

# Postpartum hemorrhage: practical approach to a life-threatening complication

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## Summary

Postpartum haemorrhage (PPH) occurs in 5% of all deliveries and is responsible for a major part of maternal mortality. Adequate attendance to this complication can mean the difference between life and death. A well-trained staff together with clear and simple guidelines can make a significant difference to the patient.

The aim of this article is to offer a practical guide for the management of PPH; a flowchart is presented. When faced with refractory hemorrhage, one can switch to interventional therapy or surgery. Efficiency and speed play a key part in the approach to this life threatening bleeding.

**Key words:** Postpartum haemorrhage; Approach; Treatment; Review.

## Introduction

Postpartum haemorrhage (PPH) has generally ranked among the top three etiologies of maternal death, along with embolism and hypertension in industrialised nations; PPH is responsible for 10 to 25% of maternal deaths [1, 2]. The maternal mortality caused by PPH varies from 1/1,000 deliveries in developing countries to 1/15,000 in industrialised nations [3, 4].

Postpartum haemorrhage is traditionally defined as blood loss in excess of 500 ml after a vaginal delivery, and in excess of 1,000 ml after caesarean section [5]. Both midwives and physicians tend to underestimate the true volume of blood loss by 30-50% [6]. In practice this means that the amount of blood loss has to be doubled once the loss exceeds 500 ml. PPH occurs in 5% of all deliveries, and in 1% of all deliveries blood loss exceeds 1,000 ml [7].

## Etiology

PPH is divided into early and late PPH. Early onset PPH occurs within 24 hours of delivery of the baby. Late onset PPH happens from 24 hours to six weeks. Uterine atony is the most common cause of early onset PPH. Other causes are retained placental tissue, lower genital tract trauma, uterine rupture, uterine inversion, placenta accreta and maternal coagulation disorders.

## Risk factors

Proven risk factors include prolonged labour, oxytocin stimulation, caesarean section, operative vaginal delivery, perineal rupture or episiotomy, prolonged third stage of labour and retained placenta [9]. Less clearly proven, but

generally accepted risk factors are induction of labour, chorioamnionitis, halothane anaesthesia (today abandoned), high birth weight and shoulder dystocia [10, 11].

The basis in prevention of PPH is active management of the third stage of labour by giving 10 IU oxytocin IM or IV after the birth of the head of the baby.

The consequences of massive postpartum hemorrhage can be greatly reduced by using guidelines and regular training, which necessitates clear and written guidelines. In this context we will present a simple flowchart for the active management of PPH [12] (Figure 3).

## Management

### Medical aspects

#### Oxytocin

Oxytocin, a synthetic nonapeptide with few side-effects, is an effective uterotonic. However an antidiuretic effect with volume overload may develop when high cumulative doses (> 40 IU) are given. Oxytocin may be given intramuscularly or intravenously. The effect of the drug is dose-related [13]. The dosage for uterine atony is 10 to 40 IU. Oxytocin is the first-line uterotonic for the prevention and treatment of PPH.

#### Methylergometrine

Methylergometrine is an ergot alkaloid that can be given orally, intramuscularly and intravenously. The oral form is ineffective in the treatment of PPH. Hypertension is an absolute contraindication to the use of methylergometrine due to the potential for generalised vasospasm and malignant hypertension. The usual dose is 0.2 mg, IM or IV.

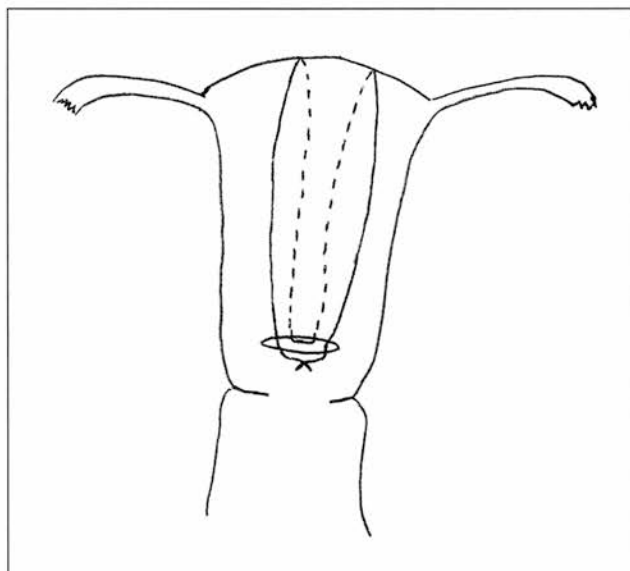


Figure 1. — B-Lynch suture.

