POSTPARTUM HAEMORRHAGE (PPH)

Postpartum haemorrhage (PPH) is one of the main causes of maternal death worldwide. It is an obstetric emergency that needs to be managed promptly and effectively to reduce the risk of morbidity and mortality.

DEFINITION AND INCIDENCE

PPH is defined as blood loss greater than 500 mLs and continuing. This definition is used as a marker for audit and to mobilise extra resources. However, clinically significant PPH is more usefully defined as any excessive bleeding that causes the woman to become symptomatic.

Primary PPH occurs in the first 24 hours postpartum and secondary PPH occurs 24 hours to 6 weeks after birth.

PPH is reported to occur after 1 to 5% of births dependent on the criteria used to define PPH.

PREDISPOSING FACTORS

Although risk factors are a prompt to remain vigilant for PPH, in reality only a small proportion of women with risk factors experience PPH. Possible predisposing factors include, but are not limited to:

Antenatal

- History of previous PPH
- Large for gestational age newborn (> 4 kg)
- Placenta praevia/ accreta
- Hypertensive disorders
- Obesity
- High Parity
- Bleeding disorders

Intrapartum

- Induction and/or augmentation
- First stage labour > 24 hours
- Delay in progress of second stage
- Precipitate labour
- Instrumental delivery
- Caesarean section
- Retained placenta
- Lacerations

(based on UptoDate.com, 2010)

DIAGNOSIS

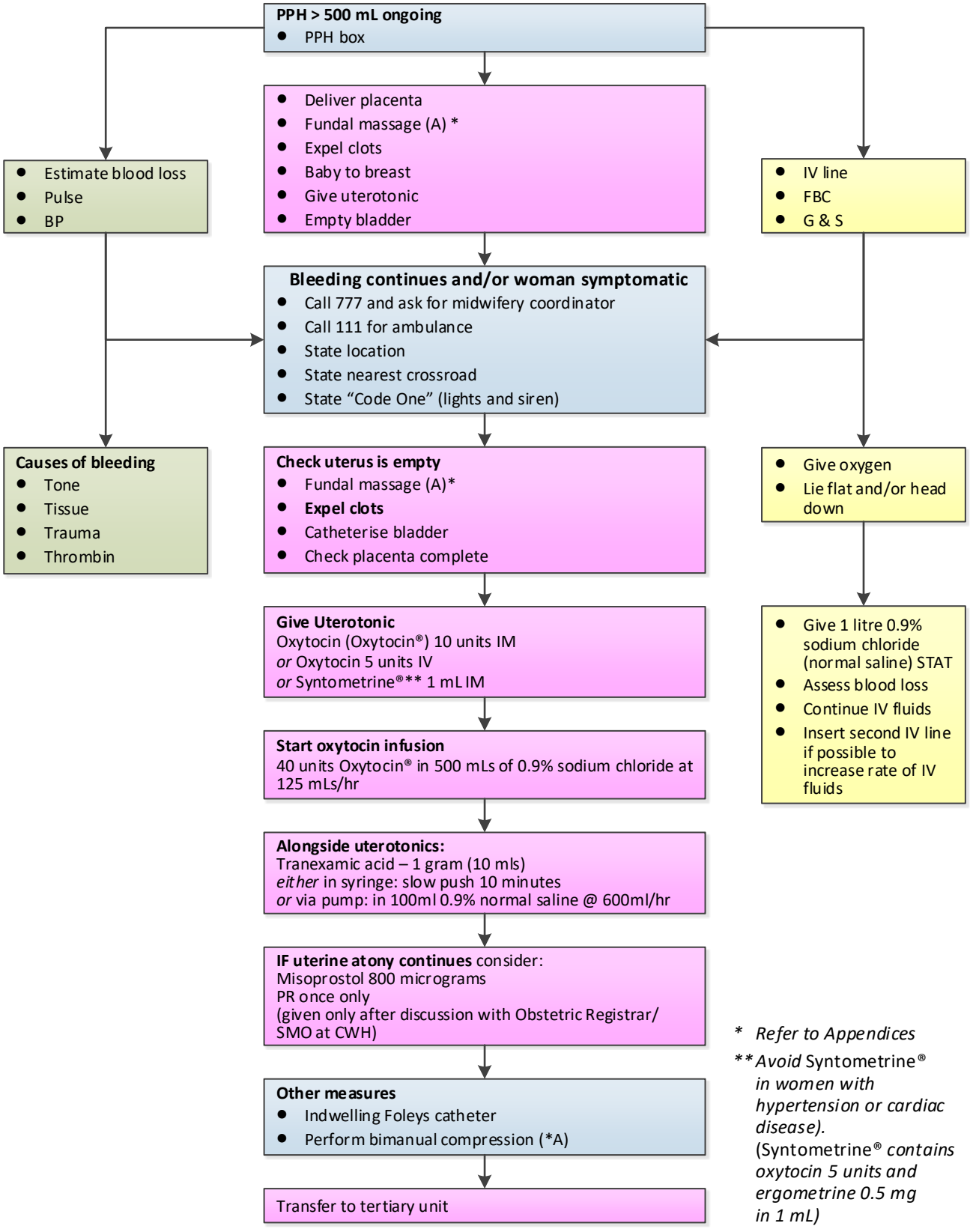
Blood loss tends to be underestimated which may delay active steps being taken to resuscitate the woman and stop the bleeding. Women may lose up to a third of their blood volume (1500-1800 mLs) without showing signs of shock.

