

# Diving Accident Management

From Diving Medicine  
Online

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# Introduction

- It is desirable to have a standard approach to the initial management (i.e. first-aid) of an injured diver.
- Coincidentally, a diver may have a non-diving related illness or injury, but in general, symptoms and signs following a dive are likely to be due to that dive.
- Ernest S Campbell, MD, FACS

# Topics of Discussion

- Rescue
- Resuscitation
- Position
- Oxygen
- IV Fluids
- Medications
- Transportation
- In Water Treatment
- Summary

# RESCUE

- Remove diver from the water quickly.
- If underwater – decompress diver with regulator in mouth. Do not purge gas..
- Flush-through air in re-breathers, full-face masks, band masks or helmets.
- Practice specific recovery techniques
- Made positively buoyant-ditch belt, inflate BC
- Do not remove tank (acts as a keel)
- Protect airway and get out of the water.

# Resuscitation

- EAR (mouth to mouth) and chest compression ( which obviously should not be attempted in the water ) are life-saving if cardiorespiratory arrest occurs, regardless of the cause of the injury.
- Use the same techniques for drowning, envenomation, and the hypothermic diver. (in whom it must never be abandoned until after re-warming has been completed).

# Position

- Maintain a flat position if decompression illness (DCI) is suspected.
- Keep flat until the diver is inside a RCC.
- A headdown posture is no longer advocated.

# Position (Head Down)

- Increases the venous bubble return.
- Engorges head veins making middle-ear inflation difficult during recompression.
- It limits access for resuscitation and assessment.
- Retards the recovery of brain function in comparison to the horizontal posture.

# Oxygen

- 100% oxygen is useful in all diving accidents except oxygen toxicity – (except post-convulsion hypoxia).
- To administer 100% oxygen, a seal of some sort is needed.

# Oxygen

- A circuit with high flow-rates and a gas reservoir must be used.
- Air breaks should be minimized as must all other interruptions. (e.g., Oral fluids)
- 100% oxygen definitive for salt-water aspiration syndrome, pulmonary barotrauma and most pneumothoraces.

# IV Fluids & Medications

- IV rehydration is probably of benefit to all injured divers using isotonic solutions - avoiding glucose solutions.
- Indwelling catheter, accurate fluid balance. Maintain high output.
- No drugs of proven benefit in the treatment of DCI. Diazepam obscures.
- Lignocaine + O2 improves neurological outcome of DCS.
- Indomethacin, analgesics, vinegar and decongestants and are useful.

# Transportation

- Stabilization before transportation. (Resuscitation, O<sub>2</sub>, IV, passive re-warming, control of hemorrhage and splinting of fractures.)
- Record oxygen and IV fluid balance.

# Transportation

- If DCI, retrieval must not exceed 1000 ft above sea level. Pressurize to sea level. Fly un-pressurized aircraft at less than 1000 feet.
- Road transport may also be difficult depending upon the road's altitude, contour and surface.

# In-water Treatment

- IWR treatment of DCI requires:
- Full-face mask; oxygen breathing system; adequate supplies of oxygen
- Cradle, chair or platform that can be lowered to the desired depth;
- Warm, calm water without current and dangerous marine animals;
- Not be used for unconscious, confused or nauseated divers.
- Ideally, transport as quickly as possible to a definitive treatment facility.

# Management, No RCC Slide #1

- a. 100% O<sub>2</sub> by tight-fitting mask in all cases. Continue to treat and transport even if becomes asymptomatic!
- b. Oral fluids - 1 liter (non-alcoholic) per hour.
- c. IV fluids as soon as possible. Avoid over-loading. One to 2 liters in first hour, then 100 cc per hour.
- Glucose containing fluids should not be given in the event of neurological DCS.

# Management, No RCC

## Slide #2

- IV - Ringer's solution (not Ringer's lactate), Normal saline, LMW Dextran (Dextran 40 Rheomacrodex) in saline (alters the charge of the RBC, preventing Rouleaux formation). 500 cc twice daily. Beware of adverse effects of anaphylaxis and pulmonary edema.
- d. Medications
- 1. Glucocorticoids in neurological DCS.

# Management, No RCC

## Slide #3

- 2. Diazepam (Valium) 10-15 mg IV or per rectum to control seizures and severe vertigo.
- 3. Aspirin is given by some.
- 4. Lidocaine is being used by some but is still not yet proven.
- e. Catheterization for the paraplegic. Use water in the balloon rather than air. Protect pressure points.
- f. Pleurocentesis, if indicated.

# Management, No RCC Slide # 4

- Fly in pressurized aircraft at low level.
- Beware driving through mountain passes.
- Have diver accompanied by a person familiar with the facts.