

Collapse and cardiopulmonary arrest

Sudden unexplained loss of consciousness is a good indication of inadequate cardiac output, especially coupled with cyanosis and a profound fetal bradycardia, and should mandate immediate CPR.

Ensure that the patient has been placed into the left lateral position (except when the use of external cardiac compression indicates manual left lateral displacement) and that high-flow oxygen therapy and intravenous access have been established.

Commence basic and advanced life support as appropriate. Intravenous access should be above the inferior vena cava. Consider using an intraosseous driver to the humerus if venous access cannot otherwise be obtained.

Where the patient is unconscious and has no airway reflexes, protect the airway with a cuffed endotracheal tube, starting at size 7.0 mm.

The presence of a pulse may be an unreliable indicator of adequate cardiac output. In the absence of a recordable blood pressure or other indicator of cardiac output, the early initiation of external cardiac compressions may be life-saving [27]. Delivering chest compressions to a patient with a beating heart is unlikely to cause harm. However, delays in diagnosis of cardiac arrest and starting CPR will adversely affect survival and must be avoided.

Be careful to exclude hypoglycaemia.

Aortocaval compression will impair the effectiveness of external cardiac compression in late pregnancy such that cardiac output will be reduced to only 10%. Place the woman in a supine position for external cardiac compression; you must ensure that manual left lateral displacement of the uterus is performed [28,29]. Allow for potentially increased recoil time to allow the heart to refill.

Use the usual doses of drugs and electrical energy. Chest compressions will probably need more force than in the non-pregnant.

Request that the arrest team, the consultant anaesthetist and the consultant obstetrician are called immediately. The consultant on call for

critical care should be involved sooner rather than later for appropriate cases.

Determine the cause. It may fall into **one or more** of three groups.

- Pre-existing maternal conditions e.g. epilepsy.
- Pathological syndromes of pregnancy e.g. eclampsia, embolus.
- Iatrogenic causes e.g. total spinal anaesthetic.

Focused, point of care ultrasound investigations can help guide decision making in the management of maternal collapse. A limited cardiac echo study as well as a FAST scan can provide vital clues to differentiate key diagnoses and is the gold standard of care for a woman with severe cardiovascular instability or compromise. [30]

Collapse during caesarean section may be related to all the causes above, but in particular local anaesthetic toxicity (page 98) and air embolism should be considered. Subclinical air entry occurs in the majority of caesarean sections, and rarely may progress to cardiovascular collapse. Activate the emergency call and prevent further embolism by returning the uterus to the abdomen, flooding the operative field with sodium chloride 0.9% solution and positioning the patient head-up. Give supportive treatment as necessary.

If the patient is still pregnant, after 20 weeks, and unresponsive to resuscitation at four minutes after collapse, with no circulation, consider immediate delivery to aid resuscitation – see below for perimortem caesarean section.

Document all events as soon as possible and as accurately as possible. Delegate someone to write down when and what drugs are given. Prepare a report as soon as possible, while events are still fresh in the mind, and ensure that others involved do so too.

The decision to terminate Advanced Life Support should only be taken after discussion with the consultant anaesthetist and consultant obstetrician on call, and the senior midwife. The patient's family must be kept informed, and their wishes ascertained and respected in conjunction with expert medical decisions.

Perimortem caesarean section

The welfare of the mother takes precedence over that of the fetus. While perimortem caesarean delivery may aid fetal survival, it is undertaken for the benefit of the mother as a resuscitative measure including where the fetus is known to be dead. It is probably best seen as resuscitative hysterotomy. Case reports indicate that emptying the gravid uterus significantly augments venous return and thus cardiac output during resuscitation [31]. Do not waste time confirming fetal viability.

Pregnant women will swiftly become hypoxic and irreversible brain damage ensues after 4-6 minutes [32]. However, if the gestational age is over 20 weeks and resuscitative attempts fail to revive the mother, then immediate fetal delivery by hysterotomy should be performed, if at all possible but not limited to within five minutes of the witnessed arrest [33,34].

- Trigger the massive haemorrhage protocol at the time of decision to undertake perimortem caesarean section.
- ALS techniques must be maintained during the delivery.
- Perimortem caesarean section should be undertaken where the resuscitation is taking place. With no circulation, blood loss is minimal, and no anaesthetic required. If necessary, the woman can be moved to an operating theatre later for anaesthesia, haemorrhage control and so on.

Below 20 weeks it is considered that immediate caesarean section would not be of benefit.

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