Assessment of signs and symptoms is more clinically useful than blood estimation alone. These include:

- feeling unwell, lightheaded and/or fainting
- pallor, cold peripheries and/or goose bumps
- hypotension and/or tachycardia (occasionally bradycardia)
- agitation and/or confusion

MANAGEMENT

POSTPARTUM HAEMORRHAGE ALGORITHM: PRIMARY UNIT



* *Refer to Appendices*

** *Avoid* Syntometrine® *in women with hypertension or cardiac disease).* (Syntometrine® *contains oxytocin 5 units and ergometrine 0.5 mg in 1 mL)*

POSTPARTUM HAEMORRHAGE ALGORITHM – TERTIARY UNIT

PPH > 500 mL ongoing
- Call 2nd midwife

- Deliver placenta
- Fundal massage (A) *
- Expel clots
- Baby to breast
- Give uterotonic
- Empty bladder

- Estimate blood loss
- Pulse
- BP

- IV line
- FBC
- G & S

Bleeding continues and/or woman symptomatic

ASSESS

Estimate blood loss
Document running total

Vital Observations
- ABC
- Pulse
- BP
- O2 sats/perfusion/RR

If cardiac/respiratory arrest is imminent call a 'Clinical Emergency' immediately

Investigations
- Check FBC, G&S sent
- Arrange cross match
- Coag screen

Causes of bleeding
- Tone
- Tissue
- Trauma
- Thrombin

CALL FOR HELP
Red Emergency Bell
Get PPH box

STOP BLEEDING

Check uterus is empty
- Fundal massage (A)*
- **Expel clots**
- Catheterise bladder
- Check placenta complete

Give Uterotonic
Oxytocin (Oxytocin®) 10 units IM
or Oxytocin 5 units IV
or Syntometrine®** 1 mL IM

Start oxytocin infusion
40 units Oxytocin® in 500 mLs of 0.9% sodium chloride at 125 mLs/hr

Alongside uterotonics:
Tranexamic acid – 1 gram (10 mls)
either in syringe: slow push 10 minutes
or via pump: in 100ml 0.9% normal saline @ 600ml/hr

Control bleeding from lower genital tract trauma

If bleeding continues
- Bimanual compression (A)*
- Call obstetric and anaesthetic consultants
- Transfer to theatre for definitive measures

IF uterine atony continues consider
- Carboprost (Prostin/15M®) 250 micrograms IM or intramyometrially max 8 doses 15 min apart
- Misoprostol 800 micrograms PR once only

RESUSCITATE

Insert second IV line
- Give oxygen
- Lie flat and/or head down

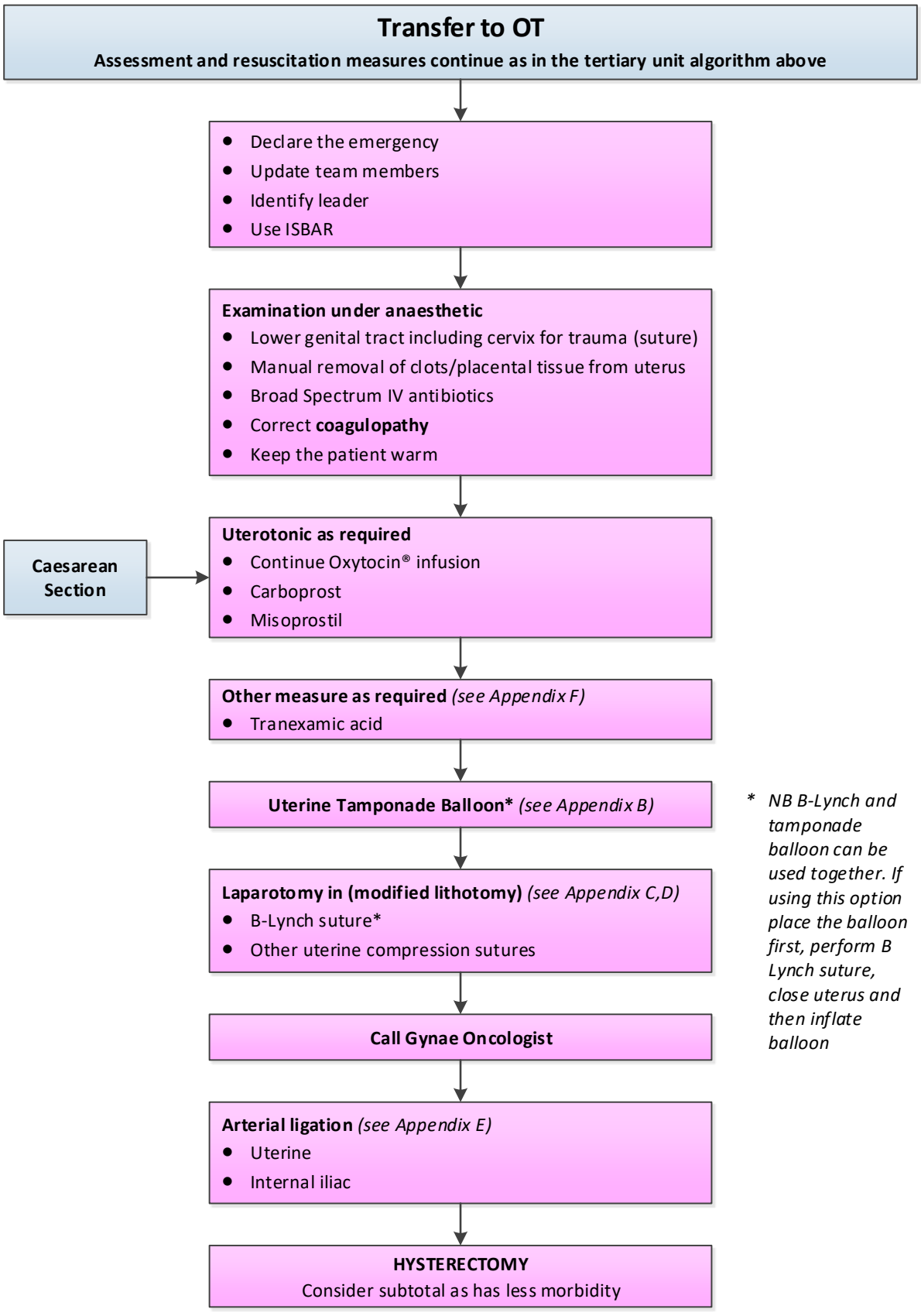
Rapid Crystalloid Infusion
0.9% sodium chloride or compound sodium lactate (Hartmanns) ≤ 3 L

