



Queensland
Trauma Education

TRAUMA IN PREGNANCY

Placental abruption

Immersive scenario

Facilitator resource kit

CSDS



Clinical Skills Development Service

Metro North
Health



Queensland
Government

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Queensland Trauma Education**Trauma in Pregnancy - Placental abruption: Immersive scenario - Facilitator resource kit
Version 1.0**

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Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

National Safety and Quality Health Service (NSQHS) Standards



About this training resource kit

This resource kit provides healthcare workers with the basic knowledge and skills on how to assess and manage placental abruption following a traumatic incident.

Target audience

- Emergency department medical and nursing clinicians.
- Obstetric medical staff and midwives.

Duration

45-60 minutes (including setup, scenario and debrief).

Group size

4-6 participants (or team composition applicable to local area).

Learning objectives

By the end of this session the participant will be able to:

- Understand the importance of the initial assessment (primary and secondary) on admission to Emergency for a pregnant patient following a motor vehicle collision (MVC).
- Identify the need for additional investigations in the pregnant trauma patient.
- Recognise, manage and respond to clinical deterioration from placental abruption.

Facilitator guide

1. Provide associated participant resource kit to the learner.
2. Discuss the pre-simulation briefing and deliver the immersive scenario on placental abruption.
3. Utilise the supporting documents to maximise learning throughout immersive scenario.
4. Utilise the debriefing guide to evaluate participant performance and provide feedback.

Participant resource kit

- Learning objectives.
- Overview of placental abruption.
- Further reading.
- Supporting resources:
 - Structured assessment - infographic poster.
 - Specific management - manual displacement.

Supporting resources

- Structured assessment - infographic poster.
- Specific management - manual displacement.

Overview of placental abruption

Placenta abruption is a complete or partial separation of the implanted placenta before birth.

- Common complication and the leading cause of fetal death following trauma.^{1,2,3}
- Most occur within 2-6 hrs and almost all within 24 hours post injury.⁴

Mechanism of injury – rapid deceleration often without direct trauma.

Further reading

Queensland Clinical Guidelines. Maternity and Neonatal Clinical Guideline - Trauma in pregnancy Assessment: page 13-14. Placental abruption: page 22.

https://www.health.qld.gov.au/__data/assets/pdf_file/0013/140611/g-trauma.pdf

Queensland Clinical Guidelines. Trauma in pregnancy clinical guideline education presentation.

https://www.health.qld.gov.au/__data/assets/pdf_file/0016/142342/ed-trauma.pdf

Queensland Clinical Guidelines. Maternity and Neonatal Clinical Guideline - Intrapartum fetal surveillance (IFS) https://www.health.qld.gov.au/__data/assets/pdf_file/0012/140043/g-ifs.pdf

Queensland Ambulance Service - Clinical Practice Guidelines. Obstetrics/Placental abruption.

https://www.ambulance.qld.gov.au/docs/clinical/cpg/CPG_Placental%20abruption.pdf



TRAUMA IN PREGNANCY

Placental abruption

Structured assessment

1 Perform a primary survey

https://www.health.qld.gov.au/__data/assets/pdf_file/0035/146699/f-trauma-initial.pdf

Scan to view the Queensland Clinical Guideline >



2 Perform fetal assessment

Obtain obstetric history.



Obtain estimation of gestational age.



Perform FHR monitoring

- over 23 weeks, initiate CTG
- normal value 110-160 bpm.

3 Perform a secondary survey

https://www.health.qld.gov.au/__data/assets/pdf_file/0033/145599/f-trauma-second.pdf

