and the "squeeze".

Decompression illnesses may also include decompression sickness ("Bends").

DCS can also occur if the individual flies in an aircraft within 12-24 hours after diving.


1. DCS is divided into Type I, Type II, and Type III.
 - A. Type I includes cutaneous manifestations and minor joint pain.
 - B. Type II includes severe symptoms related to the cardiopulmonary and neurological symptoms.
 - C. Type III is a combination of AGE and DCS with neurological symptoms.
2. Type I (Pain syndrome) is typically located in the limbs, not central skeleton.
 - A. It is typically described as dull, difficult to characterize and localized.
 - B. Typically located in the shoulders, elbows and hands.
 - C. Mild pains begin to resolve within 10-minutes of onset.



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- D. Pruritus or “skin bends” cause itching or burning sensation of the skin.
 - E. Pain occurs in the majority (70-85%) of the patients with Type I DCS.
 - F. Upper limbs are affected 3 times as often as lower limbs.
3. Type II (Neurological syndrome) is characterized by pulmonary symptoms, hypovolemic shock or nervous symptom involvement.
- A. Spinal cord is the most commonly involved site.
 - B. Symptoms typically include abdominal, lower back, lower extremity pain, weakness and loss of feeling and function.
 - C. Cerebral involvement is much more common than previously thought.
 - D. Peripheral nerves can also be involved causing numbness, limb pains and weakness.

Supportive Care

1. [Trauma Supportive Care Protocol](#).
2. Place patient supine on left side.
3. Complete the [Dive Accident Signs and Symptoms Checklist](#), (do not delay transport).
4. Obtain Dive History Profile, if possible (the patient's dive buddy may be helpful in answering many of these questions, and or recover dive computer particularly if history of multiple dives).
5. Whenever possible, have the legal authority in charge (e.g. police, Florida Marine Patrol, U.S. Coast Guard, etc.) secure all of the victims dive gear with proper chain of custody for testing, analysis, etc.


Dive Computer has information containing recent dive and needs to



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accompany patient to ER for review.

6. Manage patient according to appropriate protocol(s).
7. **Rapidly Transport** to the closest appropriate facility that is equipped with a hyperbaric chamber.

Contact on line physician medical control of receiving hospital early to verify operational status of hyperbaric chamber.

If unstable, transport to closest ER.

If patient and/or family has another hospital preference, make physician contact at hospital of patient/family request for destination decision.

8. **Consider, contacting Diver's Alert Network (DAN) at Duke University Medical Center collect at (919) 684-4326 for further assistance.**
9. Provide 100% oxygen via non-rebreathing mask. If respiratory effort is inadequate assist ventilations utilizing BVM with 100% oxygen.

ALS Level 1

1. Initiate advanced airway management if respiratory effort is inadequate.
2. Establish an IV of Normal Saline.
3. Attach EKG monitor and interpret rhythm. Contact on line physician medical control of receiving hospital early to verify operational status of hyperbaric chamber.

ALS Level 2 *(Physician authorization required)*


None



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Note


DAN (Divers Alert Network) is an excellent resource. Use of this service is similar to the use of a Poison Control Center. DAN maintains a database of diving-related injuries and provides 24hours a day consultation services, including extent of injury assessment, recommendations for management, and referral to hyperbaric therapy or local diving medicine specialists. They can be contacted at 919-684-8111 or 919-684-4DAN (4326)



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