Transfuse RBC
- Transfuse RBC when available
- After 3 litres crystalloid or if cross matched RBC not available consider O Neg
- Consider Patient Specific Emergency Blood Box

If **haemorrhage** exceeds 2000 mL and/or patient shock activate **Massive Transfusion Protocol**
- http://cdhb.health.nz/Hospitals-Services/Health-Professionals/CDHB-Policies/Fluid-Medication-Manual/PublishingImages/Pages/default/Adult-Massive-Transfusion-Protocol.pdf
- **Ring Blood Bank** (ext. 80310) and say "*I am activating the Massive Transfusion Protocol*"
- **Call for additional assistance**
  Obstetric Consultant
  Anaesthetic Consultant

* *Refer to Appendices*

** *Avoid* Syntometrine® *in women with hypertension or cardiac disease).* (Syntometrine® *contains oxytocin 5 units and ergometrine 0.5 mg in 1 mL)*



* *NB B-Lynch and tamponade balloon can be used together. If using this option place the balloon first, perform B Lynch suture, close uterus and then inflate balloon*

POSTNATAL CONSIDERATIONS

The frequency of observations will be guided by Obstetric team. Observations include:

- Pulse
- Blood pressure
- Vaginal loss
- Palpation of fundal tone and height

Blood loss 500-1500 mL once controlled

- half hourly for 4 hours
- then 4 hourly for 24 hours
- then once per shift whilst in hospital
- Women who have experienced blood loss in excess of 1000 mL will usually stay on birthing suite until 2 hours post Oxytocin® infusion

Blood loss that necessitates admission into Acute Observation Unit (AOU):

- Frequency of observations as directed by the Obstetric team
- Fluid balance – hourly urine output
- Oxygen saturations
- Further investigations as directed by Obstetric team

Refer to Appendix B for directions on removal of uterine tamponade balloon.

Refer to Obstetric Intravenous Iron Infusion Prescription (Ref.2402506).

REFERENCES

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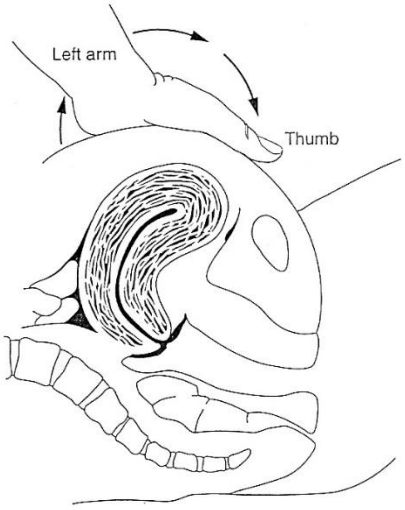
2. Thorogood C and Hendy S, 2006, *Life-Threatening Emergencies*, Pariman S, Pincombe J, Thorogood C and Tracy S, Midwifery: Preparation for Practice, Elsevier: Marrickville
3. Jacobs A, 2010, *Causes and Treatment of Postpartum Haemorrhage*, Downloaded from UpToDate.com on 8/6/10

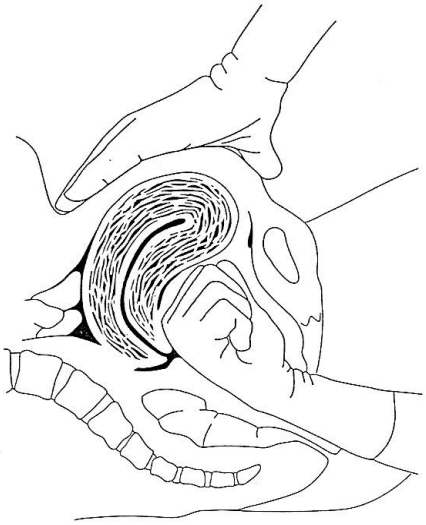
APPENDIX A TEMPORARY MEASURES TO CONTROL HAEMORRHAGE

UTERINE FUNDAL MASSAGE



The left hand is cupped over the uterus ( ) and massages it with a firm circular motion in a clockwise direction.

INTERNAL COMPRESSION BIMANUAL



COMPRESSION OF THE AORTA

Remember the bifurcation of the aorta is at the level of the sacral, promontory so press above this.

Above diagrams from; Boyle M. Emergencies Around childbirth. Chapter 10

APPENDIX B INTRAUTERINE (BAKRI) TAMPONADE BALLOON INSERTION METHOD

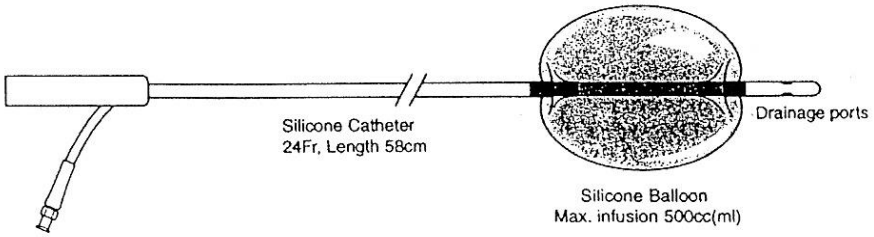
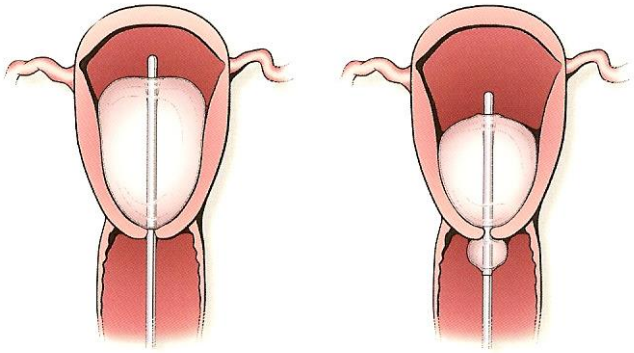


Fig. 1. Schematic drawing of tamponade balloon.