Scan to view the Queensland Clinical Guideline >



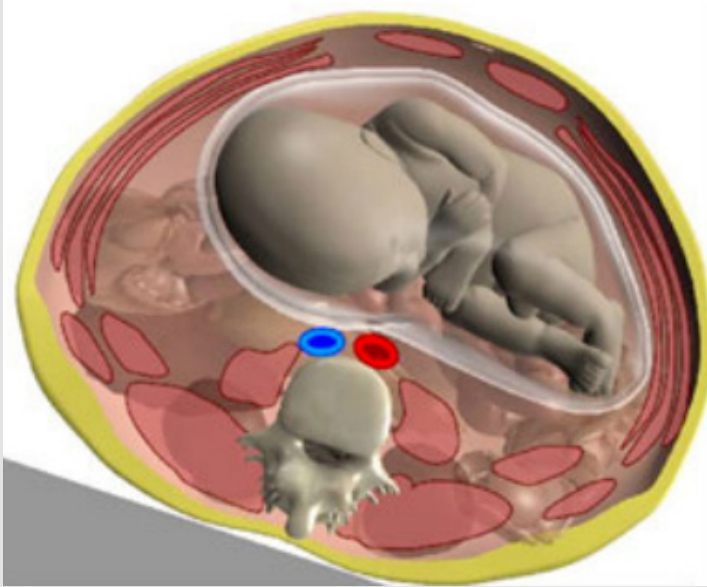
Specific management

Manual displacement

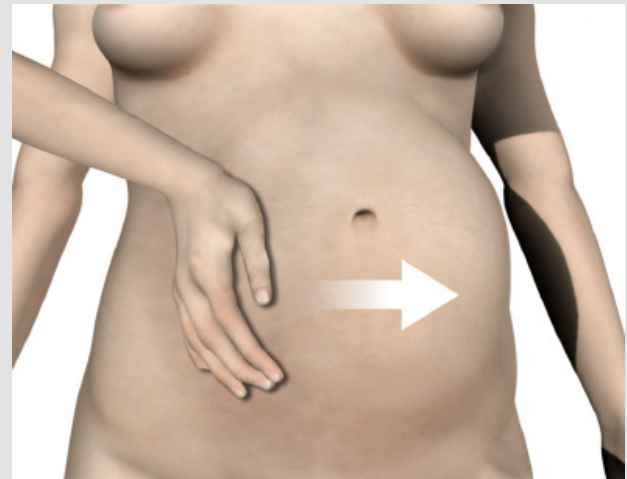
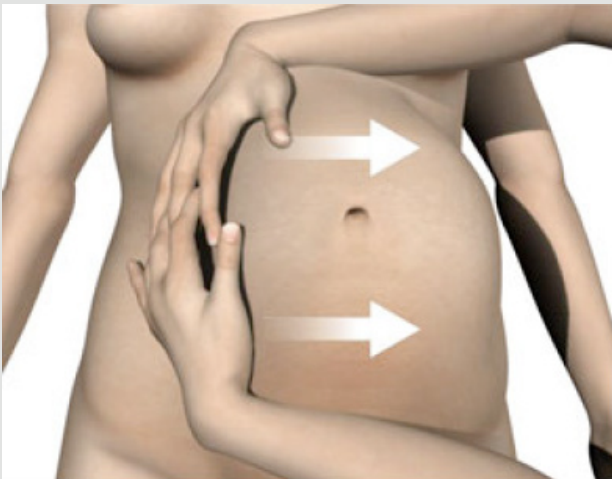
In the supine position the gravid uterus compresses the inferior vena cava and impairs venous return and reduces cardiac output.

Compression is relieved by either:

a. Left lateral tilt.



b. Manual uterus displacement — preferred position for cardiac compressions.



*Images produced by: Clinical Multimedia Unit
Metro North Hospital and Health Service, Queensland.*

Simulation event

This section contains the following:

1. Pre-simulation briefing poster.
2. Immersive scenario.
3. Resource requirements.
4. Handover card.
5. Scenario progression.
6. Supporting documents.
7. Debriefing guide.

Pre-simulation Briefing

Establishing a safe container for learning in simulation.



1 Clarify objectives, roles and expectations

- Introductions.
- Learning objectives.
- Assessment (formative vs summative).
- Facilitators and learners' roles.
- Active participants vs observers.

2 Maintain confidentiality and respect

- Transparency on who will observe.
- Individual performances.
- Maintain curiosity.

3 Establish a fiction contract

- Seek a voluntary commitment between the learner and facilitator.
- Ask for buy-in.
 - Acknowledge limitations.

4 Conduct a familiarisation

- Manikin/simulated patient.
- Simulated environment.
- Calling for help.

5 Address simulation safety

- Identify risks.
- Medications and equipment.
 - Electrical or physical hazards.
 - Simulated and real patients.

Note: Adjust the pre-simulation briefing to match the demands of the simulation event, contexts or the changing of participant composition.

Adapted from Rudolph, J., Raemer, D. and Simon, R. (2014). Establishing a Safe Container for Learning in Simulation. *Simulation in Healthcare: Journal of the Society for Simulation in Healthcare*, 9(6), pp.339-349.



Immersive scenario

Type	Immersive scenario.
Target audience	Emergency department medical and nursing staff. Obstetric medical staff and midwives.
Overview	<p>Emergency department presentation.</p> <p>27 year old G2P1. 36+4/40 gestation low risk (uncomplicated medical and obstetric history) patient is involved in an MVC at 70km/hr. She is the single occupant driver of the car, no air bag deployment but seat belts were felt tightly around her chest and lower abdomen.</p> <p>She self presents to emergency complaining of minor pain to her neck and right shoulder, and a seat belt mark across her R chest wall. On presentation she denies any PV loss but comments that she has not felt many fetal movements since the crash. Vital signs on admission to ED are normal, she is visibly shaken and distressed.</p> <p>She was on her way to pick up her other child from nursery. She believes she was travelling about 70km/hr when she was hit on driver's side by someone who ran a red light.</p> <p>The scenario has two parts: initial assessment and investigations and then fast forward two hours later with a secondary management requirement.</p>
Learning objectives	<ul style="list-style-type: none"> • Understand the importance of the initial assessment (primary and secondary) on admission to Emergency for a pregnant patient following a motor vehicle collision (MVC). • Identify the need for additional investigations in the pregnant trauma patient. • Recognise, manage and respond to clinical deterioration from placental abruption.
Duration	45 minutes including debrief.

