

# POSTPARTUM HAEMORRHAGE (PPH)

Severe bleeding after giving birth, known as PPH, is the biggest single cause of mothers dying after childbirth



**20,000** WOMEN  
**21** COUNTRIES  
**193** HOSPITALS

# 14m

mothers develop PPH each year globally



An estimated

# 100,000

women died from PPH in 2015

# 99%

of these deaths were in developing countries



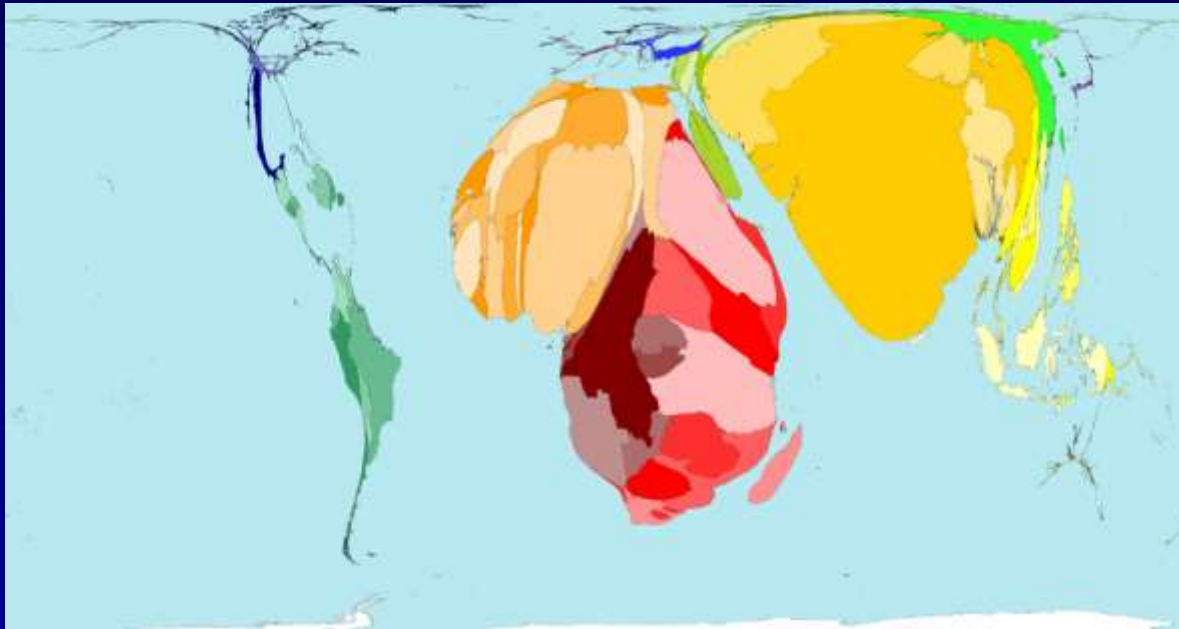
PPH can also lead to  
**hysterectomy** and  
**severe anaemia**



Find out more at  
**[bit.ly/womanvideo](http://bit.ly/womanvideo)**

Source: The WOMAN trial (2017)  
Credit: Rebecca Robinson/LSHTM

# Most deaths due to PPH are preventable



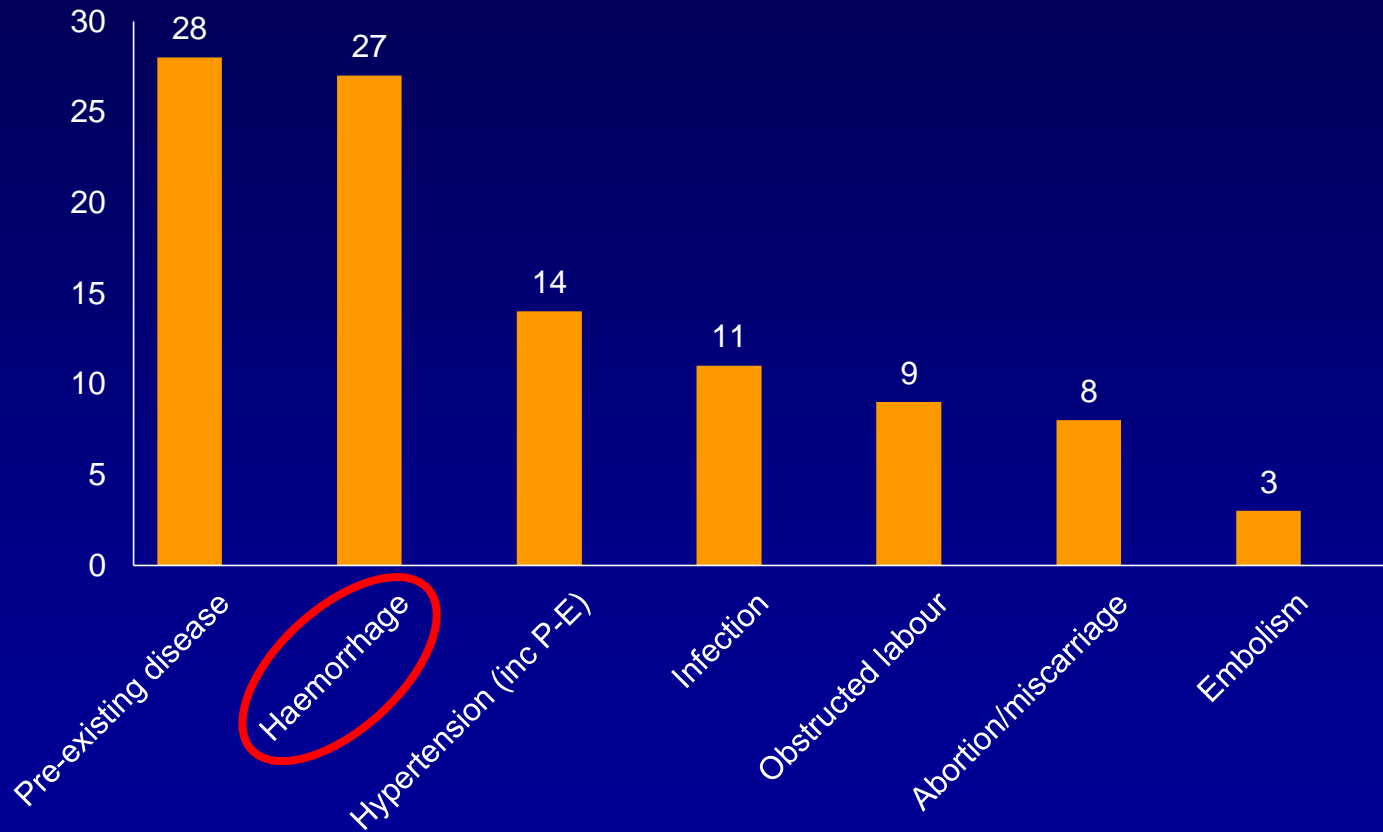
Relative territory size shows the proportion of maternal deaths during or within 6 weeks of pregnancy

<http://www.worldmapper.org>

Clark SL, Belfort MA, Dildy GA, Herbst MA, Meyers JA, Hankins GD. Maternal death in the 21st century: causes, prevention, and relationship to cesarean delivery. Am J Obstet Gynecol 2008 ;199(1):36.e1-5;