POST VAGINAL BIRTH

- Place woman in lithotomy (Lloyd Davis legs/yellow fins) and insert indwelling urinary catheter into bladder.
- Attach a urine collection bag to the tamponade balloon silicone catheter (to collect the draining blood).
- Attach a 3 way tap to the balloon inflation port.
- Feed the balloon up through the cervix (proximal end).
- Blow the balloon up with 250 to 500 mL normal saline, until tamponade is achieved (place fluid to be used in a separate container do not rely on syringe count).
- Check balloon is correctly sited completely through internal os by digital palpation and/or ultrasound scan. See diagram below (from Cook/ Obex product info).



Proper Placement Improper Placement

- Place a vaginal pack/s using a speculum. Most clinicians use firm vaginal packs tied together placed into the vagina to prevent the balloon passing out particularly if placed under tension. Up to 2-3 packs may be required.
- Attach a weight (500 mL normal saline) to the distal end of the balloon catheter shaft or alternatively tape it to patient's legs to provide counter traction and put pressure on the lower segment.
- Check for success. Move to other surgical options if unsuccessful. Discuss with team.
- Document volume of normal saline in balloon, number of vaginal packs in situ and plan for removal of Bakri and packs if used.

POST CAESAREAN BIRTH

This technique is most useful for bleeding from the lower segment, ie. placenta praevia.

- Place in frog leg position or lithotomy with Lloyd Davis legs (yellow fins).
- Feed the distal end of the balloon catheter down through the cervix to an assistant who pulls it through from below. Assistant attaches urine collection bag to balloon catheter and 3 way tap to inflation port.
- If using in conjunction with a B-Lynch suture. Place the B Lynch suture at this point
- Close the uterus (Bakri recommends to complete the Caesarean Section then you would need to reopen if not successful).
- Place a vaginal pack/s using a speculum. Most clinicians use firm vaginal packs tied together placed into the vagina to prevent the balloon passing out particularly if placed under tension. Up to 2-3 packs may be required.
- Inflate the balloon with 250 to 500 mL normal saline.
- Attach a weight (500 mL normal saline) to the distal end of the balloon catheter shaft or alternatively tape it to patient's legs to provide counter traction to put pressure on the lower segment.
- Check for success. Move to other surgical options if unsuccessful. Discuss with team.
- Document volume of normal saline in balloon, number of vaginal packs in situ and plan for removal of Bakri and packs if used.

REMOVAL

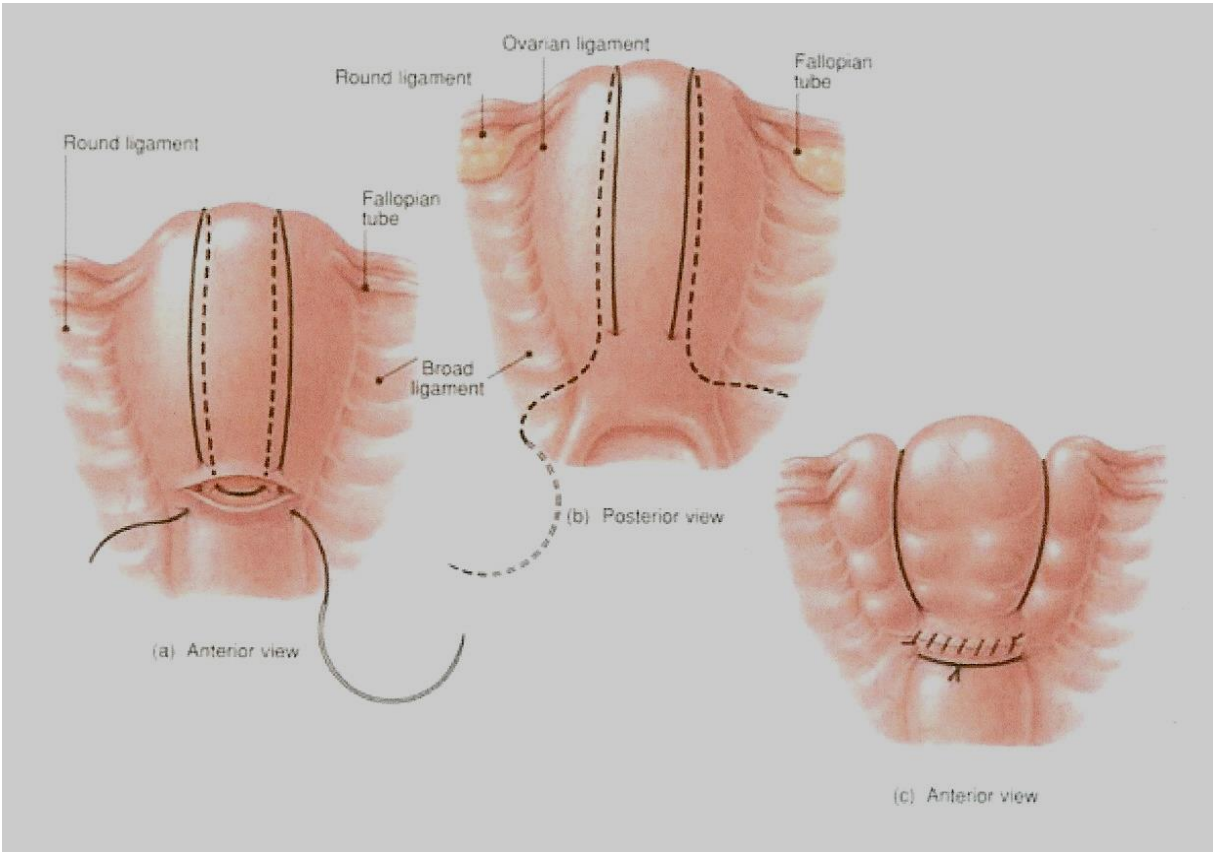
- In the majority of cases 4-6 hours of tamponade should be adequate to achieve haemostasis. Maximum recommended treatment time is 24 hours.
- Ideally remove during the daylight hours in the presence of appropriate senior staff.
- Deflate balloon. Often this is done incrementally with half of the total volume removed initially, observation for any increased bleeding into the bag then removal of remaining saline. If bleeding occurs reinstallation of fluid after medical review may be considered.
- Before removal, the balloon should be deflated but left in place for 1-2 hours to ensure bleeding does not reoccur.
- At time of removal , first remove vaginal packs by gentle vaginal exam to grasp tail (this may be protruding from introitus)
- Gently pull pack/s out (this may be a little uncomfortable for the woman).
- Gently pull on tubing to remove deflated balloon from uterus and out of vagina.
- Document removal and number of packs removed and check this correlates with the number of packs recorded as in situ.

