

## Caesarean Hysterectomy: Here to Stay...or a Thing of the Past?

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### Abstract

In this review article we are reflecting on the subject of caesarean hysterectomy. The importance of this operation comes from the fact that postpartum bleeding remains number one killer of pregnant women in large parts of the world. One of the most difficult decisions an obstetrician has to make is when he/she decides to go for caesarean hysterectomy. As we will know from the article below the procedure itself is not free of risk, in fact there is high incidence of different morbidities in addition to the fact that most of these patients are haemodynamically unstable and very high anaesthetic risk. We hope that the future can bring about many improvements in the effectiveness of current management techniques which would lead to a much reduced need to the more drastic measures like caesarean hysterectomy.

**Keywords:** Caesarean hysterectomy; Caesarean section; Hysterectomy; Placenta accrete; Placenta percreta; Postpartum bleeding; Massive postpartum bleeding; Brace sutures

### Introduction

In this review article we are trying to explore the different issues surrounding caesarean hysterectomy. This procedure has been for long time and still a major element in the management of massive postpartum haemorrhage (MPPH) throughout the world. There are relatively few studies which addressed this method of managing (MPPH) they looked at several issues surrounding this operation including indications, complications and morbidities [1,2].

MPPH is a common cause of maternal morbidity and mortality [3]. Globally, it is responsible for one quarter of maternal death [4]. Primary PPH is defined as bleeding from the genital tract of 500 ml or more in the first 24 h following delivery of the baby [3].

Other studies have suggested larger values of 600 ml or even 1,000 ml [5].

### History

The concept underlying caesarean hysterectomy dates back to the mid-1700s with a description of the procedure performed on laboratory animals. Eduardo Porro of Milan performed the first planned caesarean hysterectomy in which both the infant and the mother survived. He documented his operation in a paper published in 1876. Porro advocated hysterectomy combined with caesarean. The Porro procedure contributed to more favourable outcome for both the mother and the infant, having sterility and premature menopause as its side effects. Fortunately, the need for the procedure was soon minimised following the proposal to close the uterine incision with sutures.

Since Porro time many improvements have been introduced to the management, the most recent trend is towards fertility retaining approaches. This started with the use of intrauterine balloons internal iliac artery ligation B-Lynch suture multiple square sutures and recombinant activated factor VII [6-11].

However, as per recent surveys of maternity units in UK, caesarean hysterectomy still play a role in the management of MPPH in most obstetric units involved in the survey [12].

The incidence of caesarean hysterectomy varies between developed world 0.3-1.6/1,000 deliveries per year and developing world 3.8/1000 deliveries [13]. It is predicted that the incidence will decline worldwide with the improvements in the obstetric care and the increasing availability of fertility preserving methods mentioned above.

### Caesarean Hysterectomy

Also known by some as peripartum hysterectomy or Obstetric hysterectomy is a procedure done to save the life of the patient [1,13]. Though sometimes can be done in a planned elective way where other disciplines are on standby in case complications and morbidities happen, more often than not it is done in an emergency situation where the life of the patient was critically threatened.

It can be either total or subtotal; however this anatomical description is not enough to describe the complexity of such procedure where the anatomy is usually very much confused and less clear cut than in a case of hysterectomy for benign gynaecological indications.

To give a good idea of what the surgeon need to face while doing caesarean hysterectomy, it is sensible to subdivide it into a) those for percreta cases b) those for non percreta cases.

### Percreta Caesarean Hysterectomy

This is probably the most technically demanding procedure in obstetrics. In this kind of operation the major problem beside the invasion of placental tissue to nearby organs, is what is called neovascularization. This term refers to the formation of new immature blood vessels that lack the usual muscular layers which make it very friable and easy to bleed.

It is very important that the surgical technique in such cases should be modified and in particular use proper judgement regarding the removal of laterally invading placental tissue involving broad ligament and pelvic side wall. Embarkment on complete removal of placental tissue no matter how bold might seem but most of the time would end up in regrettable morbidities least of which is ureteric injuries. It is advisable in such cases not to remove that portion of placental tissue on condition absence of bleeding. This should be followed by postoperative methotrexate or selective arterial embolization [14].

