Pre-hospital Care of the Critically Ill or Injured Pregnant Patient

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Introduction

The previous Faculty of Pre-hospital Care Consensus Statement was published in 2017 [1]. Since that time, pre-hospital guidelines, particularly those widely available within the Joint Royal College Ambulance Liaison Committee (JRCALC) [2], have evolved to include obstetric-specific trauma and cardiac arrest algorithms.

This consensus statement aims to augment and update the prior statement, highlighting and summarising adaptations for the pregnant patient with particular reference to the pre-hospital management of cardiac arrest and the utilisation of resuscitative hysterotomy (RH).

This statement does not focus on the management of specific obstetric complications (e.g. shoulder dystocia, cord prolapse, post-partum haemorrhage etc), which should follow national guidelines published by the Royal College of Obstetricians and Gynaecologists (RCOG) [3], JRCALC [2], and Resuscitation Council UK (RCUK) [4].

It draws from published evidence where available but recognises the paucity of high-quality evidence in managing pre-hospital emergencies; in these cases, consensus opinion has been utilised.

Background

The UK Mothers and Babies: Reducing Risk through Audit and Confidential Enquiries 2024 report (MBRRACE-UK) [5], which includes both in- and out-of-hospital deaths, demonstrates an increase in maternal deaths over the last decade with ethnic minority and deprived populations being significantly over-represented.

The rate of resuscitative hysterotomy in this report increased from 20 cases in 2017-19 [6] to 43 cases in 2020-22 [5].

The most common causes of maternal death were thrombosis and thromboembolism, COVID-19, and cardiac disease.

In trauma, pregnancy is an independent risk factor for death with a mortality rate 1.6 times higher than in matched non-pregnant individuals [7].

Pregnancy should be considered in every woman of child-bearing age which is defined by World Health Organisation as 15-49 years [8]. However, any woman of reproductive age can become pregnant, and this should be considered in the assessment of collapsed and injured women.

Consensus Recommendations

Hierarchy of evidence is applied to all consensus statement recommendations. The grade of each recommendation is outlined below after the careful review of all available evidence by the consensus panel (see Appendix B and D).

Anatomical and Physiological Changes in Pregnancy

The anatomical and physiological changes of pregnancy are well-described in the literature [2, 9, 10]. Optimising maternal and fetal outcomes is reliant on the meticulous assessment and resuscitation of the mother with prompt management of hypoxaemia and hypotension [11].

The sequence of initial assessment and management should follow standard algorithms with the following considerations.

Airway

1. Airway adjuncts should be used with care where necessary to avoid precipitating bleeding [12]. [Grade: D]

Increased tissue friability may increase the risk of bleeding. This must be balanced with the risks of hypoxia to both mother and fetus and airway adjuncts, particularly nasopharyngeal airways, should be inserted carefully.

2. A smaller endotracheal tube [1] should be considered in pregnancy. [Grade: D]

Increased blood flow and airway oedema may decrease airway diameter and warrant smaller endotracheal tube selection.

3. Pregnant patients should be considered at higher risk of having a difficult airway [12, 13, 14, 15]. [Grade: B]

Indications for pre-hospital emergency anaesthesia (PHEA) in pregnant patients should align with those in non-pregnant patients and should follow local organisational protocols. It should be recognised that pregnant patients undergoing emergency anaesthesia may be up to 8 times more likely to have difficult or failed tracheal intubation [20] and mortality after failed intubation in pregnant patients is higher than in non-pregnant patients [13, 21].

4. Videolaryngoscopy should be utilised if available [16, 17, 18, 19] [Grade: C]

Optimising the chance of first pass success is essential. The use of videolaryngoscopy in trained individuals [16, 17, 18, 19] and selecting the most experienced practitioner to undertake intubation is recommended [11, 21].

5. Patients should be positioned 20-30 degrees head up for intubation [11, 16, 22] [Grade: C]

This is to optimise functional residual capacity and reduce the risk of regurgitation of gastric contents. A head up position may also assist with insertion of the laryngoscope into the mouth.