# Major global causes of maternal death

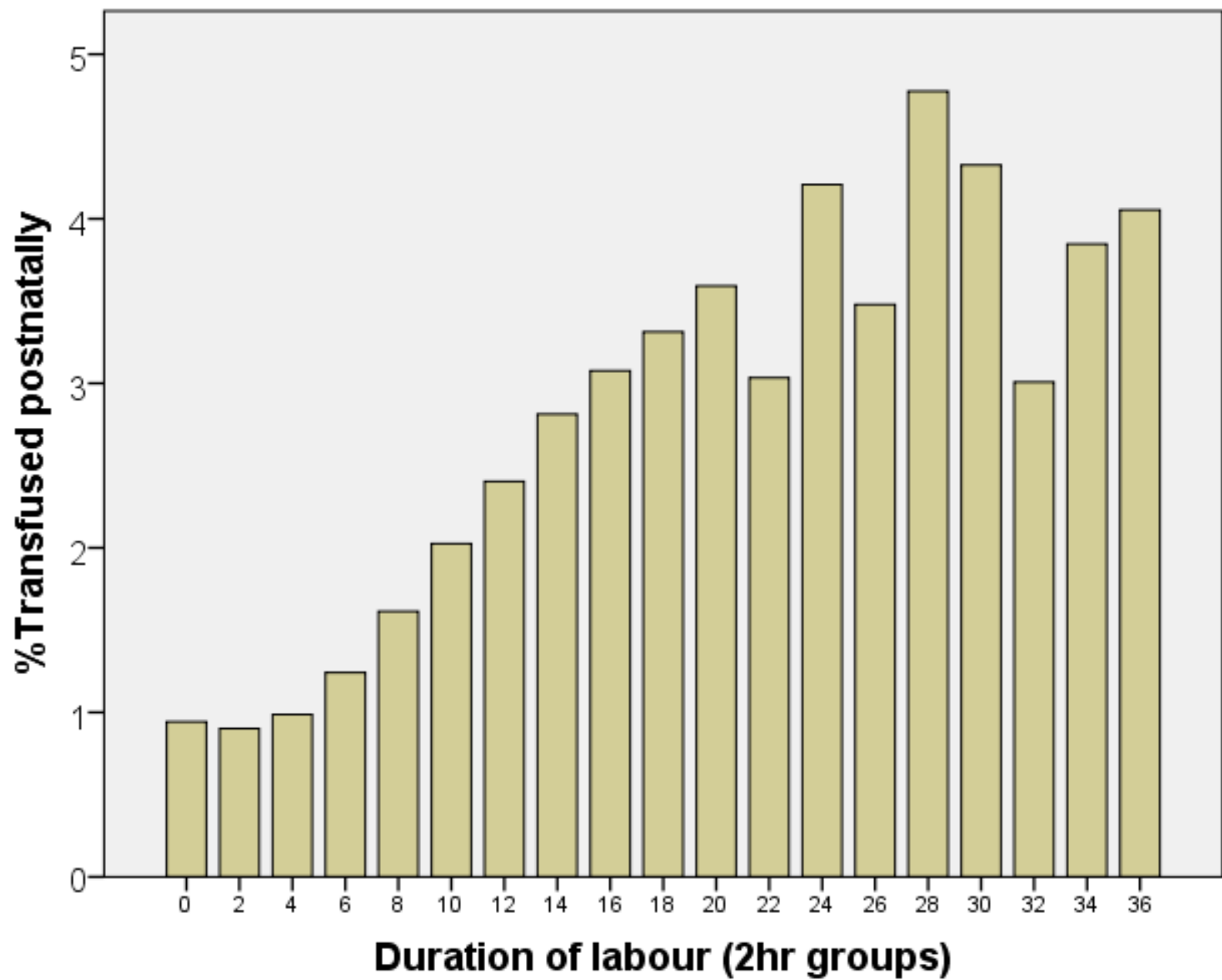
percent of deaths due to:

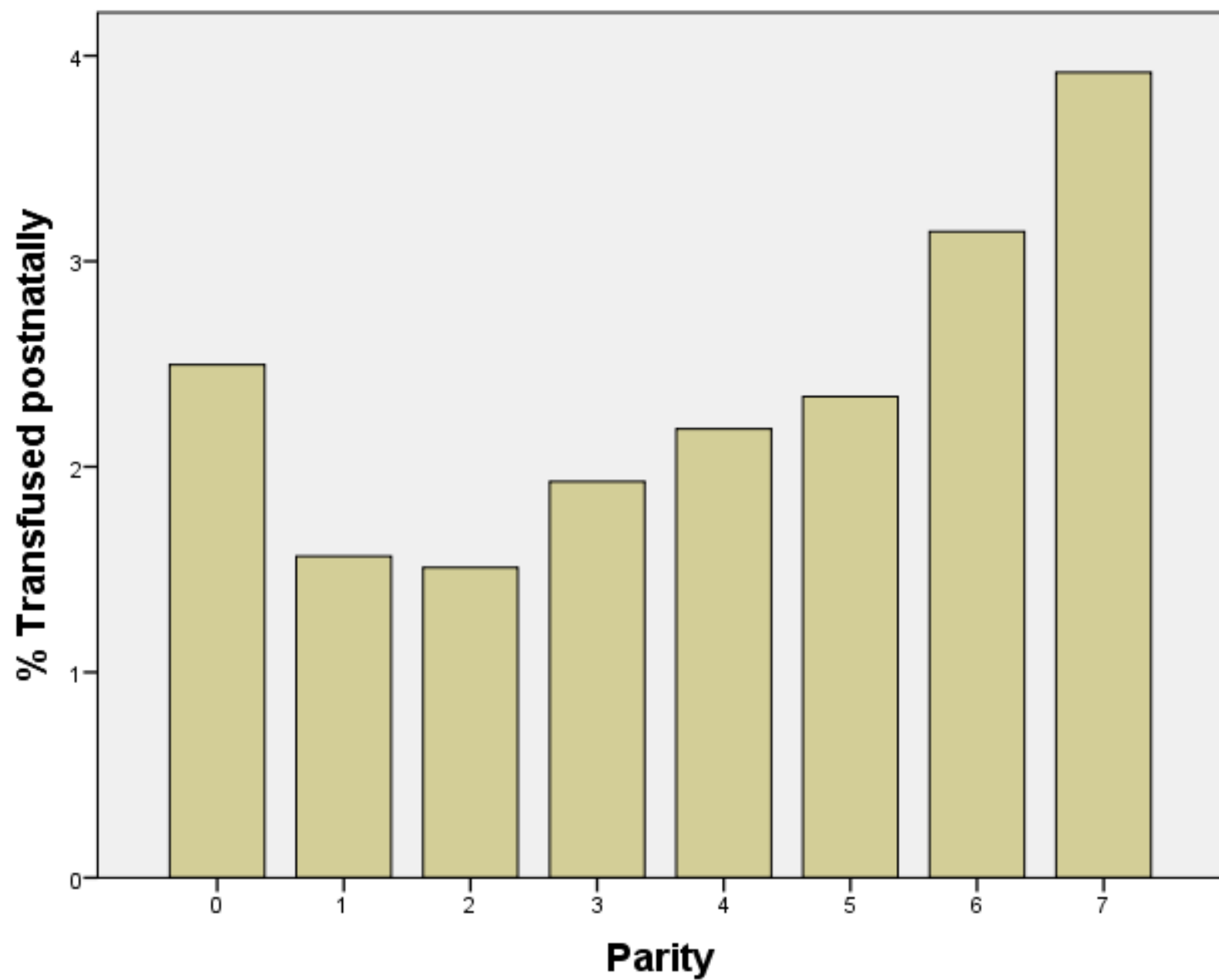


Say L et al Lancet Global Health 2014, 2, e323-333

# Contributors to maternal death from PPH

- poverty
- distance
- lack of information
- inadequate services
- cultural practices





# Active management of the third stage

- Seven studies (8247 women), 6 in high-income countries
- Active management reduced the average risk of maternal primary haemorrhage (more than 1000 ml)
- Risk ratio (RR) 0.34, 95% confidence interval (CI) 0.14 to 0.87, three studies, 4636 women
- Hypertension and interference with placental transfusion might be avoided by using modifications e.g. omitting ergot and deferring cord clamping

Begley et al Cochrane Database Syst Rev. 2011 Nov 9;(11):CD007412.  
doi: 10.1002/14651858.CD007412.pub3

# Active management of the third stage – PPH rates

- Prendiville 1988 – 5.9% vs 18.0%
- Begley 1990 - 2% vs 8%
- Rogers 1998 – 6.8% vs 16.5%

Prendiville WJ, et al. BMJ 1988; 297:1295-1300.

