



***SNS COLLEGE OF ALLIED HEALTH SCIENCES
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***DEPARTMENT OF OPERATION THEATRE AND
ANAESTHESIA TECHNOLOGY***

3rd YEAR

SUBJECT: Principles of Anaesthesia II

TOPIC: AIR EMBOLISM



- Air(or) gas embolism is a bubble that becomes trapped in a blood vessels and block it
- Any gas can result in the embolization if present in vasculature so air embolism can be
- Venous air embolism
- Arterial air embolism
- Paradoxical sir embolism



RISK FACTORS

VENOUS EMBOLISM :

Surgical factors :

- sitting craniotomy
- posterior fossa surgery
- spinal surgery
- shoulder surgery
- laproscopic surgery (CO2)
- ceasarean section



Anaesthetic factors:

- central venous access
- pressurized infusions
- non - primed giving sets
- unrecognized epidural vein cannulation



Patient factors :

Trauma blent and penetrating hypovolemia

ARTERIAL EMBOLISM

Surgical factors :

- CPB (cardiopulmonary bypass)
- ECMO (Extra carporial membrane oxygenation)
- Cardiac ablation
- laproscopic surgery



Anaesthetic factors:

Error priming transducer set

PEEP

Patient factors :

PFO

ASD/VSD



A volume of 5ml/kg is considered large enough cause cardiovascular collapse due to reduction in cardiac output

Some of the clinical manifestations which can be seen are as follows:

- Chest pain
- Arrhythmias
- Right ventricular failure
- Cardiac output
- Shortness of breath
- May cause seizure, confusion in awake patient



- Posterior fossa surgeries are performed in sitting position dural sinuses are above the level of heart therefore have subatmospheric pressure. Once the dura is opened
- ,air from atmosphere can be sucked in causing venous air embolism
- The incidence of venous air embolism can be high as 20 to 40% in posterior fossa craniotomes however clinically significant venous air embolism is very less
- The major portion of air gets absorbed through pulmonary circulation
- Paradoxical embolism can cause coronary block causing cardiac arrest (or) cerebral block causing massive infarcts



- The most sensitive tool to detect venous air embolism is trans esophageal echocardiography . It can detect low as 0.25ml of air . Other advantages of TEE is can measure quantity of air.
- Predordial Doppler : Less sensitive than TEE
- ETCO2 : Sudden drop in ETCO2 values after the opening of dura strongly suggests venous air embolism



Signs and Symptoms:

- Hypotension
- Tachycardia
- Cyanosis
- Cardiovascular collapse



Treatment:

- Ask the surgeon to pack & flood the area with saline
- Stop nitrous oxide & start 100% O₂ , Nitrous oxide can expand size of air embolism
- Cardiopulmonary resuscitation: If cardiac arrest occurred
- Aspirate air through CVP Catheter
- Hyperbaric oxygen to reduce size of air bubble .It is helpful if transfer to Hyperbaric chamber is done within 8 hours



THANK YOU