Breathing

6. Supplemental oxygen should be applied liberally [Grade: B] and in cardiac arrest, intubation should be considered early [3]. [Grade: D]

Hypoxaemia develops more rapidly in the pregnant patient due to increased oxygen consumption and minute ventilation and reduced functional residual capacity (FRC) [11].

7. Pre-oxygenation, ventilation at low peak airway pressures throughout apnoea, and the use of apnoeic oxygenation techniques should be utilised in pregnant patients undergoing PHEA [12, 13]. [Grade: D]

On induction of anaesthesia, desaturation may occur precipitously.

8. Chest decompression or thoracostomy should be higher (3rd-4th intercostal space, mid-axillary line) [10]. [Grade: C]

The diaphragm may be displaced upwards by up to 4cm by the gravid uterus in later pregnancy.

9. Impending respiratory failure may be indicated at lower levels of PaCO2 than in non-pregnant patients [10]. [Grade: D]

Whilst respiratory rate may not change significantly during pregnancy, minute volume is significantly increased with a subsequent reduction in the partial pressure of arterial CO_2. Impending respiratory failure may be indicated at lower levels of $PaCO_2$ than in non-pregnant patients, and targets during mechanical ventilation should be revised accordingly [13].

Circulation:

10. Manual displacement of the uterus or lateral tilt should be utilised immediately to reduce aortocaval compression [Grade: C]

Aortocaval compression is caused by compression of the gravid uterus on the abdominal aorta and inferior vena cava, reducing venous return to the heart causing a reduction in cardiac output of up to 40%. In some women this may result in supine hypotension syndrome and unconsciousness [3]. It occurs from the time at which fundal height reaches the umbilicus, which in singleton pregnancies is at around 20 weeks' gestation but in multiple pregnancies may be earlier.

Early intervention to relieve aortocaval compression is essential in the management of the collapsed patient with a gestation >20 weeks and should be maintained consistently with consideration being given to how this may be achieved throughout extrication and transportation.

The decision between methods to achieve aortocaval decompression depends on the underlying situation:

Cardiac arrest: Studies have demonstrated that lateral tilting of patients compromises the effectiveness of chest compressions [23]. Supine positioning with manual displacement of the uterus to the patient's left should be considered an immediate intervention in obstetric cardiac arrest [23].

Trauma: Spinal precautions for the injured pregnant patient should align with those in the non-pregnant patient. If assessment and treatment require supine positioning, manual displacement of the uterus is recommended. Injured patients who require ongoing spinal immobilisation should be secured on a scoop stretcher with left lateral tilt of at least 15 degrees; in some patients a tilt of 30 degrees may be required [23]. This is best achieved with a full-length wedge, or padding/pillows placed under the right side of the scoop stretcher. Should ongoing physiological derangement be due to significant aortocaval compression, clinicians should undertake a risk-benefit assessment of clinical findings and mechanism of injury to determine whether relaxation of spinal precautions and transportation in the full lateral position (90 degrees) is appropriate.

Medically unwell: Manual displacement of the uterus may be utilised during the initial assessment phase if the patient requires supine positioning. Placement in the full left or right lateral position (patient lying on their side at 90 degrees) is recommended as soon as possible to achieve complete aortocaval decompression. Consideration should also be given to the physiological changes to the respiratory system in late pregnancy and diaphragmatic compromise from the gravid uterus, so a ramped or seated position should be adopted where possible.

Transportation: When determining the optimum patient position for transport, consideration should always be given to the ability to safely restrain the patient during transport and the level of medical intervention predicted to

be required during transport. The 15-degree left tilt, or left lateral position may limit access to the patient depending on vehicle design, and this should be considered during loading the patient into the ambulance.

11. Intravenous or intraosseous access should be placed above the level of the diaphragm [24]. [Grade: D]

This is to optimise delivery of drugs and to prevent impedance of drug delivery through caval compression. Exercise caution with humeral IO access, which are vulnerable to being dislodged during extrication, repositioning and transfer.