Begley CM. Midwifery 1990; 6(1):3-17.

Rogers J, et al. Lancet 1998; 351(9104):693-699.

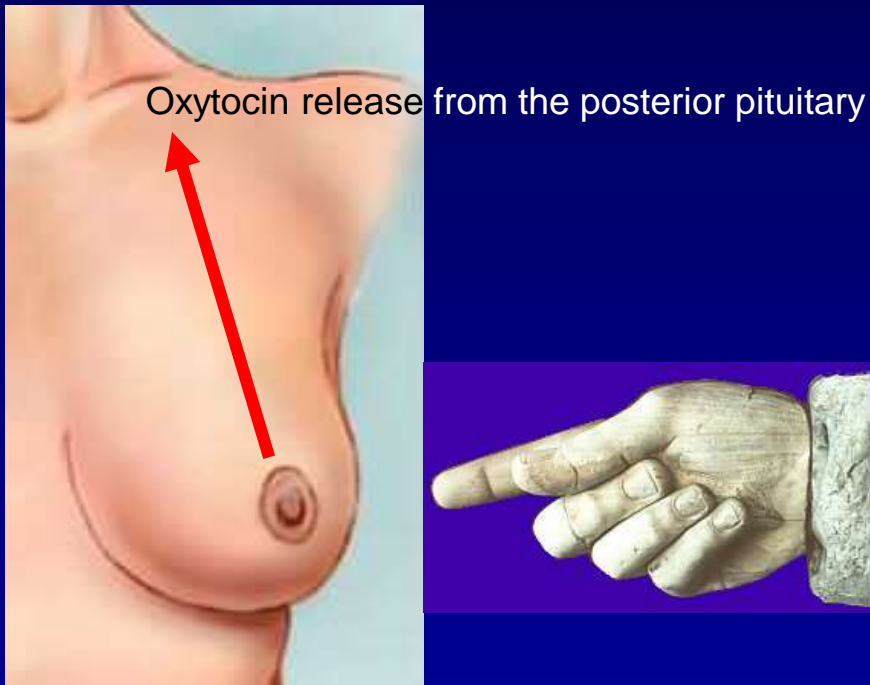
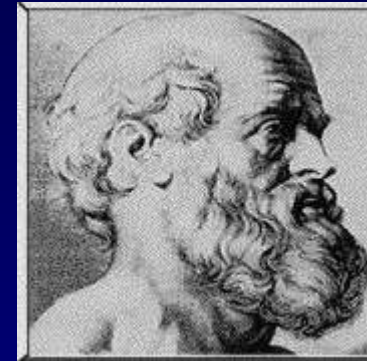


# Uterotonics

- Syntocinon
- Ergometrine
- Syntometrine
- Misoprostol (oral, vaginal, rectal)
- *15-methyl prostaglandin F2 alpha*  
(carboprost/hemabate)
- Carbetocin

# HIPPOCRATES

## 5C BCE



Trial protocol: Abedi P, at al Nipple stimulation or breastfeeding for preventing postpartum haemorrhage in the third stage of labour.  
Cochrane Database of Systematic Reviews 2013, Issue 11. Art. No.: CD010845.  
DOI: 10.1002/14651858. CD010845.

# Sir Henry Dale

- Cat model, balloon catheters in bladder, bowel and uterus
- Injected posterior pituitary extract
- Noticed that it made the uterus contract



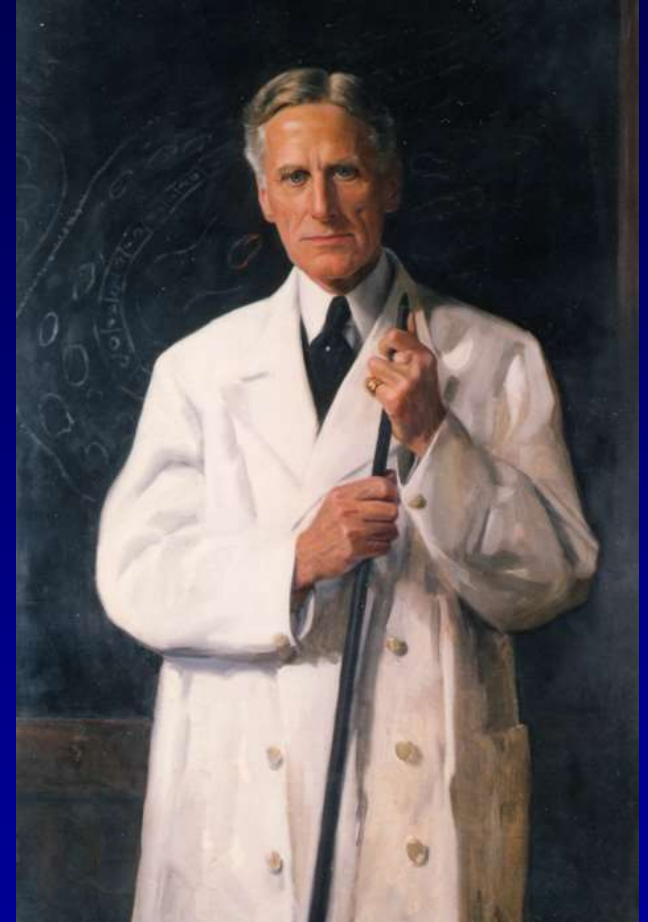
H. H. Dale.

On some physiological actions of ergot.

*J Physiol* 34:163-206, 1906.

# Sir William Blair-Bell

- Used extract of posterior pituitary to control postpartum haemorrhage



W. Blair Bell.

The pituitary body and the therapeutic value of the infundibular extract in shock, uterine atony, and intestinal paresis. *BMJ* 2:1609-1613, 1909.



# Oxytocin synthesised 1956 by Vincent du Vigneaud

- 1954 Journal of the American Chemical Society 76 (12): 3115–3118
- Awarded the Nobel Prize

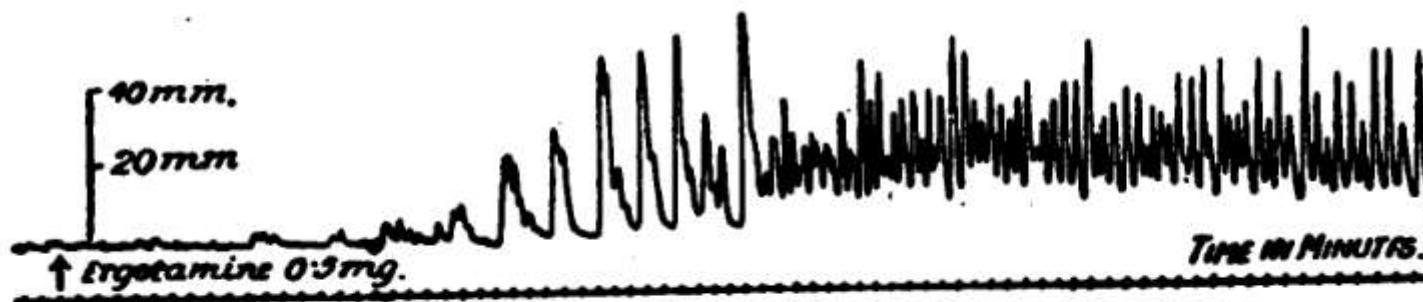
# ERGOT

- Symptoms of ergotism first clearly described in the middle ages (from 857 AD) – known as ‘Saint Anthony’s fire’
- Use in labour from 16<sup>th</sup> century
- 1906 Barger and Carr isolated ergotoxine
- 1918 Stoll discovered ergotamine
- 1935 Chassar Moir showed effect in puerperal uterus
- With H Dudley Ward FRS isolated ergometrine

Chassar Moir J, J Can Med Ass 1955, 72, 727-734



Ergotoxine 0.5 mg. by intramuscular injection.