Appendix B references

1. Int J Gyn Obs. Bakri et al. Tamponade –balloon for obstetrical bleeding. vol 74(2001) 139-142.
2. SOS Bakri Tamponade Balloon. Cook/ Obex. Product information

APPENDIX C METHOD FOR B LYNCH UTERINE COMPRESSION/BRACE SUTURE

- Use the suture from the box labelled 'B – Lynch/ PPH' available from store room between CS theatres (large blunt curved round bodied hand held needle with extra-long vicryl suture. (Johnson and Johnson W9391)
- Please refer to diagrams and note the following points:
  1. Start 3 cm below and medial to the right incision angle.
  2. Get your assistant to compress the uterus as much as possible during the procedure.
  3. Tighten the suture as you go, ie. when the first half of the pair of braces is placed tighten at this point and get your assistant to hold it tight.
  4. The suture goes through the full thickness of the myometrium posteriorly.
  5. Compress the uterus further by tightening the suture more when you tie it.



Diagrams from original article by, Christopher B – Lynch et al. The B-Lynch Surgical Technique for the control of Massive Postpartum haemorrhage. BJOG March 1997, Vol. 104, pp 372-375.

METHOD FOR BRACE SUTURE POST VAGINAL BIRTH

B- Lynch recommends opening and evacuating the uterus as for Caesarean, however an alternative is shown below without opening the uterus which may be appropriate if a thorough EUA has been performed from below.

As the uterus has not been opened modification of technique is required as shown in diagram below; the brace sutures are placed separately through the full thickness of the uterus and tied at the fundus on each side. Further compression sutures can be placed in the lower segment.

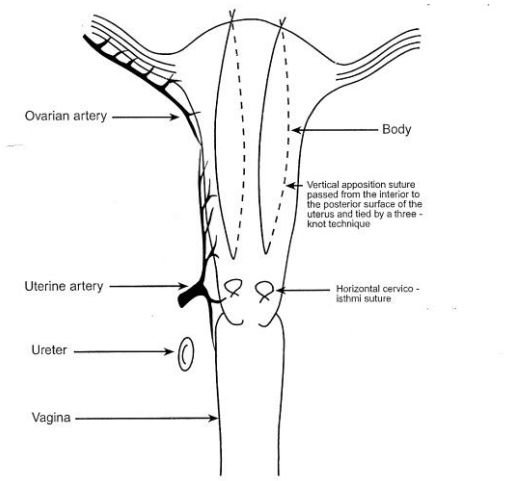


Figure 2. Cervical–isthmic horizontal apposition suture compressing the cervical portion of the placental bed together with a modified brace suture compressing the upper segment of the uterus. —— = suture anterior to uterus; – – – = suture posterior to uterus.

Diagram from Tamizian O, Arulkumaran S, The surgical management of postpartum haemorrhage. Best Practice and Research clinical O&G Vol. 16, No. 1, pp81-98. 2002.

APPENDIX D OTHER UTERINE COMPRESSION SUTURES

Other surgical techniques to appose the uterine walls are shown below.

LOWER SEGMENT VERTICAL COMPRESSION SUTURES

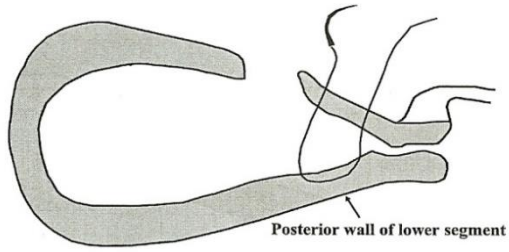


Fig. 2. The suture is pulled from back to front through the uterine cavity and anterior wall of the lower segment.

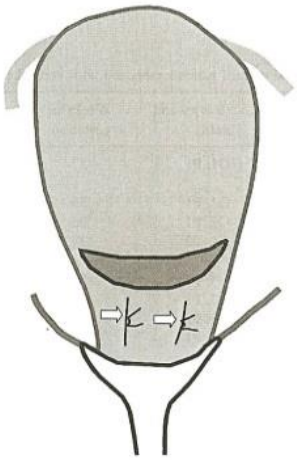


Fig. 3. Front view of the anterior lower segment after the knots (white arrow) are tied.

Above diagrams from: HWU et al, Parallel vertical compression sutures: a technique to control bleeding from placenta praevia or accreta during caesarean section. BJOG Oct 2005, Vol. 112, pp 1420-1423.