Resource requirements

Physical resources

Room setup	Resus bay in emergency.
Simulator/s	1 simulated patient with a 36/40 abdomen with a simulated patient monitor. OR 1 manikin including software with a 36/40 abdomen.
Simulator/s set up	<ul style="list-style-type: none"> • Street clothes, lying supine with a wedge under left hip. • Moulage: R shoulder redness; driver seatbelt redness to R upper chest.
Clinical equipment	<ul style="list-style-type: none"> • Standard resuscitation equipment for emergency department. • Fetal doppler. • CTG and/or CTG trace.
Access	2 IVC setups with no IV stickers attached.
Other	ED chart and relevant paperwork.

Human resources

Faculty	2 facilitators (Dr/Nurse with maternity and debriefing experience) to take on roles of scenario commander and primary debrief.
Simulation coordinators	0 if using a standardised patient – facilitators to control simulated monitor. 1 if using a simulator – for manikin set up and control.
Confederates	1 midwife from birth suite (if applicable).
Other	Initially, 1 nurse and 1 doctor in room. The other nurses and doctors outside to be called when needed. Obstetric and midwifery staff involvement if available, depending on facility.

Handover card

Handover from

Joanne self-presented following a low speed MVC.

She is a 27-year-old and currently is 36+4/40. She was travelling around 70km/hr when she was hit on driver's side by someone who 'ran' a red light. She was the driver, no other occupants, no air bag deployed, and she was wearing a seat belt.

Nil medical history. Obstetric history - G2P1, nil concerns with both pregnancies. Vital signs are normal. She is complaining of minor pain to her neck and right shoulder, no PV loss.

Thanks for looking after her.

Scenario progression

STATE 1: INITIAL ASSESSMENT			
Vital signs	Script	Details	Expected actions
ECG: ST	<p>Sally I was pulling away from the traffic lights and he came out of nowhere. He hit me on the front side of my car, there was a terrible bang. The seat belt was very tight across my chest and the lower part of my tummy.</p>	<p>Primary survey results</p> <p>A maintaining own.</p> <p>B nil respiratory distress; bilateral clear, no chest wall tenderness or crepitus/subcutaneous emphysema.</p> <p>C nil obvious bleeding; nil PV loss, warm peripherally.</p> <p>D alert and oriented, moving all limbs.</p> <p>E no cuts or abrasions, visible red make on shoulder and upper chest from seat belt, no marks on abdomen.</p> <p>Fetal assessment</p> <p>Abdominal palpation = 36 weeks.</p> <p>Longitudinal lie back Rt & lateral ROT.</p> <p>Cephalic presentation.</p> <p>Nil contractions.</p> <p>FH 126 with Doppler.</p> <p>Abdomen tender toward fundus near seat belt mark but currently soft.</p> <p>No fetal movements since accident.</p>	<p>Commence primary survey</p> <p><input type="checkbox"/> Assess airway.</p> <p><input type="checkbox"/> Assess breathing.</p> <p><input type="checkbox"/> Assess circulation.</p> <ul style="list-style-type: none"> • Position left lateral 15-30° tilt. • Insert large bore IVC. • Determine PV loss. <p><input type="checkbox"/> Assess disability – full GCS.</p> <p><input type="checkbox"/> Expose patient.</p> <p>Perform fetal assessment</p> <p><input type="checkbox"/> Obtain obstetric history.</p> <p><input type="checkbox"/> Perform abdominal palpation.</p> <p><input type="checkbox"/> Obtain gestational age.</p> <p><input type="checkbox"/> Determine fetal response.</p> <p><input type="checkbox"/> Auscultate for fetal heart (doppler uss).</p> <p><input type="checkbox"/> Discuss fetal movement.</p> <p><input type="checkbox"/> Discuss PV loss.</p>
HR: 105			
SpO2: 96%			
BP/ART: 110/60			
RR: 18			
Temp: 36.9°C			
BGL: 4.0mmol			
GCS: 15			
FHR: 126			

STATE 2: ONGOING MANAGEMENT / SECONDARY ASSESSMENT

Vital signs	Script	Details	Expected actions
ECG: ST	<p>Sally I am really worried about the fact I haven't felt the baby move since the accident.</p> <p>Am I able to have some pain relief for my sore shoulder and tummy?</p>	<p>Secondary survey results</p> <p>Head – nil abnormalities.</p> <p>Chest – visible seat belt mark R upper chest.</p> <p>Abdomen – no marks.</p> <p>Limbs – redness R shoulder, painful requiring analgesia.</p> <p>Results - see supporting documents</p> <p>Blood.</p> <p>CTG – normal (CTG 1).</p> <p>Abdominal USS.</p>	<p>Secondary survey</p> <ul style="list-style-type: none"> <input type="checkbox"/> Perform head to toe assessment. <input type="checkbox"/> Inspect abdomen ecchymosis (bruising) or asymmetry. <input type="checkbox"/> Administer analgesia - oral / IV. <p>Investigations</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bloods – FBC, G&H, Kleihauer. <input type="checkbox"/> CTG to be commenced ASAP. <input type="checkbox"/> Abdominal USS. <input type="checkbox"/> Xray – discussion pros/cons. <p>Management</p> <ul style="list-style-type: none"> <input type="checkbox"/> High index of suspicion for occult shock and abdominal injury. <input type="checkbox"/> Referral to O&G/Maternity Department for review in ED. <input type="checkbox"/> Observe in emergency CTG for minimum of 4 hours.
HR: 110			
SpO2: 97%			
BP/ART: 100/60			
RR: 16			
Temp: 36.9°C			
BGL: 4.0mmol			
GCS: 15			
FHR: 126			
Other: CTG			