Ergotamine 0.5 mg. by intramuscular injection.

**Fig. 6.**—Tracing from the human postpartum uterus showing the effect of ergotoxine and of ergotamine after intramuscular injection. Note the long delay in the onset of effect (20 minutes or more); when given by mouth the delay was in excess of two hours.



**Fig. 7.**—The effect of liquid extract of ergot (B.P. 1914) given by mouth to a puerperal woman. Note the suddenness of the action ( $4\frac{1}{2}$  minutes in this case).



# Misoprostol

- Analogue of prostaglandin E1
- Registered as 'Cytotec' from 1985
- Licensed for treatment of peptic ulcers
- Discovered by chance to 'bring on periods'
- By 1990, used in high proportion of clandestine abortions in Brazil

# Misoprostol

- Used in cases of intrauterine death
- Used to induce labour
- Used to reduce PPH in areas without effective cold storage
- In 78 RCTs including 59,216 women, NOT found to reduce maternal deaths or major morbidity

Weeks A and Faundes, IAJGO, 2007, 99, S156-159

Hofmyer GJ et al Cochrane Database of Systematic Reviews 2013,  
Issue 7. Art. No.: CD008982. DOI: 10.1002/14651858.CD008982.pub2.

# Misoprostol and pyrexia

- 78 studies (59,216 women)
- No difference in maternal mortality, even against placebo
- All 11 deaths with misoprostol were in studies of  $\geq 600 \mu\text{g}$
- Pyrexia  $>38^{\circ}\text{C}$  10.8% vs 2.3%
- “Given that misoprostol is used prophylactically in very large numbers of healthy women, the greatest emphasis should be placed on limiting adverse effects”

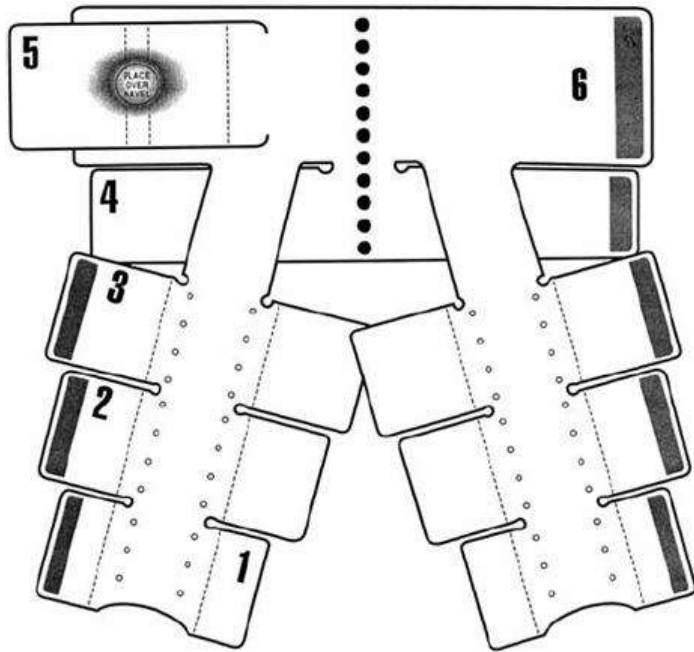
# Other agents to reduce bleeding

- Tranexamic acid
- Recombinant factor VIII
- Fibrinogen

# THE ATONIC UTERUS

- Anti-shock garment
- Bimanual compression
- Packing
- Balloons
- Compression sutures

# Non-pneumatic anti-shock garment reduces average blood loss by 50%



**Figure 1.** Schematic diagram of NASG. Reproduced with permission from Hensleigh PA. *BJOG* 2002;109:1377-84.<sup>3</sup>

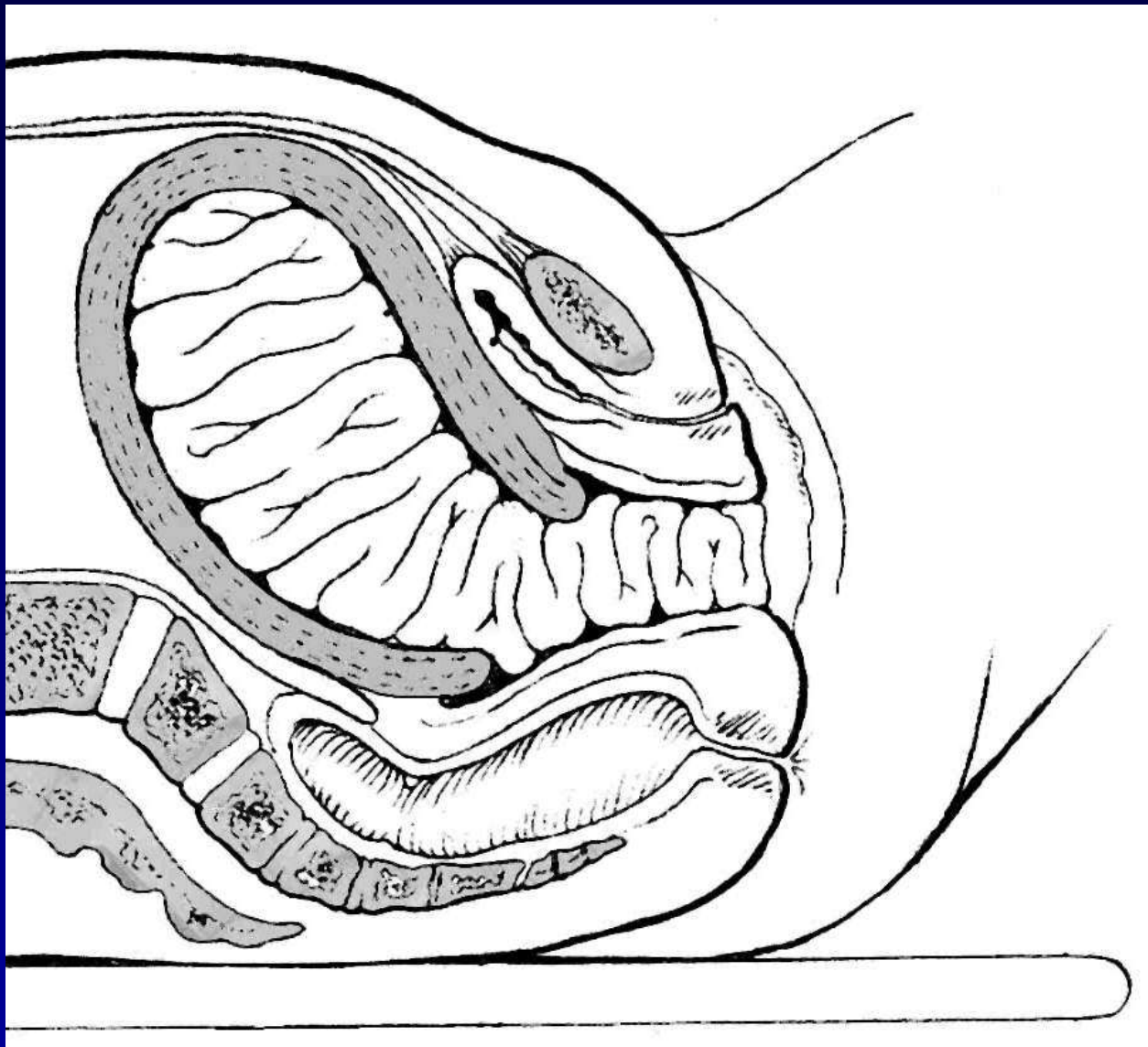


**Figure 2.** Patient in NASG.

S. Miller, S.*et al.* First aid for obstetric haemorrhage:  
the pilot study of the non-pneumatic anti-shock garment in Egypt.  
*BJOG*. 113 (4):424-429, 2006.