MULTIPLE SQUARE SUTURE METHOD

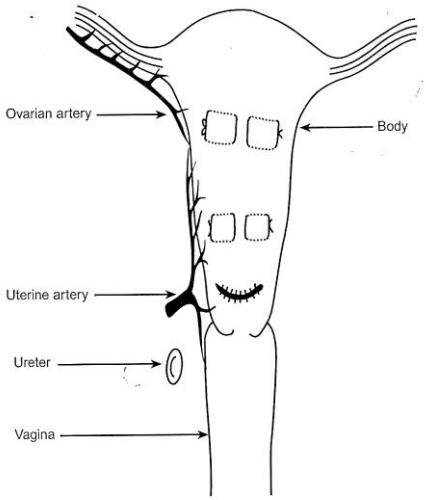


Figure 3. Haemostatic multiple square suture method. —— = suture anterior to uterus; – – – = suture posterior to uterus.

Above diagram from: Tamizian O, Arulkumaran S, The surgical management of postpartum haemorrhage. Best Practice and Research clinical O&G Vol. 16, No. 1, pp81-98. 2002.

APPENDIX E METHODS OF ARTERY LIGATION

UTERINE ARTERY LIGATION

This technique can be used by an Obstetrician familiar with uterine artery ligation during total abdominal hysterectomy, location as shown below. In view of the large collateral supply this procedure preserves the uterus. Ligation of the Utero ovarian anastamoses can also be attempted.

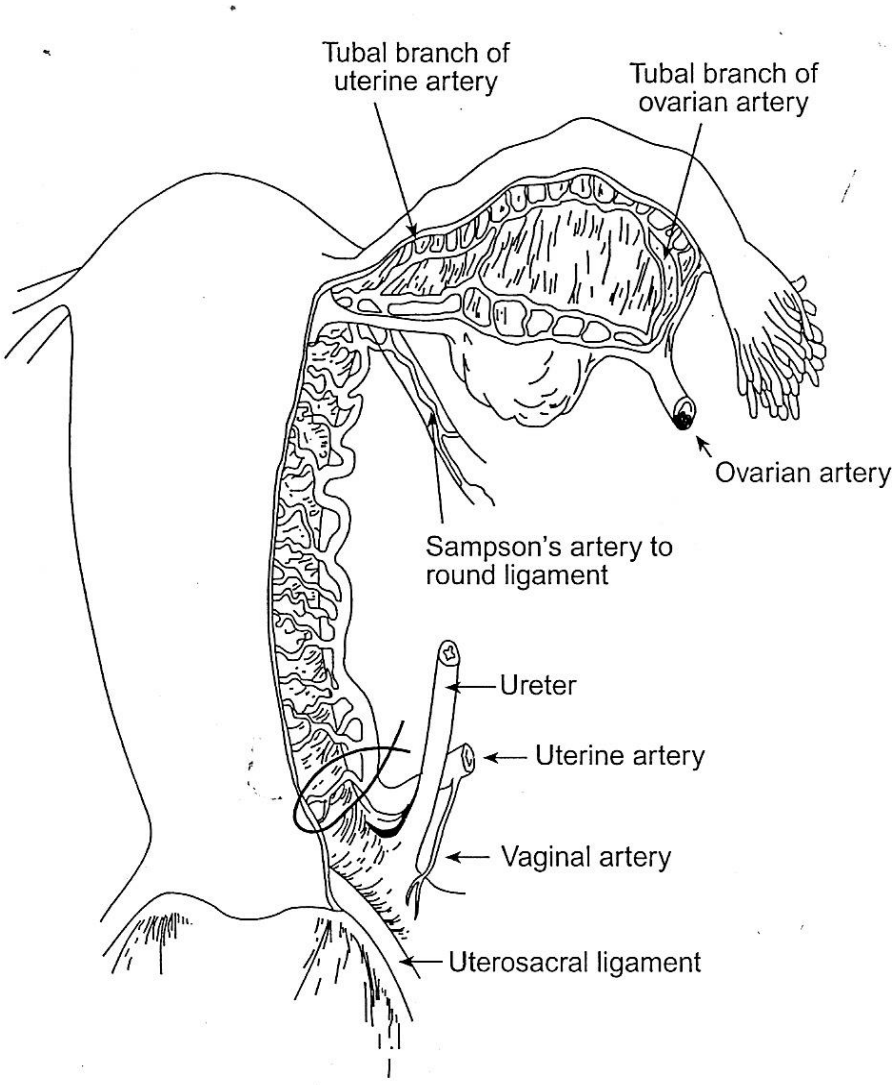


Figure 4. Uterine artery ligation.

Diagram from: Tamizian O, Arulkumaran S, The surgical management of postpartum haemorrhage. Best Practice and Research clinical O&G Vol. 16, No. 1, pp81-98. 2002.

INTERNAL ILIAC ARTERY LIGATION

NB; this should only be attempted by a surgeon skilled in this technique, eg. Gynae Oncologist, Vascular Surgeon. See diagram