12. Pelvic binders are indicated for pregnant patients who are suspected of having pelvic fractures [10]. [Grade: D]

The risk of blood loss from pelvic fractures is higher due to increased dilated pelvic vasculature during pregnancy.

13. The harm from permissive hypotension may be greater than the benefits in the pregnant patient; restrictive fluid regimes may not be appropriate and early fluid resuscitation should be considered [9]. [Grade: D]

Blood volume increases during pregnancy, with uteroplacental flow directly proportional to maternal blood pressure. Significant blood loss with subsequent fetal compromise may occur before any change in maternal physiology, with any fall in blood pressure in the mother likely to cause a reduction in uteroplacental blood flow. Thresholds for fluid and blood resuscitation should take this into account.

14. Pregnancy is not a contraindication to the administration of tranexamic acid [25]. [Grade: D]

Indications for the administration of TXA in trauma match those of the non-pregnant patient. In post-partum haemorrhage (PPH), TXA should be administered in line with established trauma treatment algorithms.

Disability

15. Analgesia, sedation and anaesthetic agents should not be withheld due to concerns over placental transmission to the fetus. [Grade: D]

However, should a fetus be delivered rapidly after maternal administration, clinical effects may be seen with benzodiazepines, and whilst all opioids cross the placenta, maternal morphine is considered to have the greatest effect on fetal respiration. Suxamethonium and rocuronium do not cross the placenta in significant amounts and are not likely to cause detrimental effects on the newborn [10, 26].

Resuscitation

16. Mechanical CPR devices should be used with caution [Grade: B]

The standard algorithm for adult life support should be followed for pregnant patients including drug doses and defibrillation.

The successful use of mechanical CPR devices in pregnancy has been described in case reports and case series [27, 28]. Communication with the manufacturers of mechanical CPR devices identified that the Stryker LUCAS device and the Corpuls CPR device are approved for use in pregnant patients. Use of the Schiller Easy Pulse or ZOLL AutoPulse device is currently contraindicated in pregnancy. Clinicians should ensure they are aware whether their mechanical CPR device is approved for use in pregnancy and utilise the device in line with manufacturer's guidance.

Placement is likely to be difficult if the fundus is above the umbilicus and case reports have highlighted the risk of liver lacerations in pregnant patients [29]. The position of the compression device should be rechecked at regular intervals, particularly after transfers. Mechanical CPR is likely to be a more useful adjunct after resuscitative hysterotomy.

17. Resuscitative Hysterotomy should not be considered beyond 60 minutes of confirmed cardiac arrest [Grade: C]

Resuscitative hysterotomy (RH), previously referred to as peri mortem caesarean section (PMCS), is an emergency surgical procedure performed to save the life of the mother by delivering the fetus to relieve aortocaval compression, restore venous return and increase the cardiac output generated by chest compressions.

RH should be considered where the fundal height is at or above the umbilicus (over 20 weeks' gestation) if there is no immediate response to CPR and first defibrillation for a shockable rhythm. Where a history of pregnancy > 20 weeks has been established but fundal height is difficult to ascertain, we recommend treating as per > 20 weeks pregnancy. In traumatic cardiac arrest (TCA), resuscitative thoracotomy (RT) to relieve pericardial tamponade in penetrating injury should be prioritised before RH.

Guidelines recommend starting the procedure within four minutes of collapse, with delivery of the baby within five minutes; this may not be feasible in the pre-hospital setting [4]. To provide optimal outcomes for mother and baby, the aim is to provide high quality advanced life support (ALS) with manual uterine displacement, and to achieve RH as quickly as possible. This may require an ambulance crew to transfer the patient to the nearest emergency department for RH, awaiting an enhanced pre-hospital care team or rendezvousing with one enroute to hospital.

Case reports describe intact neurological status after RH in maternal survivors up to 29 minutes and newborn survivors up to 47 minutes after maternal cardiac arrest. There were also newborn survivors at premature gestations as low as 26+5 weeks [30].