BIMANUAL COMPRESSION



## PACKING THE UTERUS

S. Hsu, B. Rodgers, A. Lele, and J. Yeh.  
Use of packing in obstetric hemorrhage of uterine origin.  
*J.Reprod.Med.* 48 (2):69-71, 2003.



# INTRAUTERINE BALLOON

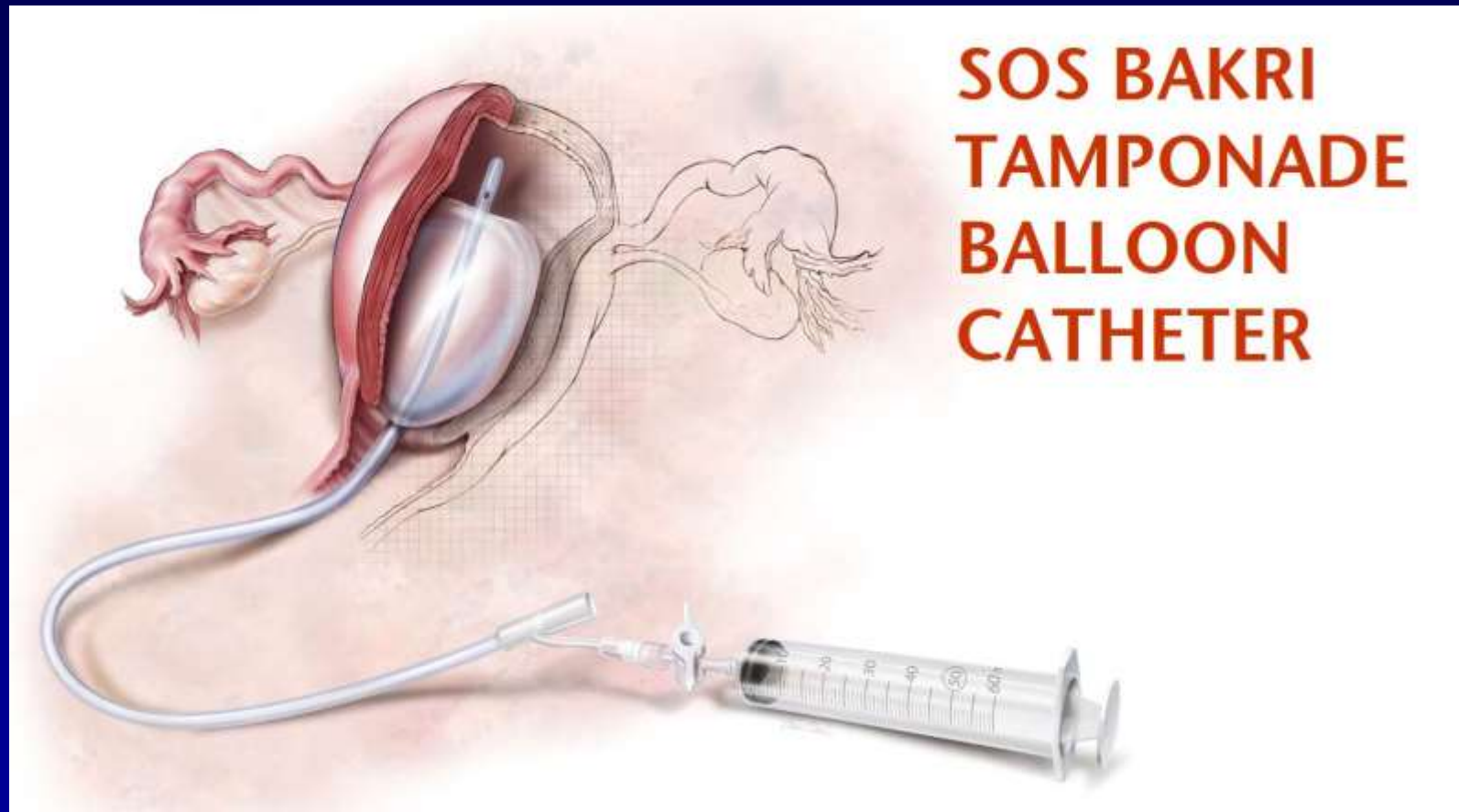
Management of massive postpartum haemorrhage: use of a hydrostatic balloon catheter to avoid laparotomy

R. Johanson, M. Kumar,  
M. Obhrai, and P. Young.  
*BJOG* 108 (4):420-422, 2001.

500 cc warm saline  
in-situ for 24 hours

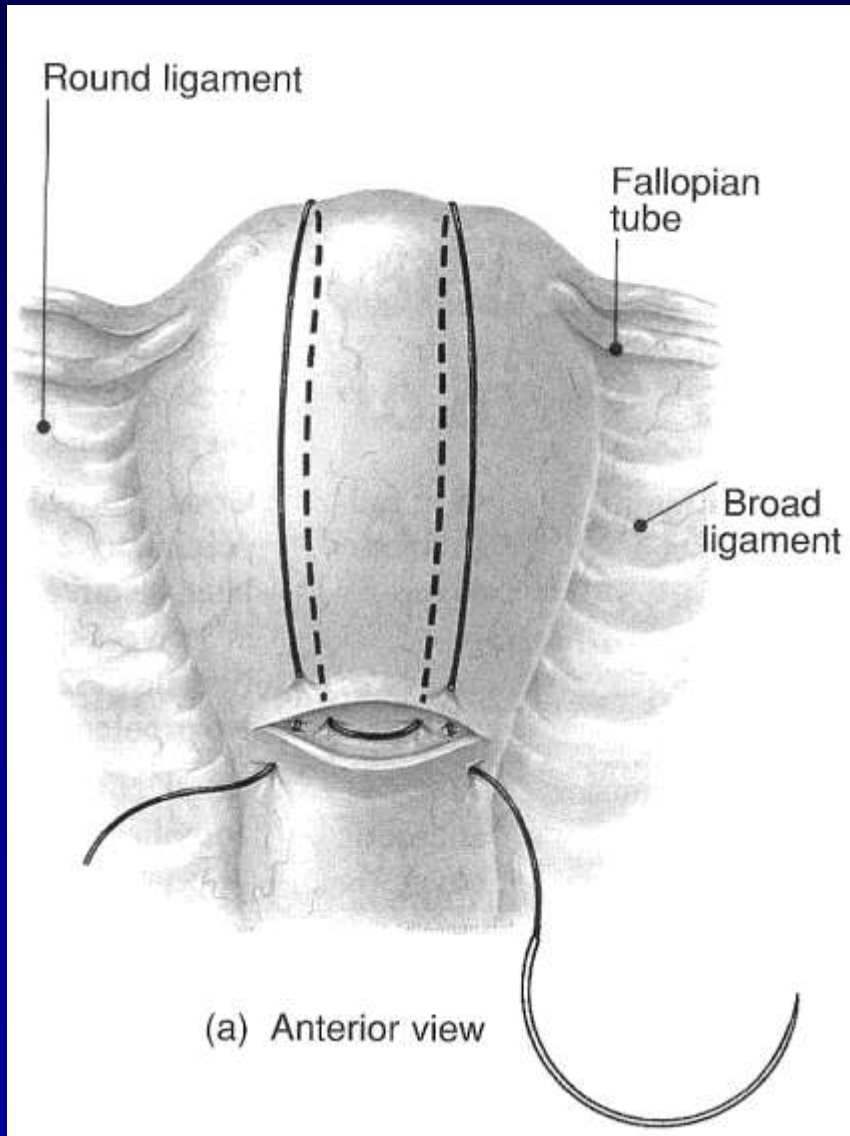


# INTRAUTERINE BALLOON



Y. N. Bakri, A. Amri, and Jabbar F. Abdul.  
Tamponade-balloon for obstetrical bleeding.  
*Int.J Gynaecol Obstet.* 74 (2):139-142, 2001.