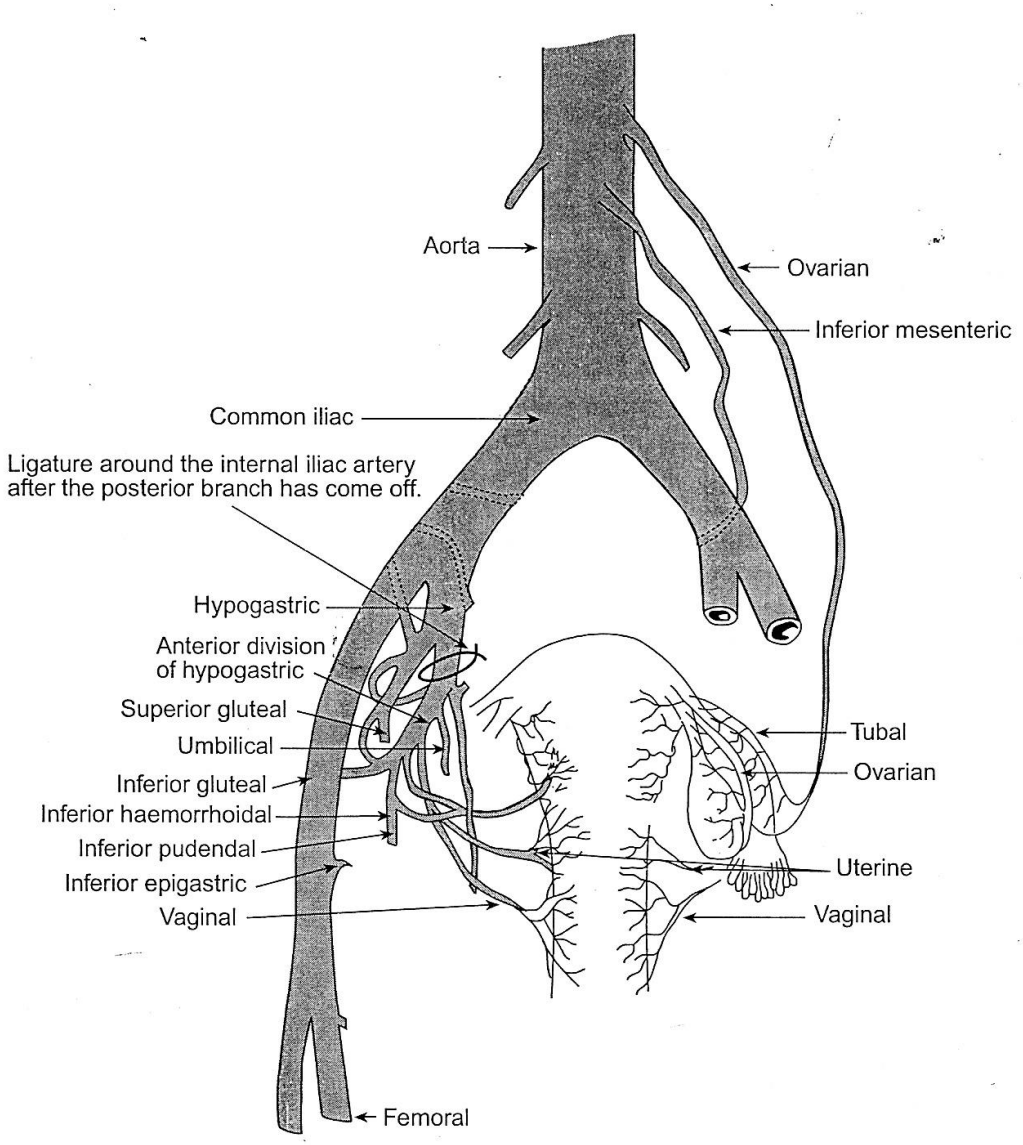


Figure 6. Internal iliac vessel ligation.

Diagram from: Tamizian O, Arulkumaran S. The surgical management of postpartum haemorrhage. Best Practice and Research clinical O&G Vol. 16, No. 1, pp81-98. 2002.

APPENDIX F TRANEXAMIC ACID FOR THE MANAGEMENT OF PPH

Tranexamic acid is an antifibrinolytic drug that reduces bleeding by inhibiting the enzymatic breakdown of fibrinogen and fibrin by plasmin.[1] Early activation of fibrinolysis is common after trauma and is associated with increased mortality.[2] Trauma triggers the release of tissue plasminogen activator, the enzyme that converts plasminogen to the fibrinolytic enzyme plasmin.[3,4]

Findings of a systematic review of clinical trials of tranexamic acid in surgery showed that the drug reduces blood loss by about 30%.[5,6] The CRASH-2 trial, which studied the use of tranexamic acid in management of haemorrhage in trauma patients[7] showed that tranexamic acid reduced death due to bleeding, with no apparent increase in vascular occlusive events. In addition, planned subgroup analysis of the effect of tranexamic acid in relation to time from injury to the start of treatment showed that early treatment is essential.[8] In patients given treatment within 3 hours of injury, tranexamic acid reduced death due to bleeding by nearly one third. However, when given after 3 hours there was no benefit.[8] Early activation of fibrinolysis is also recorded after childbirth. Within 1 hour of giving birth, the serum concentration of tissue plasminogen activator doubles, possibly because of tissue damage during childbirth;[9] thereafter, the concentration falls.[9] Since 2012, on the basis of clinical trials of tranexamic acid in surgery and trauma, WHO guidelines have recommended the use of tranexamic acid in post-partum haemorrhage if uterotonics fail to stop the bleeding or if it is thought that the bleeding may be due to trauma.[10]

The results of the WOMAN trial published in April 2017[10] further support this recommendation. This large (n = 20060), multi-national, randomised, controlled trial studied the effect of giving a 1 g infusion of tranexamic acid in addition to usual care to women aged > 16 years who experienced postpartum haemorrhage. Results of this trial suggest that tranexamic acid significantly reduces the risk of death or need for laparotomy due to bleeding with no evidence in any increase in risk of thromboembolic events. Trial results also suggested that if tranexamic acid is used in the treatment of postpartum haemorrhage it should be given as soon as possible after the onset of post-partum haemorrhage alongside uterotonics.[10] A significant proportion of mothers die within hours of postpartum haemorrhage onset.[11] In such circumstances, waiting to see if uterotonics fail to stop the bleeding before commencing tranexamic acid could put some mothers' lives at risk.