STATE 3: 30 MINUTES POST PRESENTATION

Vital signs	Script	Details	Expected actions
ECG: ST	Sally My tummy is more painful now.	Increasingly more uncomfortable and restless due to pain. Assessment results B increased respiratory rate due to increased pain. C not certain if there are contractions due to a constant pain. Abdomen tender around the fundus, uterus feels hard, “woody”. Couvelaire uterus (concealed abruption). Results - see supporting documents Kleihauer – positive result for fetal maternal haemorrhage. CTG – abnormal (CTG 2).	Assessment <input type="checkbox"/> Repeat primary and secondary survey. <input type="checkbox"/> Full obstetric assessment of abdomen. Investigations <input type="checkbox"/> CTG. <input type="checkbox"/> PV Loss +/- speculum examination. <input type="checkbox"/> Bloods – FBC, ROTEM. Management <input type="checkbox"/> Check Kleihauer result. <input type="checkbox"/> Identify emergency situation. <input type="checkbox"/> Perform cross match. <input type="checkbox"/> Consider MTP / blood products. <input type="checkbox"/> Organise disposition. <ul style="list-style-type: none"> • CAT 1 LSCS. • Involve neonatal team, if available. • Organise admission / retrieval.
HR: 110			
SpO2: 97%			
BP/ART: 100/60			
RR: 16			
Temp: 36.9°C			
BGL: 4.0mmol			
GCS: 15			
FHR: 126			
Other: CTG			

Supporting documents

The following supporting documents are provided for this immersive scenario:

1. USS anterior placenta.
2. X-ray pelvic.
3. Doppler wave forms.
4. USS abdominal scan 1.
5. USS abdominal scan 2.
6. Kleihauer results.
7. Recommended Anti D.
8. Group and antibody screen.
9. Full blood count results.
10. Biochemistry.
11. CTG 1 - on admission.
12. CTG 2 - 30 minutes post admission.