# B-LYNCH SUTURE



C. B-Lynch, A. Coker, A. H. Lawal, J. Abu, and M. J. Cowen.

The B-Lynch surgical technique for the control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported.

Br J Obstet Gynaecol 104 (3):372-375, 1997.

# FURTHER MODIFICATIONS

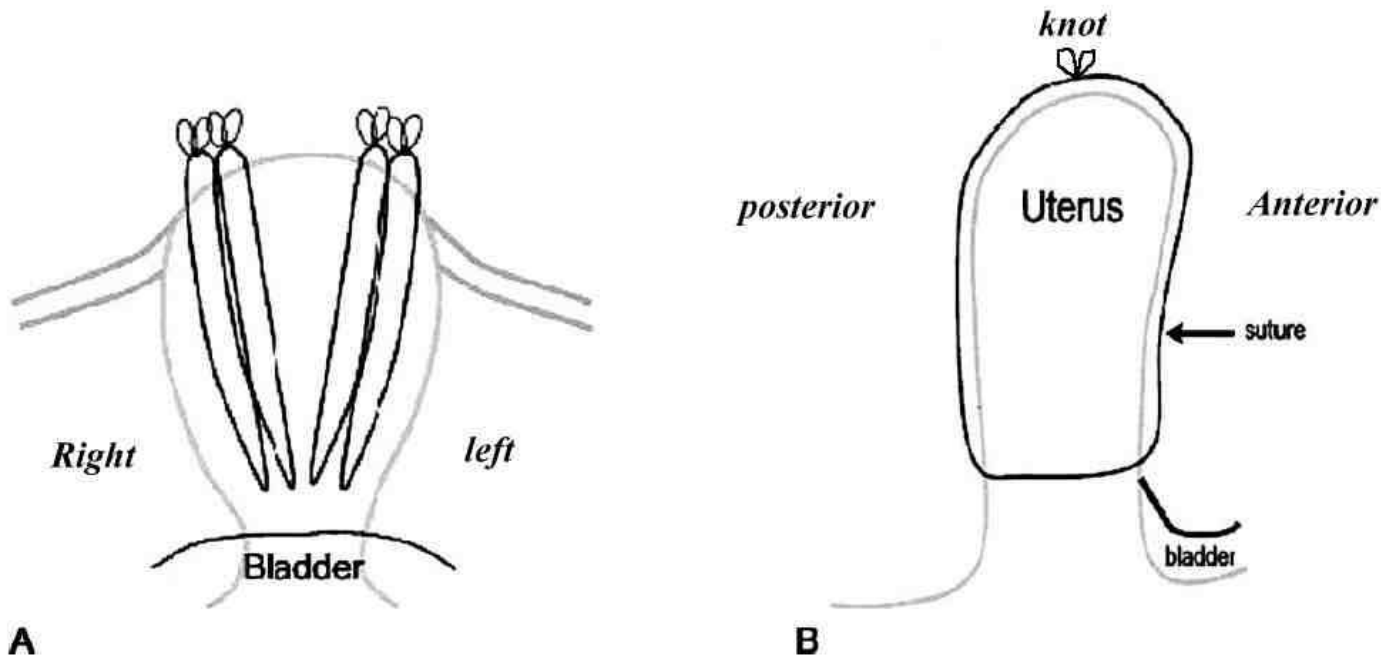
R. G. Hayman, S. Arulkumaran, and P. J. Steer.

Uterine compression sutures: surgical management of postpartum hemorrhage.

*Obstet Gynecol* 99 (3):502-506, 2002.

