SURGICAL MANAGEMENT OF POSTPARTUM HAEMORRHAGE

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FACTS:

ALL PREGNANCIES ARE AT RISK OF PPH EVEN IF NO PREDISPOSING FACTORS ARE PRESENT

LUIS G KEITH 2007
Postpartum haemorrhage (PPH) has always been a major cause of maternal mortality and morbidity.

Fortunately, techniques for dealing with it have improved so that mortality from this cause continues to decline.

Some PPHs are traumatic vaginal and uterine lacerations.

The primary approach to dealing with these is surgical correction of the defect and the techniques required are as varied as the lacerations themselves.
The surgical approach to the more generic causes of PPH, namely uterine atony, and the less common conditions of uterine inversion, placenta praevia and placenta accreta.

It should be noted that, as with many emergency surgical procedures, there are very few systematic studies of their use and non randomised trials of efficacy.

Long-term follow-up data are also very few.
ACHTUNG!!!!!!!!!!

- WHEN UTERINE TAMPONADE FAILS OR LIFE THREATENING HAEMORRHAGE HAS OCCURRED, LAPAROTOMY SHOULD BE PERFORMED
## Surgical techniques for controlling postpartum haemorrhage (TOG 2009)

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# Surgical Management of PPH

## Conservative surgery

1. Undersuturing placental bed
2. B Lynch brace suture (Modifications)
3. Trans vaginal uterine artery ligation
4. Trans abdominal uterine artery ligation
5. Ovarian vessel ligation
6. Internal iliac artery ligation

## Radical surgery

1. Subtotal hysterectomy
2. Total Hysterectomy
When DO WE opted for conservative surgery?

1. Patient relatively stable
2. Fertility is an issue: young age primid
3. Blood loss slow
4. Good support: adequate blood products, anaesthetist, ot staff.
5. Skilled OBGYN
UTERINE ATONY

- Failure of the uterus to contract effectively following the delivery of the baby is the commonest cause of massive PPH
- Massive PPH: EBL 1500 ml
- Despite medical therapy, patient still bleeding then surgical approach is required.
If packing or balloon tamponade are ineffective, the next step is to consider direct uterine compression suturing.

The first suggestion of this approach was by Christopher B-Lynch, of Milton Keynes Hospital in the UK, who in 1997 published an account of 5 cases where compression of the uterus was achieved following caesarean section.
It requires that the uterus is opened; the suture compresses the upper segment but the lower segment remains open.
Figure 2a–c  Summary of the application of the B-Lynch procedure
The B – Lynch suture compression techniques

- Llyod Davis or frog legged position essential
- The Uterus must be exteriorised
- Basic surgical competence required
- Bimanual compression to test for potential success
- Transverse lower segment incision made
- Uterine cavity checked, explored and evacuated

Conservative Surgical Management
C. B-Lynch and H. Shah
The B – Lynch suture compression techniques

- Apply Vicryl 1.0 Suture correctly with even tension (no shouldering)
- Allow free drainage of blood debris and inflammatory material
- Check bleeding control vaginally including swab and instrument
- Closed abdomen
Absorbable

The first paper by B-Lynch describes the use of a 70 mm round bodied hand needle with a number 2 chromic catgut suture

Straight needles / curves

70 mm DEXON or VICRYL (1.0)

The needle should ideally be 6 cm long so as to exceed the combined thickness of the anterior and posterior lower segment
B -LYNCH -applied correctly

- Even tension
- No ischemia
- No necrosis
If the uterus has not previously been opened (e.g. at caesarean section), a simplified suture can be inserted, such as square suturing. However, there is concern that the square suture may completely occlude the blood supply to the uterine muscle within the square, leading to ischaemic necrosis and subsequent complications.
Multiple square sutures are used to cover the whole body of uterus using a straight 10 cm needle.