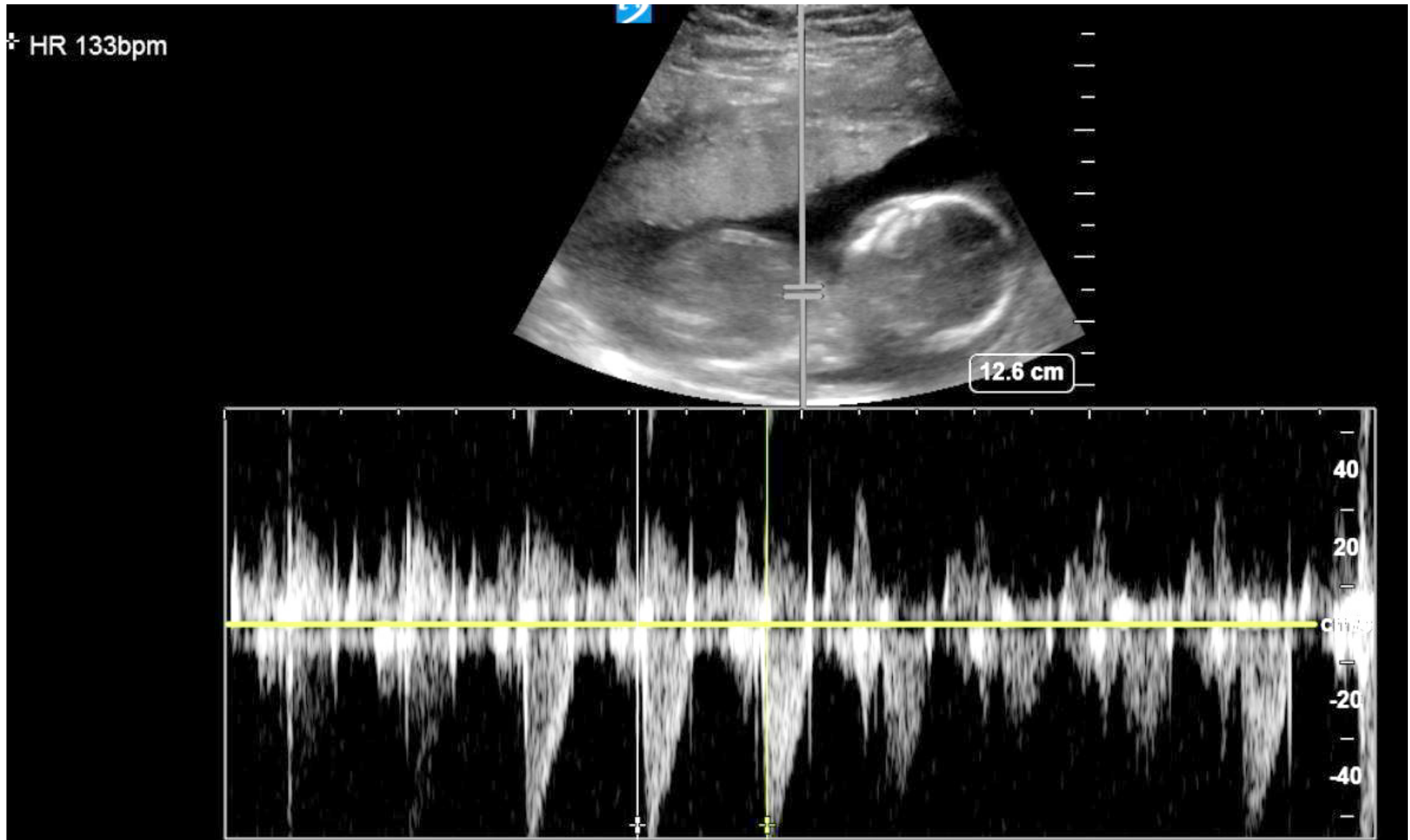
USS anterior placenta



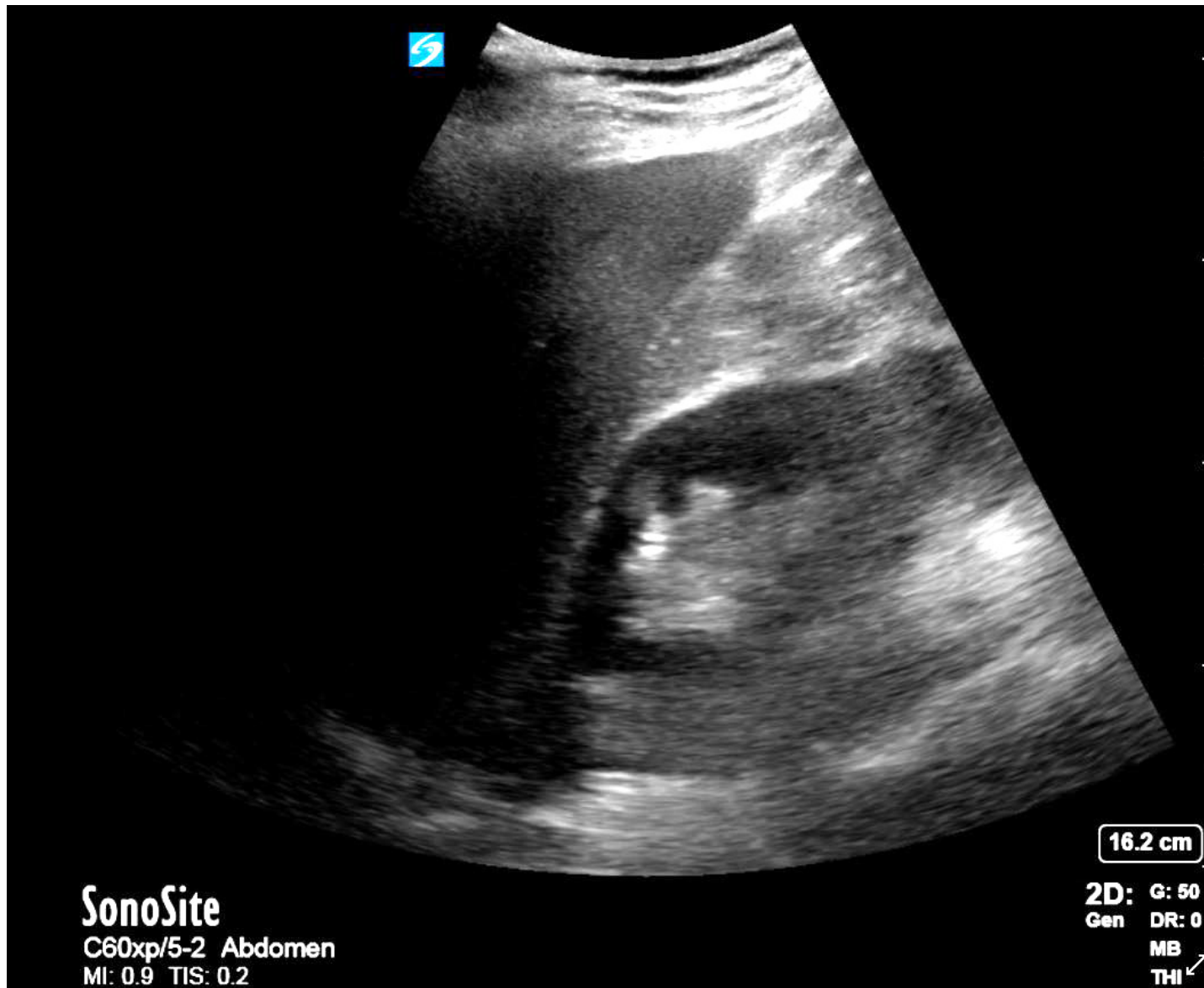
X-ray pelvic



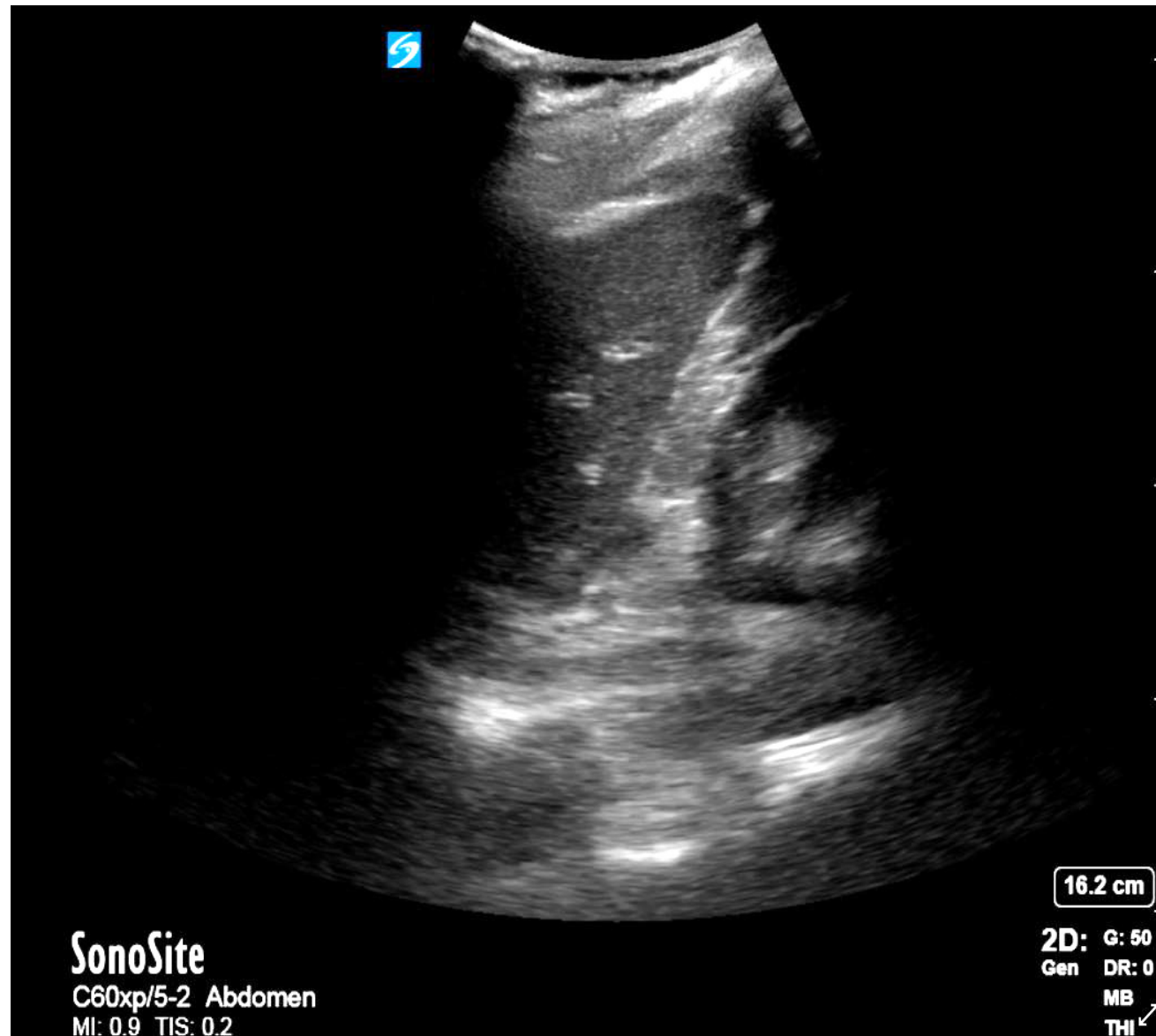
Doppler wave forms



USS abdominal scan 1



USS abdominal scan 2



Kleihauer results

FOETO-MATERNAL HAEMORRHAGE SCREEN

Kleihauer : PENDING

:

:

Anti-D required : vials

Maternal Blood Gp : O Rh(D) NEGATIVE

Cord Blood Group : Labnumber :

Comment:
In relation to detection of foetal blood loss (reduced foetal movements, trauma, abruption). Kleihauer results should be interpreted with caution and taking into account clinical findings. Overestimation and underestimation of

Recommended Anti D

Dosage Guidelines for Prevention of Rh(D) Haemolytic Disease of the Newborn for patients without Immune Anti-D.

Sensitising events in the 1st trimester - 250 IU CSL Rh(D) Ig

Sensitising events beyond the 1st trimester - 625 IU CSL Rh(D) Ig

Pregnancy

28 and 34 weeks - 625 IU CSL Rh(D) Ig

Post partum - 625 IU CSL Rh(D) Ig

TO CALCULATE VIALS REQUIRED:

* One vial of 625IU CSL Rh(D) Immunoglobulin is sufficient to prevent

immunisation by a foetomaternal haemorrhage of 6ml of Rh(D) POSITIVE red cells.

* Rh(D) immunoglobulin should be administered within 72hrs of the sensitising event, however a dose given up to 10 days after the event may provide protection.