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In order to have a satisfactory outcome in such cases, it is very important that we have the most senior team available, such team should have a plan before on how to face the possible difficulties. This is not like any other hysterectomy, uterine arteries may not be identified very easily, and there may be other few arterial feeders that also need to be secured. It is always advised in such cases that a proper retroperitoneal dissection with proper devascularisation well clear of the uterine wall to avoid tearing of the very friable tissue next to the placenta. Some might resemble this to the technique of radical hysterectomy in gynaecology cases.

One of the common problems is the involvement of the bladder with the placental tissue. It is advised that cystotomy is performed first to identify the extent of bladder involvement. The region involved can be excised and left attached to uterus as long as the trigone is not involved. The bladder would be reconstructed later.

Several modified approaches has been described including the modified peritoneum lateral approach in which they described delivery of the fetus through lateral uterine incision away from placental tissue followed by closure of the incision and the step wise devascularisation of the uterus with the placenta insitu.

Finally, surgeons delivering the baby by caesarean section in the presence of a suspected placenta praevia accreta should consider opening the uterus at a place which is distant from the placenta, and delivering the baby without disturbing the placenta, in order to enable conservative management of the placenta or elective hysterectomy to be performed if the accreta is confirmed [15].

### **Non Percreta Caesarean Hysterectomy**

In all other cases that are due to accrete, uterine atony or any other causes, the surgical challenges are less than above but still considerable in comparable to elective gynaecological hysterectomy. The crucial point here is the decision time, leaving it too late will result in a very unstable patient haemodynamically and probably element of associated DIC. The basic surgical principles should be followed here; clear identification of anatomy through careful dissection, step wise devascularisation, gentle handling of tissues to avoid tearing, appropriate use of intrapartum and post partum antibiotics, careful inspecting of urinary bladder before closure to exclude any associated injuries and finally checking that all pedicles are properly secured without any oozing which would lead to pelvic haematoma later on.

### **Total or Subtotal Hysterectomy**

The literature suggests a total hysterectomy is a preferable [16]. The reality of matter it is very difficult in these cases to know for sure whether cervix is removed or not especially in cases of full dilatation. Subtotal is preferred by some because it is quicker and associated with lower ureteric damage. Supracervical removal of the uterus during surgery should be avoided in cases of placenta percreta because of the possibility of aggravating bleeding by cutting through communicating blood vessels to placental tissue within cervical canal.

### **Morbidities and Complications**

There are mainly two types of morbidities associated with caesarean hysterectomy, bleeding and or urinary tract injuries. We shall be talking about each one separately.

#### **Bleeding**

The involvement of nearby organs by invading percreta placenta, the friability of tissues, the dilated veins surrounding uterus and adnexa,

the coagulatory problems involved and sometimes the wrong surgical techniques all contribute to this specific morbidity.

This can present as either uncontrolled intraoperative bleeding, or post operative haematoma.

Bleeding from adnexal pedicles was a common cause of intraoperative bleeding and early postoperative bleeding and an indication for removal of one or both adnexa. These oedematous pedicles are under considerable tension, which causes vessels to retract and escape their ligatures [17].

The transfixing of the uterine vessels has reduced the incidence of postoperative retroperitoneal bleeding from retracted uterine vessels. It is very important to make sure that these pedicles are not too large and to avoid clamp manipulation that tears pedicles away from the uterine wall. Bleeding at the vaginal angles is often resulting of traction of stay sutures that open ascending branches of the vaginal arteries. Vigorous use of the suction tip and retractors in the region of the bladder pillars, angles of the vaginal cuff can often lead to troublesome bleeding in this area which is very difficult to control [18].

The presence of broad ligament haematoma presents special technical problem for the surgeon who is trying to secure uterine pedicles, however, it is often possible to find a free dissecting space near the lateral pelvic wall where the uterine vessels can be ligated near their origin from the internal iliac artery or ligating the internal iliac (hypogastric) artery itself. In severe cases compression of the abdominal aorta can be tried to minimize bleeding and clear the surgical field in order to be able to view pedicles properly.

Beside what mentioned above there are several other measures which can be used to control and minimize bleeding. Use of surgical packs is one of these measures. These packs can either be temporary during the procedure to control constant venous oozing, or these packs can be left in after closure to be removed after few days when patient is more stable.