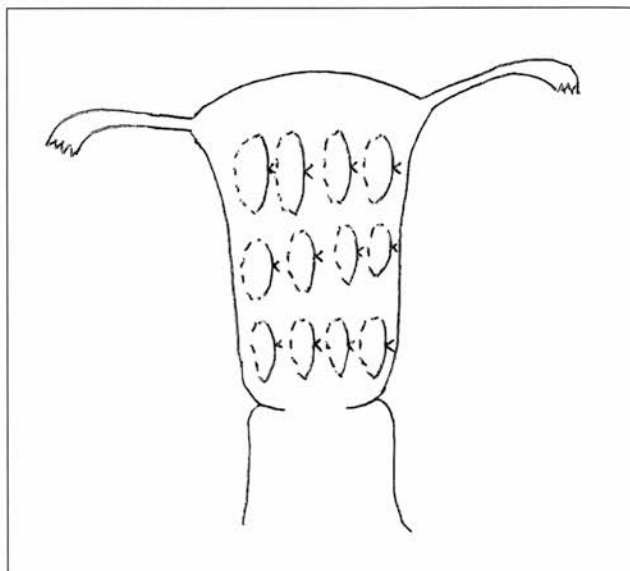


Figure 2. — Compression sutures.

## Prostaglandins

### Misoprostol

Misoprostol is a synthetic prostaglandin E1 analogue. It may be given to patients with asthma or hypertension. Misoprostol administered per rectum is better tolerated than oral administration. Few side-effects are known: mainly shivering and pyrexia. The dose administered per rectum varies in the literature from 600 µg to 1,000 µg. The average serum concentration is much lower and is achieved later than with oral administration. Administration of higher rectal doses could solve this problem without increase of side-effects.

Oral or rectal misoprostol is effective in the treatment of PPH [19-21].

### Prostaglandin E2 and F2α

Prostaglandin PGE2 and PGF2α can be used intramuscularly or intravenously and can be injected directly into the myometrium for treatment of uterine atony. The intramyometrial injection of prostaglandins has a very strong uterotonic effect, and has proven to be very effective in the treatment of PPH caused by uterine atony. In addition it is a very simple technique.

## Intervention

### Embolisation

Embolisation of the uterine artery or the iliac (hypogastric) artery is the first-line treatment in case of excessive blood loss resistant to medical treatment and uterine massage. Embolisation is effective in 85%. Ideally both uterine arteries are selectively embolised. If this is not feasible, embolisation of the hypogastric artery can be considered. It can as well be necessary to embolise the cervicovaginal branches in case of haemorrhage of the

cervicovaginal region. In case of refractory haemorrhage it may become necessary to embolize the ovarian arteries. Resorbable material is used for embolisation so that after some time reperfusion occurs. Embolisation is done preferably before hysterectomy. However if diffuse pelvic haemorrhage persists after postpartum hysterectomy, an embolisation can be necessary even after hysterectomy. A combination of ligation of the uterine arteries and embolisation is almost 100% effective. If a combination of both is needed, it seems to be safer to perform a postpartum hysterectomy [29]. Also the availability of an interventional radiologist and the expected delay of treatment is an important factor in the choice of treatment.

### Uterine packing with sterile gauze or inflated balloon

Packing of the uterine cavity with sterile gauze is a time-honoured, effective and safe method on condition that all the areas of the cavity are uniformly packed [30-32]. There are no recent trials evaluating this method or comparing it to other methods. The uterine cavity is packed through the vagina under general anaesthesia. Fear of infection appears unnecessary [33]. One can also use different types of intrauterine balloons (Rüsch®, Sengstaken-Blakemore®, Bakri S.O.S. balloon®, etc.) for uterine compression. Balloon methods have proven useful in patients for whom fertility preservation is of major interest [34, 35]. If the bleeding stops after the insertion of the balloon, chances are good that surgery is not necessary [36].

## Surgery

### B-Lynch

The B-Lynch procedure is a surgical technique for mechanical compression and apposition between the anterior and posterior wall of the uterus using sutures (Figure 1).