- Probably time consuming if many suture required.
- Uterine cavity drainage restriction—pyometra risk.
- Risk producing multiple uterine senechiae.
- Lower uterine segment or cavity not opened
- Uterine cavity not explored under vision
- Probably quicker to apply
- Unequal tension leads to segmented ischemia secondary to slippage of suture – shouldering with venous obstruction
- No data on fertility outcome

© Copyright B-Lynch ’05
Multiple U-suture (Hackethal)
An important principle is, therefore, to avoid sutures that apply compression both vertically and horizontally, but instead use sutures that are compressive, whether transversely, e.g. multiple horizontal sutures as described by Hackethal et al. or horizontally as with the simpler loop suture inserted through the lower segment and tied at the fundus, as described by Hayman et al.
A particular problem is dealing with bleeding from the lower segment of the uterus.

This can be dealt with by square suturing, by a simple horizontal or vertical loop suture, opposing the anterior to the posterior walls of the lower segment.

An ingenious variant of this, if the cervix is not fully dilated, is to invert the lower segment upon itself before suturing it, thus compressing the bleeding surfaces without occluding the uterine cavity.
Dawlatly suture for control of bleeding from the lower segment of the uterus.
Another possibility is to combine the compression suture with an intrauterine balloon. The suture must be inserted first clearly, inserting a suture after the balloon risks puncturing it.

A series of five such cases was reported by Nelson and O’Brien and this method was effective in all cases without complications.
UTERINE COMPRESSION SUTURE

- As with balloons, there are no randomised controlled trials of compression sutures but in a recent series of 11 cases where the Hayman suture was used, hysterectomy was only necessary in one patient.
If use of a simple compression suture is unsuccessful, then ligation of the uterine arteries can be tried next and is often effective.

90% of blood supply to uterus is from uterine arteries.

Uterine artery ligation involves taking large purchases through the uterine wall to ligate the artery at the cervical isthmus above the bladder flap.
Uterine Artery Ligation

ABDOMINAL ROUTE
UTERINE ARTERY LIGATION

- A suture through broad ligament to include 2-3 cm of myometrium.
- Suture placed about 2 cm above the point where incision for lower segment caesarean section would be.
- Ligating ascending branch of the uterine artery and avoiding inclusion of ureter in the suture.
There appear to be no consequences for future pregnancies of such ligation, presumably because a collateral circulation develops from other vessels (particularly the ovarian arteries) to compensate.
OVARIAN ARTERY LIGATION

- Ovarian artery directly arises from aorta
- Anastomosis with the uterine artery in the region of the uterine aspect of the utero ovarian ligament
OVARIAN ARTERY LIGATION

- Ligation of ovarian vessels
  - Ligation of the utero ovarian anastomosis

Figure 5. Infundibulopelvic vessel ligation.
INTERNAL ILIAC ARTERY LIGATION

Internal Iliac Artery (Anatomy-Surgical dissection)

- External iliac artery
- Common iliac artery and vein
- External iliac vein
- Internal iliac vein
- Aorta
- Internal iliac artery
- Posterior division of internal iliac artery
- Anterior division of internal iliac artery
INTERNAL ILIAC ARTERY LIGATION

- Procedure to be learnt by ALL obstetrician recommendation of the CEMD Malaysia
- Bilateral ligation results in 85% reduction in pulse pressure & 50% reduction of blood flow
- Technically difficult initially
- Aware of complications
The common, internal, and external iliac arteries must be identified clearly.

The hypogastric vein, which lies deep and lateral to the artery, may be injured as instruments are passed beneath the artery, resulting in massive, potentially fatal bleeding.
INTERNAL ILIAC ARTERY LIGATION
The artery is double-ligated with an absorbable suture (Vicryl 1/0) but not divided.