Appendix F references

1. Electronic Medicines Compendium. Summary of Product Characteristics: Tranexamic acid. http://www.medicines.org.uk/ emc/medicine/1489 (accessed March 3, 2017). 7 Ker K, Edwards P, Perel P, Shakur H, Roberts I.
2. Sawamura A, Hayakawa M, Gando S, et al. Disseminated intravascular coagulation with a fibrinolytic phenotype at an early phase of trauma predicts mortality. Thromb Res 2009; 124: 608–13.
3. Chapman MP, Moore EE, Moore HB, et al. Overwhelming tPA release, not PAI-1 degradation, is responsible for hyperfibrinolysis in severely injured trauma patients. J Trauma Acute Care Surg 2016; 80: 16–23.
4. Wu X, Darlington DN, Cap AP. Procoagulant and fibrinolytic activity after polytrauma in rat. Am J Physiol Regul Integr Comp Physiol 2016; 310: R323–29.
5. Effect of tranexamic acid on surgical bleeding: systematic review and cumulative meta-analysis. BMJ 2012; 344: e3054 8 Ker K, Prieto-Merino D, Roberts I.
6. Systematic review, meta-analysis and meta-regression of the effect of tranexamic acid on surgical blood loss. Br J Surg 2013; 100: 1271–79.

7. CRASH-2 Collaborators. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. Lancet 2010; 376: 23–32 10 CRASH-2 Collaborators.
8. The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial. Lancet 2011; 377: 1096–101
9. Kruithof EK, Tran-Thang C, Gudinchet A, et al. Fibrinolysis in pregnancy: a study of plasminogen activator inhibitors. Blood 1987; 69: 460–66.
10. Haleema Shakurlan Roberts Bukola Fawole, http://www.sciencedirect.com/science/article/pii/S0140673617306384?via%3Dihub%20-%20! Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. The Lancet Volume 389, Issue 10084, 27 May–2 June 2017, Pages 2105-2116
11. http://www.who.int/maternal_child_adolescent/documents/newsletter/mps_newsletter_issue4.pdf

APPENDIX G POSTPARTUM HAEMORRHAGE CHECKLIST

Postpartum Haemorrhage Checklist (Ref.2403626)

Te Whatu Ora
Health New Zealand
Waitaha Canterbury
MATERNITY SERVICES

NHI ..... WARD .....
SURNAME .....
FIRST NAME .....
GENDER ..... DOB ..... AGE .....
(or affix patient label)

DOCUMENTATION/ CHECKLIST FOR OBSTETRIC EMERGENCY **OBSTETRIC EMERGENCY: 777**

Postpartum Haemorrhage

Date	Time of birth	Time of emergency call	Time placenta delivered
...../...../.....	.....	.....	.....

NAMES OF STAFF IN ATTENDANCE	Time	Designation

ACTIONS *(may need to be repeated)*	Time	Comments
Rub up uterine contraction/expel clots		
Intravenous access 1st line		
Intravenous access 2nd line		
Bloods: CBC, cross match, coagulation		
Vital signs – recorded on MEWS		
Urinary catheter		
Recheck placenta – appears complete		☐ Yes ☐ No
Check trauma		
Facial oxygen, *if appropriate*		
Bimanual compression, *if appropriate*		
Other comments:		

DRUGS (to be reconciled on MedChart)	Time	Dose and Route
Oxytocin: 10iu IM or 5iu IV (stat dose – see below for infusion)		
Syntometrine: 1 vial (1 ml) IM		
Carboprost: 250 micrograms IM		
Misoprostol: 800 micrograms PR (once only)		
Tranexamic acid: 1 gram (10 mLs) *either* in syringe: slow push 10 minutes *or* via pump: in 100mLs 0.9% normal saline @ 600 mL/hr		
Other *(specify)*		

IV FLUIDS	Time	Volume
0.9% Sodium Chloride/Hartmanns		..... mLs Bag no.: .....
40 international units Oxytocin in 500 mLs 0.9% Sodium Chloride – 125 mLs/hr		
Other *(specify)*		

Time of decision to go to operating theatre: .....
Time massive transfusion protocol activated: .....
Time of transfer to theatre: .....

Total estimated blood loss: *(prior to theatre)*
.....mLs

Person completing form: Name: ..... Date: ...../...../.....
Signature: ..... Time: .....

Ref.2403626 Approved by: Executive Director of Maternity & Midwifery Page 1 of 2 Version 11 September 2023

POSTPARTUM HAEMORRHAGE C280123

NHI ..... WARD .....
SURNAME .....
FIRST NAME .....
DOB ..... AGE .....
(or affix patient label)

Postpartum Haemorrhage

Actual blood loss calculation *(include all swabs, etc. from birthing room and theatre)*

Item	Tally	Total number used	Singular item DRY weight (gms)	Total DRY weight (Total number used x singular weight)
Small greenie			25	
Large greenie			65	
TouchDry			210	
Sanitary Pad			15	
Large swab/sponge			10	
Vaginal pack			20	
Sterile green sheet			130	
Pillowcase			150	
Towel			320	
Draw sheet			350	
Gown			400	
Sheet			550	
Shock blanket ('Cuddly')			760	
Other (.....)				
Total DRY weight (gms)				

WET bag no.	Weight (gms)
1	
2	
3	
Total (gms)	

Suction	Blood loss (mLs)
1	
2	
3	
Total (mLs)	

Total WET weight (gms)	
Less total DRY weight (gms)	-
	=
Plus suction blood loss (mLs)	+
Equals total blood loss (mLs)	=

PLEASE NOTE
ONE MILLILITRE OF WATER HAS A MASS OF ONE GRAM

Follow up		
Explanation to parents	By:	
	Comments:	
Safety 1st	☐ Yes ☐ No	
Debrief for team arranged?	☐ Yes ☐ No	Debrief date: ...../...../.....

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