**WHAT IS IT?**
- An air embolism takes place when bubbles of air are introduced into circulating blood.
- This can be due to trauma, surgical procedures such as IV injections during surgery, or by decompression illness (the bends), where divers attempt to come to the surface too rapidly.
- In the case of the bends, the air embolism will consist of a nitrogen bubble.
- In other air embolisms, such as those caused by surgery, the bubble contains the normal mix of air gases, including oxygen, carbon dioxide and nitrogen.

**CAUSES**
- Decompression illness is very serious and potentially lethal. It occurs when divers run out of air and hold their breath while ascending to the surface or if they surface too quickly. The air in the lungs expands and a bubble of nitrogen can enter the veins that carry blood back to the heart. From there it is pumped to the brain and elsewhere.

**SYMPTOMS**
- Symptoms vary according to where the embolism causes a blockage in the bloodflow. For example, a large air embolism affecting the arteries that feed the brain can cause sudden loss of consciousness and convulsions and an embolism in the joints will result in pain.
- An air embolism can result in a stroke or heart attack.
- For divers experiencing decompression illness, the main symptoms are joint pain, and itching and mottled skin.
- Other symptoms include:
  - Low blood pressure;
  - Arrhythmia
  - Visual disturbances;
  - Disorientation;
  - Apnoea;
  - Hypoxia.

**DIAGNOSIS**
- Divers should always be monitored after a dive as symptoms can appear within eight hours of resurfacing and sometimes after just a few minutes.
- During surgery there are several methods for monitoring whether a patient is at risk. These include:
  - A transeosophageal echocardiography monitors the heart with ultrasound;
  - A doppler ultrasound placed over the right side of the heart can measure the speed of blood flow and changes in blood density;
  - A pulmonary artery catheter can monitor blood pressure in the pulmonary artery and indicate the presence of an air embolism.

**TREATMENT**
- In the case of decompression illness, the main treatment is immediate recompression in a hyperbaric chamber. The increased air pressure within the chamber reduces the size of any nitrogen bubbles in the body.
- If air embolism is suspected during surgery, the team must:
  - Seal any open blood vessels to prevent more air entering the bloodstream;
  - Attempt to reduce the amount of air already in the bloodstream. If an embolus is found, this is normally done by using a hyperbaric oxygen chamber;
  - Reposition the patient. The operation site should be at a lower level than the heart;
  - Support the heart and lungs while any embolism is absorbed into the normal blood flow. Low blood pressure can be prevented by giving fluids;
  - Give the patient pure oxygen to breathe. As the patient takes in more oxygen the nitrogen will be forced out of the bloodstream.

**REFERENCES**