The ligation is then performed on the contralateral side in the same manner.
INTERNAL ILIAC ARTERY LIGATION

Therapeutic indications

- Before or after hysterectomy for PPH for refractory atonic uterus, abruptio placenta with uterine atony
- Continuous bleeding from broad ligament base profuse bleeding from pelvic side wall or vaginal angle.
- Diffuse bleeding without clearly identifiable vascular bed
- Rupture uterus in which uterine artery may be torn at its origin from internal iliac artery
- Where extensive laceration of cervix have occurred following difficult instrumental delivery
## Success rates of the measures in the management of PPH

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of Cases</th>
<th>Success Rates (%)</th>
<th>95% CI (%)</th>
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<tbody>
<tr>
<td>B-Lynch/compression sutures</td>
<td>108</td>
<td>91.7</td>
<td>84.9–95.5</td>
</tr>
<tr>
<td>Arterial embolization</td>
<td>193</td>
<td>90.7</td>
<td>85.7–94.0</td>
</tr>
<tr>
<td>Arterial ligation/pelvic devascularization</td>
<td>501</td>
<td>84.6</td>
<td>81.2–87.5</td>
</tr>
<tr>
<td>Uterine balloon tamponade</td>
<td>162</td>
<td>84.0</td>
<td>77.5–88.8</td>
</tr>
</tbody>
</table>

There was no statistically significant difference between the four groups ($P = 0.06$).
Peripartum HYSTERECTOMY

- Should not be left until the woman is *in extremis*, but instead should be carried out promptly if the previously described procedures prove to be ineffective and there are signs of impending cardiovascular decompensation.

- The precise timing of this intervention must, of course, always remain a matter of clinical judgment.
PERIPARTUM HYSTERECTOMY

- Resort to hysterectomy **SOONER RATHER THAN LATER**
- Need to perform fast / RAPID
- **No use of saving the uterus and losing the mother**
Subtotal or total hysterectomy?

- Subtotal is usually enough - less transfusion, faster operative time, decreased intraoperative and postoperative complications.
POSTPARTUM HYSTERECTOMY

- May need to combined with internal iliac ligation
- Abdominal packing?
- Replace blood loss and correct DIVX accordingly
- HDU/ICU care post operatively
Other circumstances

- Genital tract lacerations
  - Genital trauma always must be eliminated first if the uterus is firm
  - Need for good analgesia, lighting, assistant & blood support
Vulvar hematoma
Other circumstances

- Placenta previa +/- accreta
  - Importance of antenatal diagnosis & preparation
  - Role of leaving behind the placenta
  - Midline incision and incision on the fundus followed by hysterectomy
UTERINE ARTERY EMBOLISATION

- Evolved from other angiographic embolisation techniques (Since 30 Years)

- Gelatin Sponges are injected into the bleeding vessel until stasis of flow in target vessel is achieved. Access is gained via femorals to internal iliac and subsequently the uterine arteries
ANGIOGRAPHY – UTERINE ARTERY
BLOCKED
uterine
ARTERY
after
EMBOLIZATION
UTERINE ARTERY EMBOLISATION

Advantages

Preserves Fertility

Useful in Haemorrhage associated with Placenta praevia

Disadvantages

- Requires 24hr availability of radiological expertise.
- Patients must be stable
- Complications include: Necrosis of uterine wall, contrast adverse effects, local haematoma formation
AVERTING MATERNAL DEATH IS BASED ON HAVING A PREPARED MIND, A PREPARED TEAM AND A FULL RANGE OF POSSIBLE THERAPIES

LUIS G KEITH, 2007
CONCLUSION

- IMPORTANT TO ANTICIPATE PPH
- BE PREPARED, SKILLS AND SPEED VERY IMPORTANT
- SURGICAL INTERVENTION MUST BE EARLY IN MANAGEMENT
- CONSERVATIVE SURGERY ONLY IF PERMITS, IF NOT RADICAL SURGERY.
- INVOLVEMENT OF SKILLED CONSULTANT EARLY
"Sorry, but your private health insurance won't cover a Cæsarian... however, it does cover the Heimlich Maneuver..."