Pre-hospital clinicians will need to make a case-by-case decision weighing up the maternal and neonatal benefits of performing RH even after extended periods of resuscitation and the potential harm of undertaking a futile procedure. Based on current available data, the authors would not consider RH beyond 60 minutes of confirmed continuous cardiac arrest.

In pregnant patients >20 weeks gestation, with fatal injury, RCUK recommends considering immediate RH [4]. This is a challenging and ethically sensitive area. British Association of Perinatal Medicine (BAPM) guidance advises timing, viability, and adhering to legal and professional guidelines must all be considered [31].

18. Following Resuscitative Hysterotomy and delivery of the baby, advanced life support protocols should continue [Grade: D]

Following delivery of the baby, maternal resuscitation should continue according to ALS protocols and newborn resuscitation as per Neonatal Life Support (NLS). Manual displacement can be removed as the aorto-caval compression has been resolved. Given the lack of uterine contraction the placenta may not immediately detach, whereby gentle cord traction should be applied. Only one attempt should be made to remove the placenta before packing the uterus with gauze swabs.

Reversible causes of cardiac arrest should be addressed. If pulmonary embolism (PE) is strongly suspected, thrombolysis should be considered in line with local policies.

Uterine bleeding post-RH is likely to be minimal during cardiac arrest, however clinicians should be vigilant especially in the context of high-quality CPR or following return of spontaneous circulation (ROSC). If there is significant bleeding then fluid resuscitation (ideally with blood products), TXA and uterotonics should be administered along with uterine compression between two hands via the abdominal incision.

Where a patient has received thrombolysis, this risk is significantly increased and a patient who survives to hospital may require in-hospital surgical intervention to control bleeding.

European Resuscitation Council (ERC) guidelines recommend consideration of extracorporeal cardiopulmonary resuscitation (ECPR) when traditional ALS measures fail in pregnant patients [32]. However, there is a shortage of evidence on the success of ECPR in this patient cohort and further research is needed.

Newborn life support should be performed in accordance with RCUK (which are reproduced in JRCALC guidance) and BAPM guidelines [2, 4, 31].

Conveyance of mother and newborn should be to the nearest appropriate hospital, with the aim of keeping mother and baby together for the benefit of supporting the family. This includes if Termination of Resuscitation (ToR) has been performed for one or both patients.

19. Ultrasound should not be used to estimate gestation or to predict fetal viability with regards to Resuscitative Hysterotomy (RH) decisions [Grade: D]

Studies suggest that non-radiology clinicians can be trained to reliably identify fetal heart (FH) activity and estimate gestational age using ultrasound. [33, 34, 35].

However, robust evidence to support its application in pre-hospital settings, particularly in decision-making around RH, is lacking and limited to case reports including those where FH presence ended in newborn non-survival [36-41]. The use of pre-hospital ultrasound in assessing gestation or FH activity complicates an already time-critical and high-pressure situation.

We do not recommend its use for this purpose. Instead, emphasis should be placed on the delivery of high-quality ALS and the early performance of RH where gestational age is assessed clinically or inferred from available history to be >20 weeks.

20. Following Resuscitative Hysterotomy, if significant bleeding occurs, manual compression of the uterus is recommended for haemorrhage control [Grade: D]

In the event of sustained return of spontaneous circulation (ROSC) bleeding may be expected to be brisk, however most case reports do not report this. Monitoring of the abdominal/uterine incision and externally per vaginum is recommended to avoid missing occult haemorrhage. Haemorrhage control may be achieved by packing the uterus with gauze swabs and compressing the uterus with two hands via the abdominal incision. There is currently insufficient evidence to recommend internal compression of the abdominal aorta. Volume resuscitation (with blood products where available), tranexamic acid (TXA) and uterotonics should be given in line with local policies. Rapid extrication and transport to a hospital with obstetric facilities to surgically manage the bleeding should be prioritised.