* For large volume bleeds (>12ml), Rhophylac immunoglobulin administered intravenously is the product of choice. One syringe (2ml) Rhophylac 1500IU will suppress the immunising potential of up to 15mL of Rh(D) POSITIVE red cells

Group and antibody screen

Transfusion Medicine - Group and Antibody Screen

Blood Group: O Rh(D) NEGATIVE

Antibody Screen: Passive NEGATIVE

Sample Expires: 15:30 15-Oct-19

Comments:

Clinical information available indicates administration of Rh D-Ig at 34 weeks. These results suggest that the anti D detected may be passive in nature. However the possibility of an early immune response cannot be excluded by serology alone.

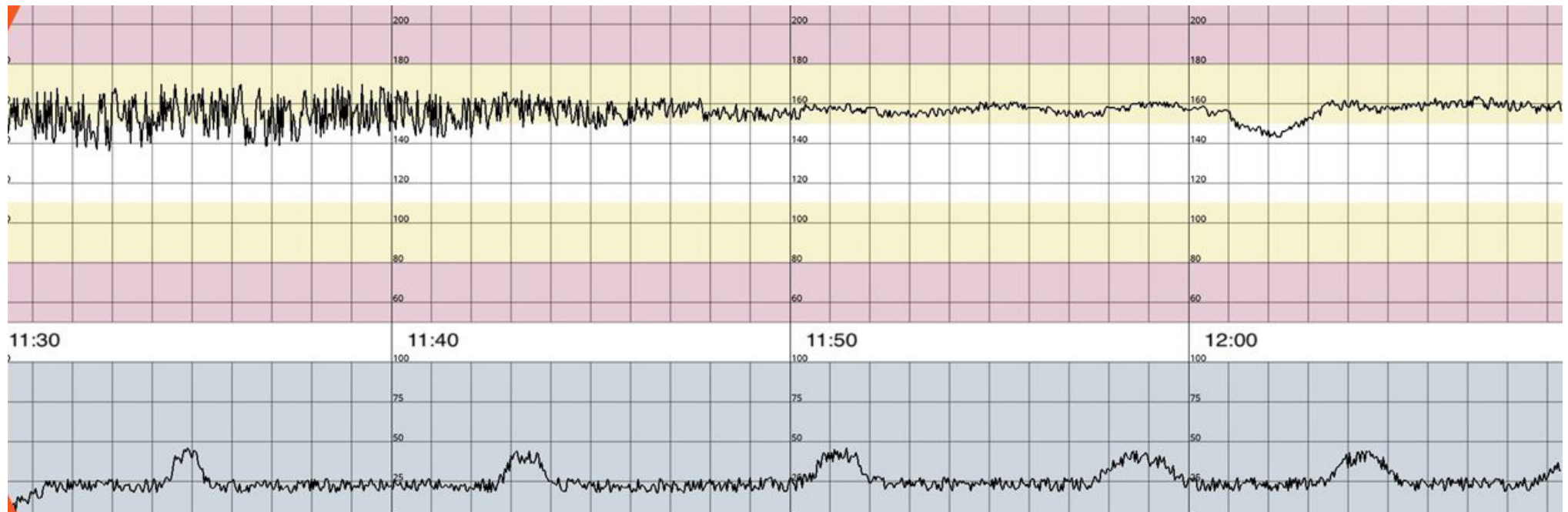
Full blood count results

```
Diff: Automated   Specimen: Blood
Hgb : 121         WBC  : 11.0
PLT : 194         :
RBC : 3.84        HCT  : 0.36
MCV : 93          MCH  : 31.5
RDW :             MCHC :           Press shift-insert to view reference ranges
Neut ( 83 %): 9.16
Lymph ( 11 %): 1.18
Mono ( 6 %): 0.62
Eosin ( 0 %): 0.01
Baso ( 0 %): 0.03
NRBC          /100 WBC
SusFlg
Comment:       Patient Age: 27 years   Val: sys
```