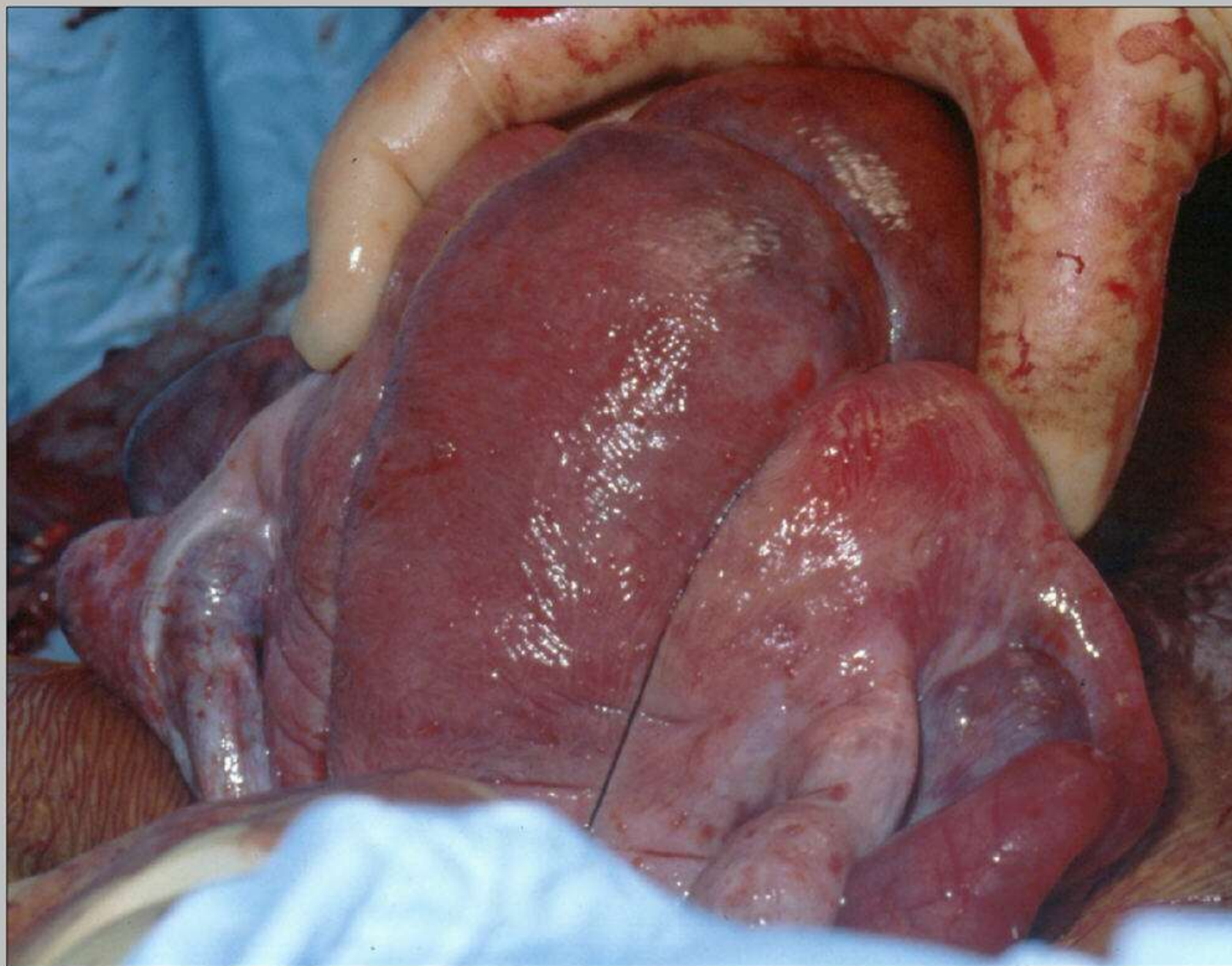
FRONT VIEW

SIDE VIEW



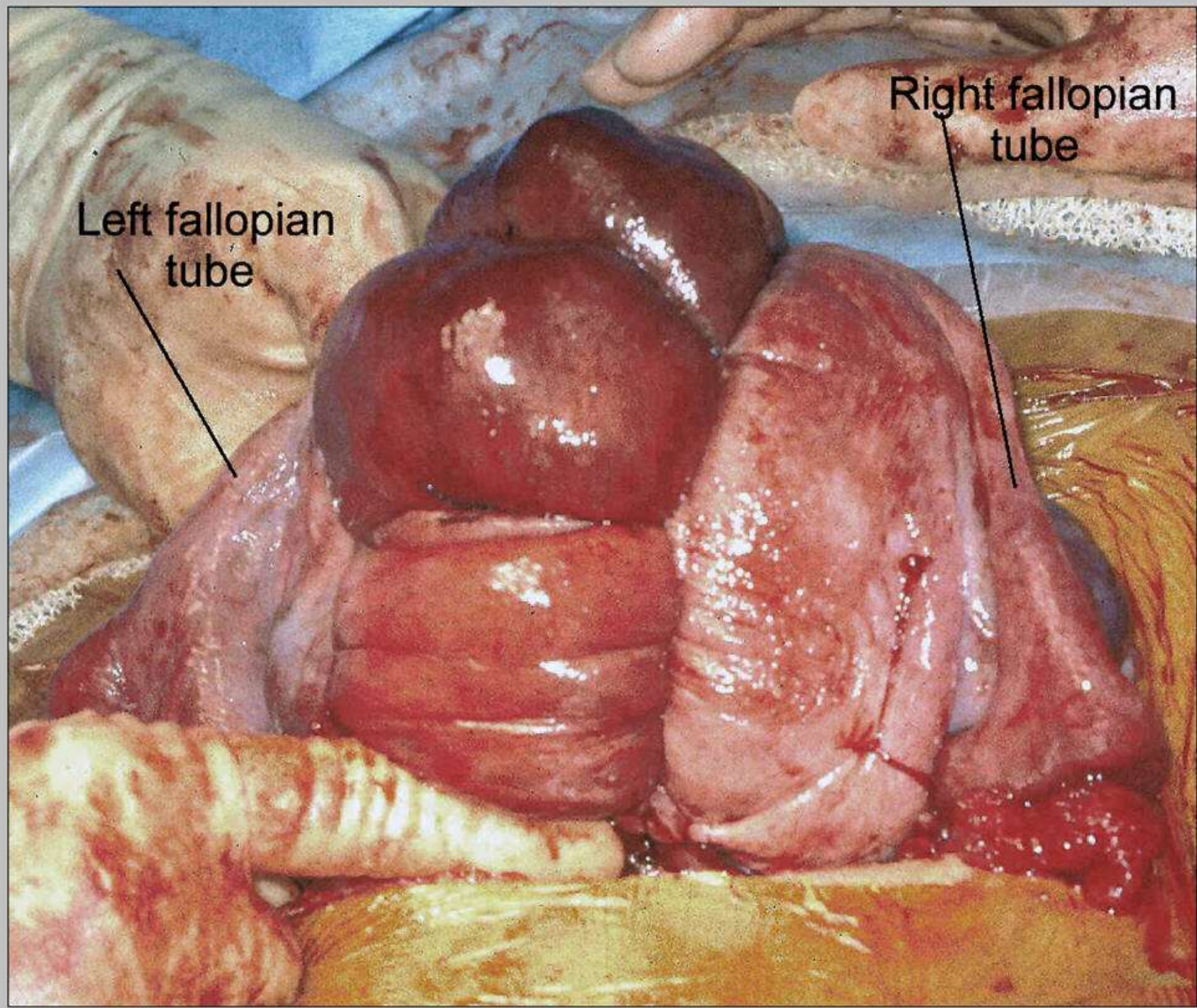
**Figure 2.** Insertion of four 1-vicryl sutures, passing the needle from front to back above the bladder reflection, in the line where a lower segment incision would have been made. The sutures were tied anteriorly. A) Anterior view. B) Lateral view.

*Hayman. Uterine Compression Sutures. Obstet Gynecol 2002.*



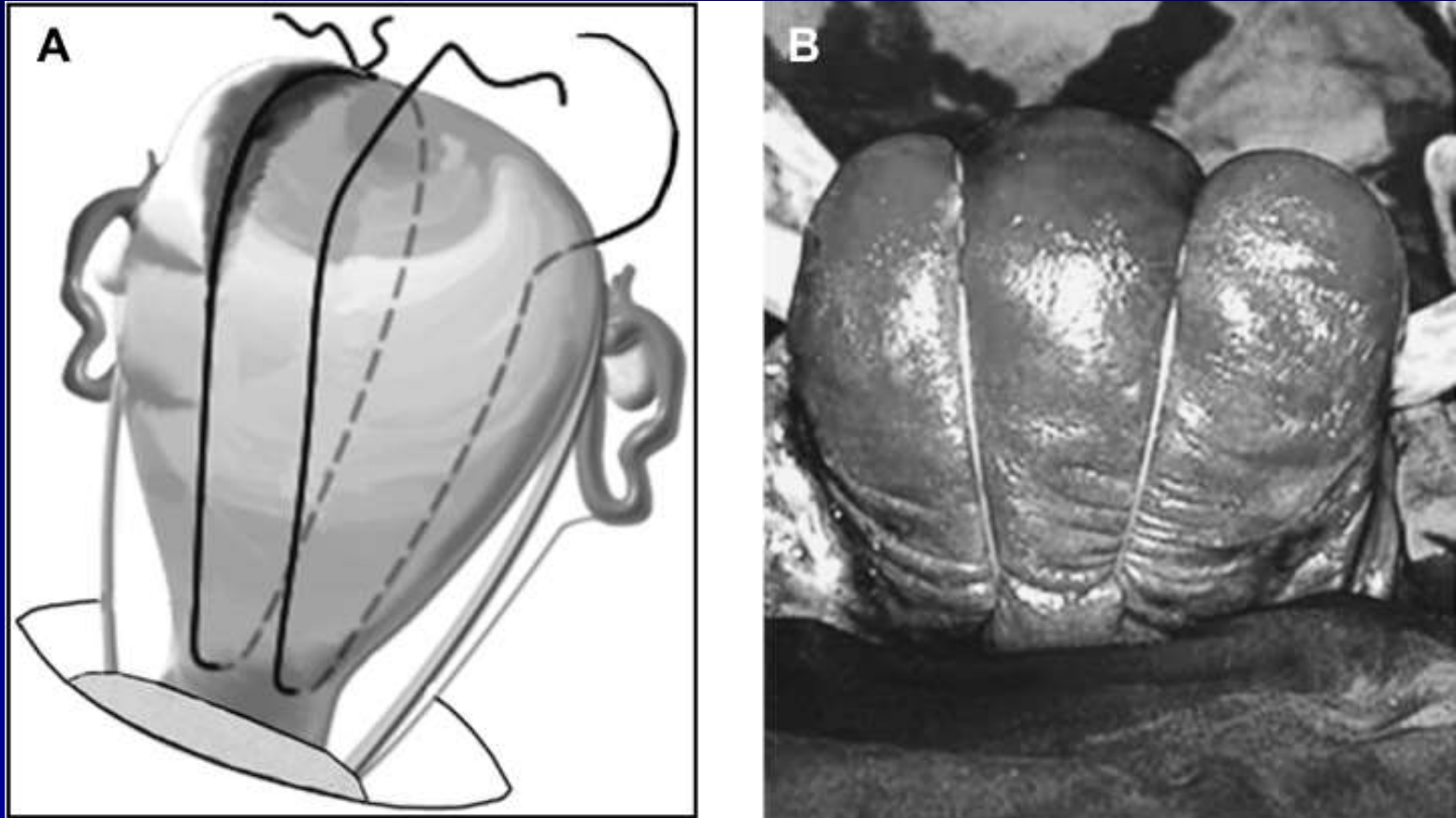
ANTERIOR VIEW





POSTERIOR VIEW

# HAYMAN SUTURE



11 cases, 1 hysterectomy –

F. Ghezzi, A. Cromi, S. Uccella, L. Raio, P. Bolis, and D. Surbek.

The Hayman technique: a simple method to treat postpartum haemorrhage.