21. Termination of Resuscitation might be considered in the pre-hospital setting [Grade: D]

In certain circumstances it may be appropriate to terminate resuscitation of the mother and/or baby at the scene. This includes if all reversible causes have been addressed, RH has been undertaken (or excluded as a management option), there are no additional treatment options at hospital, and the setting is appropriate

(including environmental factors and family). Clinicians should consider seeking senior clinical advice to support this difficult decision-making before terminating resuscitation.

This type of incident is likely to be one of the most stressful incidents attended by pre-hospital clinicians. Teams should take time to debrief in a private area where they cannot be overheard by bystanders or families. Crews should stay offline to complete accurate documentation without being pressured to attend further emergency calls. Staff may need to be signposted towards additional support.

An ambulance service incident report should be submitted to ensure that the midwifery/maternity lead is informed and to support staff with internal and external investigations. An ambulance service safeguarding referral must be completed for the newborn baby and any existing children.

A number of organisations investigate maternal deaths including His Majesty's Coroner, the Maternity and Neonatal Safety Investigation Programme (MNSI) and MBRRACE-UK. If the patient is taken into the Emergency Department with active resuscitation, the reporting is managed by the in-hospital Obstetric team. If ToR has occurred at the scene, the patient should be conveyed to the local hospital mortuary and the Consultant Obstetrician or senior midwife at this hospital/Trust informed. The Bereavement Midwife at this site may also be able to support the family.

Questions for future research

There is limited published evidence on the management of out-of-hospital cardiac arrest in pregnancy. This review has identified a number of topics which would benefit from future research. These include:

At what time frame from onset of maternal cardiac arrest does RH become futile for positive maternal and neonatal outcomes?

What are the benefits versus harms of mechanical CPR in pregnancy >20 weeks gestation?

What are the optimal techniques for haemorrhage control of the uterus post-RH?

What is the role for ECPR in the management of cardiac arrest in pregnancy?

Conclusion

This consensus statement provides further guidance in the pre-hospital management of critically ill and injured pregnant patients. Recognising the unique physiological and ethical complexities of maternal collapse, it emphasises the importance of prioritising maternal and fetal outcomes through evidence-informed practices. This statement discusses the evolving landscape of pre-hospital maternal collapse and highlights the need for continued data collection to inform refinement of future training and protocols.

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Appendix B - Methods

An initial meeting was convened inviting previous authors and key stakeholders. A small group was established to conduct a literature review, assess current guidance documents, and provide expert consensus in areas where evidence was limited or absent. The group then developed a draft statement, which was shared with relevant stakeholders to gather feedback and support for the consensus statement.

Members of the working group

Dr Caroline Leech

Caroline is a Consultant in Emergency Medicine at University Hospital Coventry and a PHEM Consultant working with The Air Ambulance Service and West Midlands Ambulance Service MERIT. She has completed a NIHR Research Scholarship researching the topic of "Out of hospital cardiac arrest in pregnancy" with Warwick Clinical Trials Unit. She has published book chapters and journal articles on the topic of trauma in pregnancy and out-of-hospital cardiac arrest in pregnancy.

Dr Ali Hieatt

Ali Hieatt has been a PHEM Consultant since 2012 and was the maternity lead at Magpas Air Ambulance before moving to Essex and Herts Air Ambulance where she is a member of the paediatric and maternity specialist interest group. She has had a long-standing interest in the provision of high-quality advanced care to the pregnant patient given the relative paucity of evidence and guidance in the pre-hospital arena. She has ensured regular simulated training of the pre-hospital team in the decision-making and implementation of resuscitative hysterotomy in particular, and in 2023 was awarded the National Air Ambulance Innovation Award for her resuscitative hysterotomy model.

Claire Foweraker

Claire is a Critical Care Paramedic for South East Coast Ambulance Service with over 16 years' experience in a variety of pre-hospital care roles. She is an active member of the Clinical Standards Committee for the Faculty of Pre-hospital Care and has played a leading role in the development of this consensus statement. She has a strong interest in patient safety, critical care, and enhancing the quality of pre-hospital care delivered to patients.