A Logthatopulos pack or umbrella pack is a bowel bag containing a number of packs with the opening protruding through the vagina. The entire pack can then be placed on traction, compressing the vasculature of the pelvis. Whenever we leave a pack in the abdomen, we administer broad-spectrum antibiotics for 72 hours.

We should not forget to mention the big help intervention radiology can offer in the management these cases either preoperatively by the use of selective uterine artery embolization or even post operatively to reduce to need for re operation in these cases [19].

### **Urinary Tract Injuries**

We are here talking about two organs; bladder and ureter.

#### **Bladder**

The bladder is at risk because of its direct relation to cervix and lower uterine segment. The initial dissection of the bladder from cervix carry the first risk of possible trauma, surgeon is cautioned to avoid lateral dissection, which may disrupt dilated veins of the plexus of Santorini.

Some methods of caesarean hysterectomy include the technique of cross-clamping the upper vagina just before excision of the specimen. This technique is better avoided in the presence of oedematous tissues, because vesicovaginal fistulas can result due to the involvement of bladder tissue with subsequent necrosis and fistula formation [18].

Post operative abscess can also lead to vesicovaginal fistula due to ischemic necrosis at the bladder base.

Bladder injury is also a very likely risk with uterine rupture or even scar dehiscence and that's why it is imperative to look out for this during operation. Bladder injuries if recognized and repaired during caesarean hysterectomy usually heal well. It is only when they are missed that fistulas will develop [2].

### Ureters

The three sites where the ureters are vulnerable during CH are:

The infundibulopelvic ligament ligation site (when adnexal structures are removed), the uterosacral ligament dissection, and the uterine vascular and cardinal ligament pedicles.

The only proven method to avoid injuring the ureter is direct visualization.

The ureter is avoided at the level of the uterine artery and cardinal ligament pedicles by placing the clamps exactly against the lateral wall of the uterus and cervix. When the uterosacral ligament is divided as a separate pedicle, it must be carefully identified and accurately clamped and ligated without endangering the ureter, which passes just lateral to this dissection.

### Other Morbidities

The following morbidities have also been reported; vesicovaginal fistula, ureterovaginal fistula, rectovaginal fistula, pyrexia, postoperative haematoma and or abscess, anaesthetic complications and reoperation.

### Alternative Techniques

Over the years and with experience new techniques have been developed to control MPPH and to avoid patients ending up in losing up their fertility. We shall be discussing below some of these techniques in brief.

### Balloons

This is a technique using the well-known idea of hydrostatic compression using different kinds of balloons with different specificities e.g. Foley catheter, Bakri balloon, Sengstaken-Blakemore oesophageal catheter condom catheter and finally the Rusch balloon [20-24].

All of the above balloons have proved their place in the management of MPPH and were successful in averting hysterectomy in up to 78% of patients.

Much talk about the tamponade test. It is a test which is used to select the cases which are going to respond to such technique simply by inserting the balloon within the uterine cavity, inflating the balloon and monitor the vaginal bleeding and see the difference. Negative test with the continuing of vaginal bleeding in spite of inflating of the balloon is an indication to abandon the technique and proceed to laparotomy. Each balloon can filled with normal saline up to 500 mills in some types and usually left intrauterine for up to 12 hours or even longer if needed. When it comes to deflate it, some prefer to do it in stages with gradual removal of fluid and assess how much loss is going on till it is stopped completely.

### Brace sutures

The best well known brace suture is B Lynch suture. It was described in 1997 as a type of haemostatic suture used during caesarean section [8]. There was few case series which looked at the effectiveness of this

suture, the latest one found the technique to be effective in almost all cases studied except a single case [25].

Since then many variations were described with similar effectiveness some of which don't require hysterectomy like Hayman suture [26].

The Scottish confidential audit of severe maternal morbidity has identified 52 cases of MPPH in which brace suturing were used and have managed to avert hysterectomy in 81% of cases. There is not enough comparative studies to demonstrate the superiority of one technique of brace suturing over another and therefore surgeons have to familiarise themselves with at least one technique they choose to adapt in the management of MPPH.