*BJOG*. 114 (3):362-365, (March) 2007.

# ARTERIAL EMBOLISATION

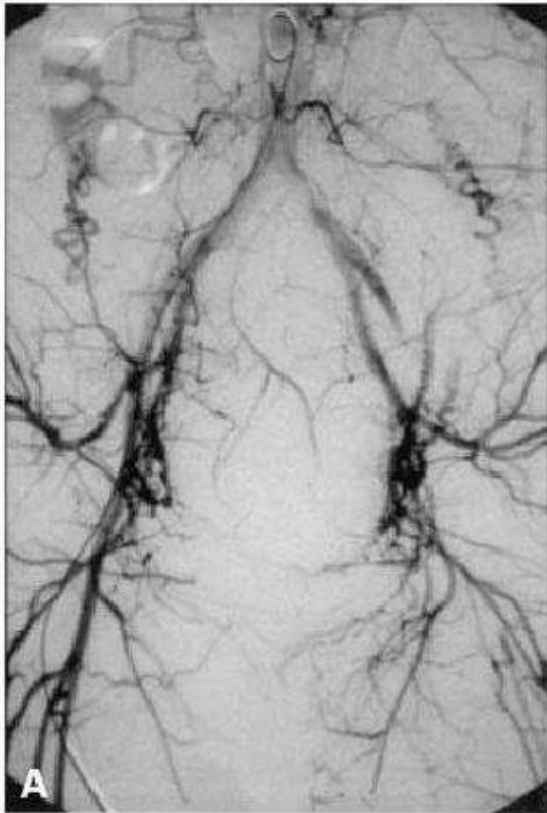
- First described in 1979
- up to 95% success
- Requires angiography facilities

C. Boulleret, et al.

Hypogastric arterial selective and superselective embolization for severe postpartum hemorrhage: a retrospective review of 36 cases.

Cardiovasc.Intervent.Radiol. 27 (4):344-348, 2004.

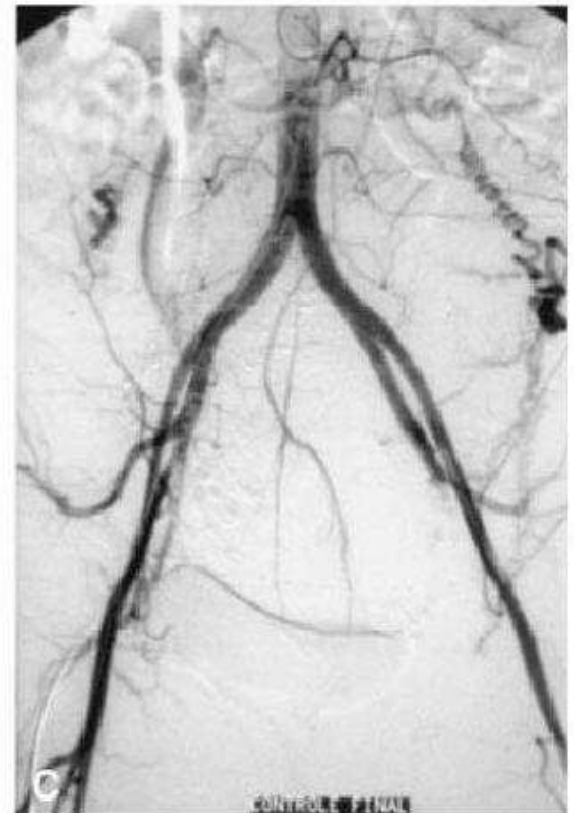




**A** Severe postpartum hemorrhage (Cesarean); terminal aorta injection: early slice.



**B.** Same injection, late acquisition: uterine heterogeneous hypervascularization.



**C.** Same patient, after bilateral hypogastric embolization.

C. Boulleret, et al.

Hypogastric arterial selective and superselective embolization for severe postpartum hemorrhage: a retrospective review of 36 cases. Cardiovasc.Intervent.Radiol. 27 (4):344-348, 2004.

# ARTERIAL EMBOLISATION

- Gelfoam is material of choice (*Vedantham 1997*)
- Preoperative placement of catheters - calculate radiation dosage and inform patient of risks to fetus if  $> 5$  Rads
- Potential complications of embolisation:
  - Angiography (haematoma, contrast nephrotoxicity)
  - Pelvic infection (low-grade fever, pelvic abscess)
  - Ischaemic phenomena (necrosis, buttock claudication)

# Complications of Embolisation

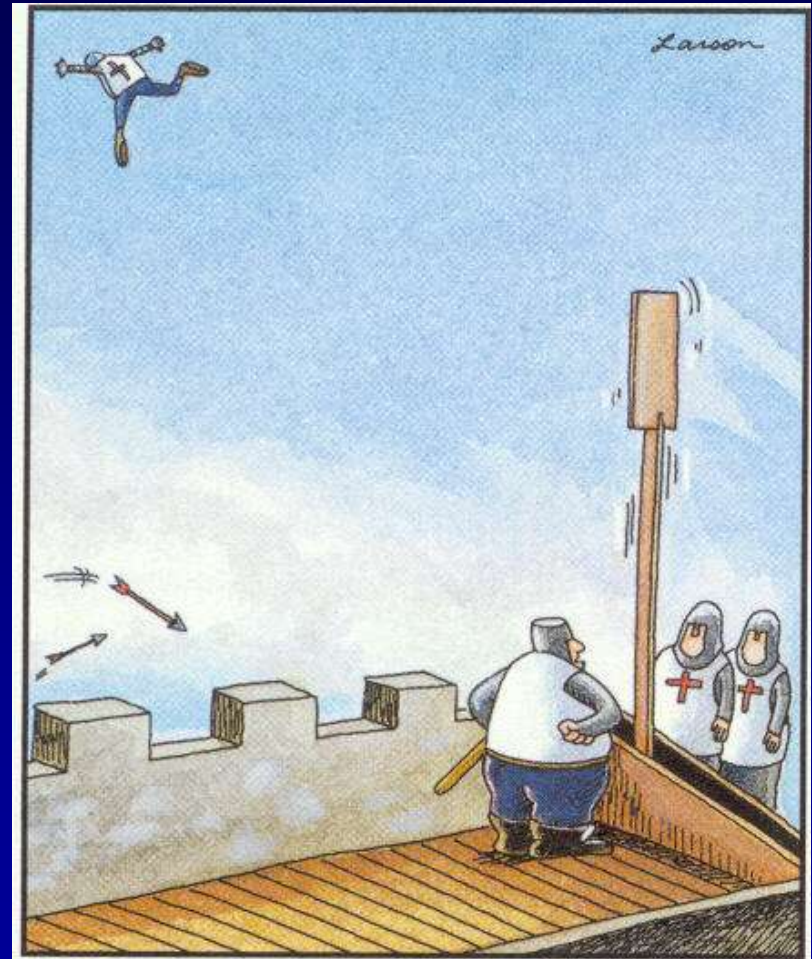


Al-Thanyan et al. Obstet Gynecol 2012;120:468–70

# SPECIAL POINT

## DON'T PANIC

- If you rush, you will make silly mistakes



"I told you guys to slow down and take it easy or something like this would happen."