Dr Matthew Newport

Matt is a Consultant in Anaesthesia at East Lancashire Hospitals NHS Teaching Trust, a PHEM Consultant with North West Air Ambulance and the Deputy Chair of the FPHC Clinical Standards Committee.

Dr Chris Hardy

Chris is an anaesthetic registrar with a keen interest in trauma and resuscitation and responds pre-hospital with a local BASICS scheme. Since being involved in a pre-hospital resuscitative hysterotomy he has been increasingly interested in the evidence base in this field and ways to advance this forward given this fact.

Appendix C – Additional information

Anatomical and Physiological Changes in Pregnancy and impact on pre-hospital patient management

MBRRACE-UK maternal death reports have identified that delays in recognising and responding to early signs of deterioration is a contributing factor in preventable maternal deaths [5]. MEWS (Maternity Early Warning Score) parameters are embedded within the Pre-hospital Maternity Decision Tool [2]. These parameters should be used when assessing perinatal women (from conception to 4 weeks following a pregnancy) in obstetric and non-obstetric presentations including traumatic injury and medical emergencies. This is because the use of NEWS2 or other non-specific parameters which do not account for physiological changes in the perinatal period are used can lead to abnormalities and deterioration may be missed. Consistent use of the pre-hospital maternity decision tool to aid early assessment and timely conveyance is crucial to reduce the risk of maternal collapse or arrest in the pre-hospital setting.

Airway:

Pregnant patients should be considered at higher risk of having a difficult airway [13]. Tissues may be friable and more prone to bleeding due to increased blood flow and oedema. Airway adjuncts should be used with care to avoid precipitating bleeding. Neck adiposity is increased, and, along with increased breast size make laryngoscopy and intubation more difficult. There is increased risk of regurgitation of gastric contents due to reduced oesophageal sphincter tone and increased intra-abdominal pressure; this may be compounded by delayed gastric emptying as a result of significant pathophysiology including trauma, as well as the use of opioid analgesia.

Breathing:

Due to increased oxygen consumption and minute ventilation, and reduced FRC due to the gravid uterus, hypoxaemia develops more rapidly in the pregnant

patient [10]. Supplemental oxygen should be applied liberally and in cardiac arrest, intubation should be considered early. Where possible, a head-up position reduces the effect on FRC and may improve oxygen delivery.

Circulation:

Blood volume increases during pregnancy. Significant blood loss may occur without significant effect on maternal physiological parameters so meticulous assessment whilst maintaining a high index of suspicion should be undertaken, particularly in trauma, or suspected concealed blood loss, which may be significant even in apparently minor trauma. Obvious and occult bleeding should be addressed including the use of haemostatic agents, traction devices and pelvic binders as per injured non-pregnant patients.

Blood pressure falls in pregnancy and nadirs around the mid-term point, returning to the patient's pre-pregnancy normal at term [10]. Uterine autoregulation is lost during pregnancy with uteroplacental blood flow directly proportional to maternal blood pressure; significant fetal compromise may occur before maternal physiological compromise. Any fall in blood pressure in the pregnant patient is therefore likely to indicate a high risk of fetal compromise and indications for fluid and blood resuscitation should take this into account. The harm from permissive hypotension may be greater than the benefits in the pregnant patient; restrictive fluid regimes may not be appropriate as they are likely associated with reduced uteroplacental blood flow, and fetal compromise. Fluid resuscitation should be started earlier. Vasopressors should be used with caution as they result in vasoconstriction of the uteroplacental vessels and may worsen fetal distress.

Laboratory studies are unlikely to be available in the pre-hospital environment. Haemodilution results in relative anaemia and thrombocytopaenia. Pregnancy is considered a hypercoagulable state, however, is not a contraindication to the administration of TXA in the context of major trauma, head injury or PPH.

