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| 3-5 Circulatory embolus v.1 |

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| **Causes:** thrombus, fat, amniotic fluid, air/gas.**Signs:** hypotension, tachycardia, hypoxemia, decreased ETCO2 **Symptoms:** dyspnoea, anxiety, tachypnoea. Also consider if sudden unexplained loss of cardiac output. |

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| Box A: THROMBOEMBOLISM |
| Consider thrombolysis e.g. alteplase 10 mg i.v. then 90 mg over 2 h (>65 kg)Consider surgical removal – consult vascular surgeon Consider percutaneous removal – consult radiologist |

 START.

❶ Call for help and inform theatre team of problem. Note the time.

❷ Call for cardiac arrest trolley.

❸ Stop all potential triggers. Stop surgery.

❹ Give 100% oxygen and ensure adequate ventilation:

* Maintain the airway and, if necessary, secure it with tracheal tube.

❺ If indicated start CPR immediately (CPR can help disperse air emboli and large thrombi).

❻ Give i.v. crystalloid at a high infusion rate. (Adult: 500-1000 ml, Child: 20 ml.kg-1)

* Inotropes may be required to support circulation.

❼ Treat according to suspected embolus type (see Boxes A-D) whilst considering alternative diagnoses (Box E).

❽ Consider investigations to help confirm diagnosis:

* Arterial blood gases (increased PaCO2-ETCO2 gradient).
* Transoesophageal echocardiography (right heart strain, pulmonary arterial emboli).
* Computerised tomography.

**❾** If cardiovascular collapse refractory to treatment, consider extra-corporeal membrane oxygenation (ECMO) or intra-aortic balloon counter-pulsation.

❿ Plan transfer of the patient to an appropriate critical care area.

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| Box B: FAT EMBOLISM |
| * Petechial rash, desaturation, confusion/irritability if patient conscious
* Supportive measures are mainstay of initial management
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| Box C: AMNIOTIC FLUID EMBOLISM |
| * Supportive measures are mainstay of initial management
* Monitor the fetus, if undelivered
* Treat coagulopathy (fresh frozen plasma, cryoprecipitate and/or platelets)
* Consider plasmaphoresis
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| Box D: AIR/GAS EMBOLISM |
| * “Mill wheel” murmur may be present
* Discontinue source of air/gas if applicable and discontinue N2O
* Tell surgeon to flood wound with saline and cover with wet packs
* Lower surgical field to below level of heart if possible
* Place patient in left lateral position if possible
* If central venous catheter in situ, attempt to aspirate air
* Volume loading and Valsalva manoeuvre may help
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| Box E: ALTERNATIVE DIAGNOSES |  |
| Pneumothorax (+/- tension)Bronchospasm (→ 3-4) Pulmonary oedemaCardiogenic shock | HypovolaemiaMyocardial failureSepsis**(→ 3-14)**Bone cement implantation syndromeAnaphylaxis **(→ 3-1)** |

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