They are generally safe with only very few report of complications like uterine pyometra and partial uterine necrosis in two case reports [27,28].

### Internal iliac artery ligation

Is a well establish technique in the management of MPPH. Studies do agree that this technique is generally less effective than the above mentioned methods though it is more difficult to perform and needs specialist vascular-surgical training [29]. The evidence suggests that it can avert hysterectomy in around 60% of the cases without having any effect on future fertility and conception [30].

### Selective arterial embolization

Intervention radiology as a new branch is witnessing great advances in recent years resulting in increasing popularity among obstetricians as a very effective tool in the management of MPPH. The technique of uterine artery embolization is constantly being used in the management of massive obstetric bleeding with very high success rate up to 97% in some reports [31].

Interventional radiology may be considered in cases of placenta praevia with accreta if intra-arterial balloons can be placed in the radiology department before the woman goes to theatre for caesarean section. Follow up studies of women who had undergone arterial embolization for control of PPH suggest that the intervention does not impair subsequent menstruation and fertility [32,33].

### Other new technique

There was a recent study which evaluated the use of medicated intrauterine packs with a substance called chitosan [34-36]. This substance is a linear polysaccharide derived from shrimp and other crustacean shells. Chitosan has been found to be very potent haemostatic agent, has antibacterial properties and many other uses in agriculture and industry.

In this study Patients suffering from postpartum hemorrhage were treated by uterine packing with chitosan-covered gauze, either through the hysterotomy in case of caesarean delivery or transvaginally, for up to 24 hours. Total number of PPH cases were nineteen due to variety of causes including atony, placenta accrete/increta and anticoagulation. In all but one case the bleeding stopped. The rate of caesarean hysterectomy during the study period was reduced by 75% ( $P=0.044$ ).

This technique besides being very effective is also is very inexpensive compared with other treatment options, making it suitable for use also in low resource-countries, where the death toll due to postpartum haemorrhage is especially high.

### The Basrah Study

This study is coming from one of the main maternity units in Basrah city which is called Basrah maternity and Child hospital.

It is a retrospective study looking at the incidence of caesarean hysterectomy, indications, management and outcome over a period of 12 months from 01/10/2012- 01/10 /2013. Over this 12 months period there were 12 cases of caesarean hysterectomy giving incidence of 0.062%.

Regarding the causative factor, in the majority of cases it was placenta accrete 6/12(50%), followed by equal share from other causes: percreta and placenta previa (16.6%).

In five of cases subtotal hysterectomy was performed (41.6%) while the reminder of cases had total hysterectomy (58.3%).

### Morbidities and complications include the following

There was two cases of bladder injuries, one case of ureteric injury, and one patient went to theatre again view of intra-abdominal bleeding.

### Maternal outcome and hospital stay

There were no fatalities in this study and patient stayed in hospital between 3-9 days (mean stay 5.7 days).

### The Future

One of the hardest jobs in life is to try and predict the future. Caesarean hysterectomy has always been a nightmare scenario for most obstetricians. Because it is relatively rare event, the experience of most Obstetricians is not great enough to justify doing it independently or even to allow juniors to do it on their own. This ultimately would lead to a training gap between the two generations of clinicians. This gap is enlarging by the day with the advents of the new simpler techniques like balloons and brace sutures.

Because this procedure is an end of road measure, it is absolutely necessary to be hundred per cent sure and beyond any reasonable doubt that caesarean hysterectomy is the only answer. It is always been said that the secret of success in using this operation is not to delay it too much. So one would try to put himself in the shoes of this Obstetrician who has to make a big decision which can save life keeping in mind that he or she might only have a very limited experience in such kind of procedures.

As we seen above, the technicality can be very tricky; it is not like any other hysterectomy, that's why it is now globally accepted that more than one senior Obstetrician should be available on the site in addition to other specialists as needed. This has been noticed even in the Basrah study where in most of their cases there was two or even three Obstetricians involved. This usually does not prevent morbidities from happening but it can minimize them.

Looking at all this together, I think caesarean hysterectomy would gradually become less and less and be replaced by the newer more clever techniques with much less morbidities. However, it will never disappear completely from the practice of Obstetrics for a simple reason and that is we cannot guarantees that all these new techniques can be successful in all cases.

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