Appendix D - Hierarchy of evidence & grading of recommendations

Hierarchy of evidence

Level of evidence	Type of evidence
Ia	Evidence from systematic reviews or meta-analysis of randomised controlled trials
Ib	Evidence from at least one randomised controlled trial
IIa	Evidence from at least one controlled study without randomisation
IIb	Evidence from at least one other type of quasi experimental study
III	Evidence from non-experimental descriptive studies such as comparative studies, correlation studies and case-control studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities

Grade of recommendation	Type of evidence
A	Based on hierarchy I evidence
B	Based on hierarchy II evidence or extrapolated from hierarchy I evidence
C	Based on hierarchy III evidence or extrapolated from hierarchy I or II evidence
D	Directly based on hierarchy IV evidence or extrapolated from hierarchy I, II or III evidence

Shekelle PG, Woolf SH, Eccles M, et al. (1999). Clinical guidelines: developing guidelines. BMJ: British Medical Journal. Feb 27;318(7183):593.

Appendix E – Endorsing Organisations

The Faculty of Pre-Hospital Care would like to give thanks to the following groups for their support and guidance whilst writing this statement;

- National Newborn and Maternity Group
- Joint Royal Colleges Ambulance Liaison Committee (JRCALC)
- Association of Ambulance Chief Executives (AACE)
- College of Paramedics

Quick Reference Guide

Summary of Recommendations

1. **Airway adjuncts should be used with care where necessary to avoid precipitating bleeding [12]. [Grade: D]**

2. **A smaller endotracheal tube [1] should be considered in pregnancy. [Grade: D]**

3. **Pregnant patients should be considered at higher risk of having a difficult airway [12, 13, 14, 15]. [Grade: B]**

4. **Videolaryngoscopy should be utilised if available [16, 17, 18, 19]. [Grade: C]**

5. **Patients should be positioned 20-30 degrees head up for intubation [11, 16, 22]. [Grade: C]**

6. **Supplemental oxygen should be applied liberally [Grade: B] and in cardiac arrest, intubation should be considered early [3]. [Grade: D]**

7. **Pre-oxygenation, ventilation at low peak airway pressures throughout apnoea, and the use of apnoeic oxygenation techniques should be utilised in pregnant patients undergoing PHEA [12, 13]. [Grade: D]**

8. **Chest Decompression or thoracotomy should be higher (3rd – 4th intercostal space, mid-axillary line) [10]. [Grade: C]**

9. **Impending respiratory failure may be indicated at lower levels of PaCO2 than in non-pregnant patients [10]. [Grade: D]**

10. **Manual displacement of the uterus or lateral tilt should be utilised immediately to reduce aortocaval compression [Grade: C]**

11. **Intravenous or intraosseous access should be placed above the level of the diaphragm [24]. [Grade: D]**

12. **Pelvic binders are indicated for pregnant patients who are suspected of having pelvic fractures [10]. [Grade: D]**

13. **The harm from permissive hypotension may be greater than the benefits in the pregnant patient; restrictive fluid regimes may not be appropriate and early fluid resuscitation should be considered [9]. [Grade: D]**

14. **Pregnancy is not a contraindication to the administration of tranexamic acid [25]. [Grade: D]**

15. **Analgesia, sedation and anaesthetic agents should not be withheld due to concerns over placental transmission to the fetus. [Grade: D]**

16. **Mechanical CPR devices should be used with caution [Grade: B]**

17. **Resuscitative Hysterotomy should not be considered beyond 60 minutes of confirmed cardiac arrest [Grade: C]**

18. **Following Resuscitative Hysterotomy and delivery of the baby, advanced life support protocols should continue [Grade: D]**

19. **Ultrasound should not be used to estimate gestation or to predict fetal viability with regards to Resuscitative Hysterotomy decisions [Grade: D]**

20. **Following Resuscitative Hysterotomy, if significant bleeding occurs, manual compression of the uterus is recommended for haemorrhage control [Grade: D]**

21. **Termination of Resuscitation might be considered in the pre-hospital setting [Grade: D]**