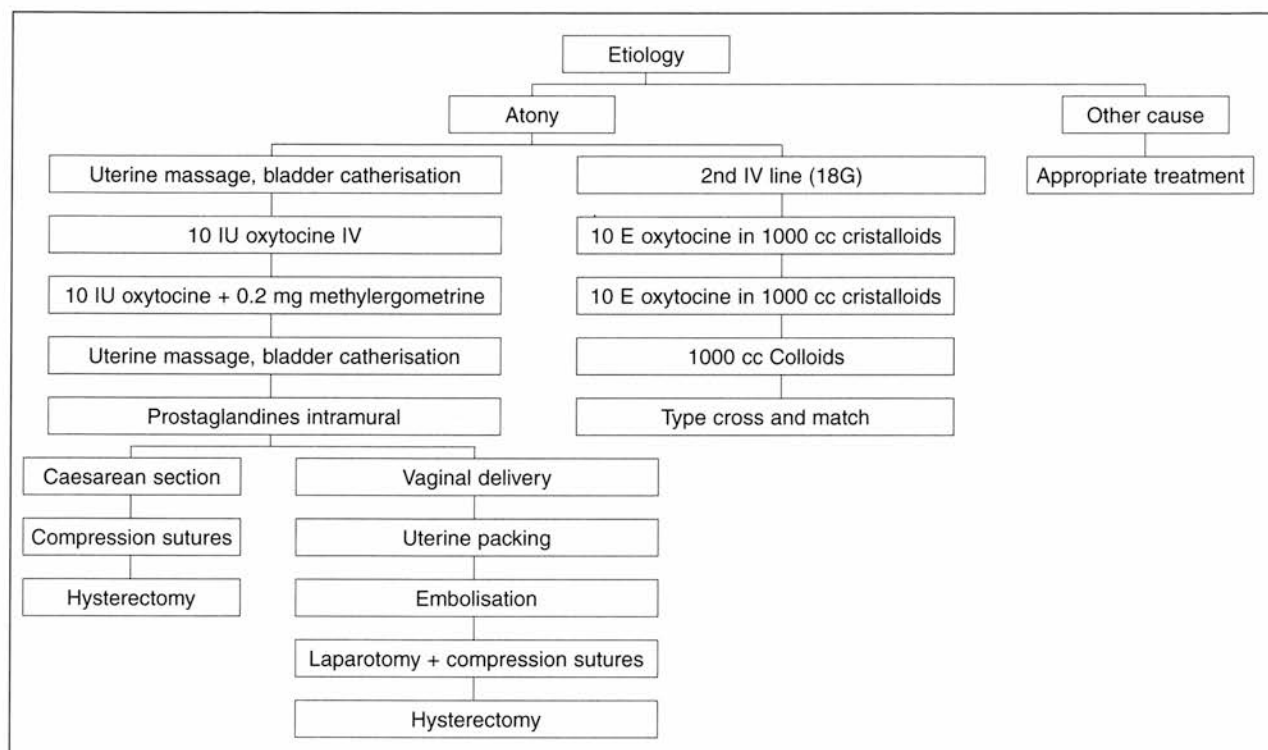


Figure 3. — Flowchart PPH.

This can be used in combination with other invasive methods like embolisation or arterial ligation [37]. Erosion of the suture through the uterine wall with the B-Lynch procedure has been described [38].

Since the B-Lynch procedure is a relatively complex technique, different variants of these compression sutures have been described [39] (Figure 2). The most simple one seems to be placing sutures in three rows of four through the anterior and posterior uterine wall. They are placed two centimetres from each other, with resorbable thread. This technique can be used as an alternative to the B-Lynch suture.

#### Ligation of the uterine vessels

Ligation of the uterine vessels with resorbable stitches is an alternative to postpartum hysterectomy, and consequently preservation of the uterus and fertility [40].

Devascularisation can be considered systematically in five steps.

1. Unilateral ligation of the ascending branch of the uterine artery, approximately 1 cm paracervical.
2. Ligation of the contralateral branch of the uterine artery.
3. Ligation of both descending branches of the uterine arteries.
4. Unilateral ligation of the ovarian artery.
5. Ligation of the contralateral ovarian artery.

When faced with cervicovaginal haemorrhage, perineal haematomas and diffuse pelvic haemorrhage, first-line treatment is embolisation. If embolisation fails, ligation of both hypogastric arteries is needed [41].

#### Hysterectomy

Postpartum hysterectomy is the final option in cases of uncontrollable hemorrhage [42, 43]. A supracervical interadnexal hysterectomy is the easiest technique, unless the haemorrhage originates from the cervix [44]. The difficulty of a postpartum hysterectomy is mostly dictated by the size of the cervix, dilation, and the blood vessels that are strongly enlarged in pregnant women. The tissues are often also more fragile, although the cleavage plains are easier to distinguish. It is strongly recommended to respect common steps of an interadnexal hysterectomy and to identify the different landmarks. If possible, a total hysterectomy is to be preferred, eventually preceded by a supracervical hysterectomy.

#### Conclusion

Management of PPH can be improved dramatically by a quick and adequate approach through simple guidelines. Figure 3 shows the flowchart for the approach once confronted with PPH. This will not only save lives but also the uterus and further fertility.

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