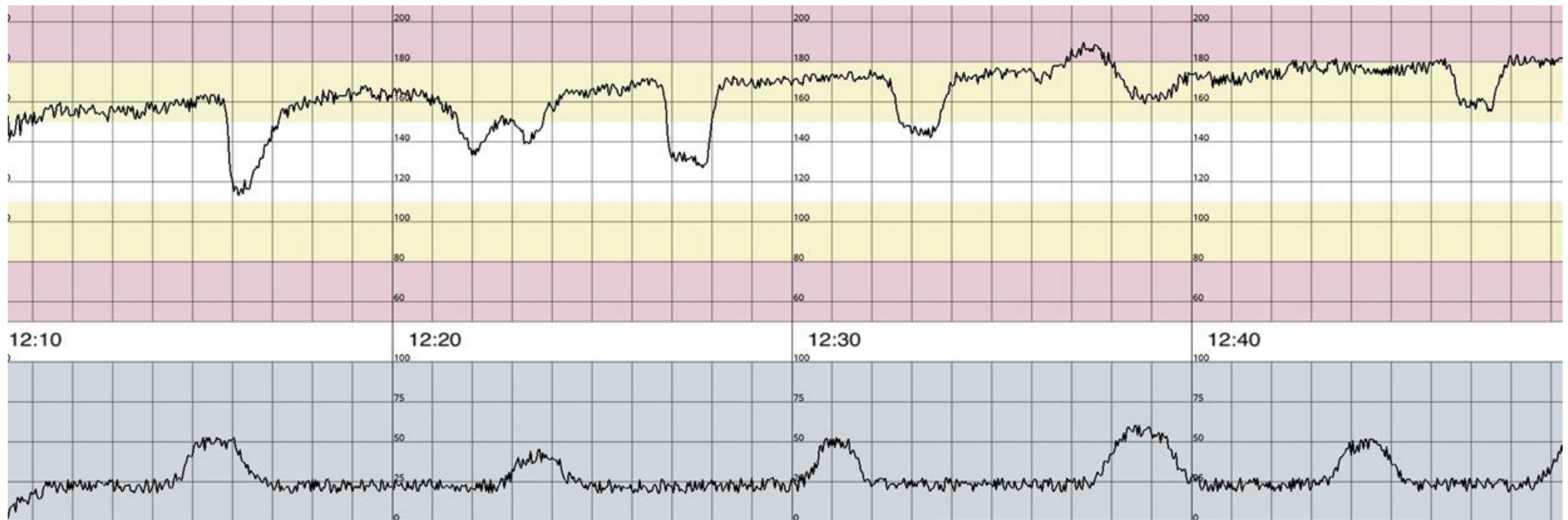
Biochemistry

Specimen type	Blood	Urate	0.30 mmol/L (0.10 - 0.35)	Phosphate	1.55 H mmol/L (0.75 - 1.50)
Sample Appearance	Clear	Protein	61 g/L (61 - 75)	Lipase	34 U/L (< 60)
Sodium	135 L mmol/L (135 - 145)	Albumin	30 L g/L (33 - 40)	Magnesium	0.76 mmol/L (0.70 - 1.10)
Potassium	4.4 mmol/L (3.5 - 5.2)	Globulin	31 g/L (25 - 45)	OSM(Calc)	283 mmol/L (270 - 290)
Chloride	103 mmol/L (95 - 110)	Bilirubin	10 umol/L (< 20)	CHEM 20 PROFILE	
Bicarb.	21 mmol/L (18 - 26)	Bili(Conj)	< 4 umol/L (< 4)	Press Shift F1 for more information on	
Anion Gap	11 mmol/L (4 - 13)	ALP	183 U/L (40 - 220)	Osmolality calculation	
Glucose	4.0 mmol/L (3.0 - 7.8)	Gamma GT	8 U/L (< 38)		
Fasting RR	--> (3.0 - 6.0)	ALT	22 U/L (< 34)		
Urea	3.9 mmol/L (2.1 - 7.1)	AST	27 U/L (< 31)		
Creatinine	74 H umol/L (32 - 73)	LD	206 U/L (120 - 250)		
Urea/Creat.	53 (40 - 100)	Calcium	2.28 mmol/L (2.10 - 2.60)		
eGFR	>90 mL/min/(> 60)	Corr Ca	2.47 mmol/L (2.10 - 2.60)		
	1.73m ²				
Comment:	Age:27 years I	H	L	KC	

CTG 1 - on admission



CTG 2 - 30 minutes post admission



Debriefing guide

Scenario objectives

- Understand the importance of the initial assessment (primary and secondary) on admission to Emergency for a pregnant patient following a motor vehicle collision (MVC).
- Identify the need for additional investigations in the pregnant trauma patient.
- Recognise, manage and respond to clinical deterioration from placental abruption.

Example questions

Exploring diagnosis

- Explain your thought process on how the team came to conclude that this patient has placental abruption (suspected/actual)?
- Do you have structured process for fetal assessment - FHR/fetal movement?

Discussing management

- What is the most effective position for this patient (upright/tilting/manual displacement)?
- Why? How do you perform these manoeuvres?
- What's the importance of obtaining a Kleihauer level?
- How long should you perform CTG monitoring?
- What factors affected your decision making around the plan for this patient (observation/Cat 1 LSCS)?

Discussing teamwork / crisis resource management

What available resources do you have in your area to assist with managing placental abruption caused by trauma?

- Who do you call for CTG monitoring? When are they available? How do you access them?
- Do you have cognitive aids available in your department?
- Ability to obtain Kleihauer level. How long would it take?
- Ability to perform a ROTEM.

Key moments

- Recognition of placental abruption (potential/actual).
- Performing structured assessment in the pregnant trauma patient.
- Correct positioning.
- Performing fetal assessment.
- Obtaining Kleihauer levels.

Acronyms and abbreviations

Cat 1	category one
CTG	cardiotocography
FHR	fetal heart rate
LSCS	lower (uterine) segment caesarean section
MTP	massive transfusion protocol
USS	ultrasound
PV	per vagina

References

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3. Wyant, A. R., & Collett, D. (2013). Trauma in pregnancy: diagnosis and management of two patients in one. *JAAPA : official journal of the American Academy of Physician Assistants*, 26(5), 24–29. <https://doi.org/10.1097/01720610-201305000-00005>

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<https://www.surveymonkey.com/r/3FWL3ZD>



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Trauma in Pregnancy - Placental abruption: Immersive scenario - Facilitator resource kit

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