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## Purse-String Compression Sutures at Cesarean Section: Its Role In Prevention Of Primary Post-Partum Hemorrhage (PPH) In Port Harcourt

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### ABSTRACT

**Objective:** To highlight the efficacy of a simple surgical procedure, during cesarean section in preventing primary postpartum hemorrhage in women who are predisposed to having it. **Methods:** After closure of the transverse lower segment incision on the uterus, the operator moves laterally to the left round ligament. An absorbable vicryl-2 suture on a round bodied needle is passed through the ligament, about 2 cm below the level of the uterine incision. The suture is knotted and passed through an avascular space in the adjacent broad ligament. The suture is then passed through the uterine wall at the level of the utero-cervical junction in a purse-string fashion posteriorly and continuing anteriorly under tension until it gets to the left round ligament (the starting point). The two edges of the suture are knotted together and cut about 1 cm from the knot. **Result:** One thousand and five (1005) patients had this procedure done between 2014-2020. Their mode of delivery was cesarean section, and all of them had predisposing factors to primary postpartum hemorrhage. 997 (99.2%) had blood loss of <1000 ml. Only 8 (0.79%) had intraoperative and post-operative blood loss >1000 ml. These were due to extensive cervical lacerations and co-agulation disorders. **Conclusion:** It is suggested that the reduced blood loss in these women who were predisposed, was as a result of the purse-string suture during cesarean section. Reduced incidence of primary postpartum hemorrhage results in reduced incidence of maternal death due to this cause. **Key Words:** Purse-String, compression, round ligament, utero-cervical junction, primary postpartum hemorrhage.

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## Introduction

Obstetric hemorrhage is one of the major causes of maternal mortality and morbidity all over the world, especially in sub-Saharan Africa.<sup>1,2</sup> More than 50% of the population of childbearing women in developing countries like Nigeria live in rural areas where standard obstetric care and skilled (specialized) personnel may not be available, as in the cities.<sup>1,2,4</sup>

Knowledge of a simple surgical technique during cesarean section (CS) to prevent primary postpartum hemorrhage in women with risk factors will go a long way to reduce the incidence of maternal mortality and morbidity from primary postpartum hemorrhage.<sup>2,3,10</sup>

Purse-string compression suture (PSCS) is a surgical method of preventing primary postpartum hemorrhage (PPH) in women who are predisposed (having risk factors) to PPH and are being delivered by cesarean section.

Primary postpartum hemorrhage is bleeding from the genital tract within 24 hours of delivery in excess of 500ml in vaginal delivery, and 1000ml during cesarean section, or any amount of blood loss that compromises the hemodynamic stability of the woman.<sup>2,4</sup> It is a major component of obstetric hemorrhage.

There are risk factors that predispose a woman to having PPH. These include: Antepartum hemorrhage secondary to Abruptio Placentae and placenta previa, previous history of postpartum hemorrhage, over-distention of the uterus as found in macrocosmic babies, multiple gestation, Polyhydramnios, co-existing uterine fibroids, coagulation disorders, prolonged labor, precipitated labor, etc.<sup>2,4,6</sup>

When a decision is taken to deliver these women by cesarean section, adequate precautions are taken pre-operatively and intra-operatively to prevent obstetric hemorrhage.

These measures could be conservative or surgical. They include availability of blood or blood products, oxytocics, vasopressing, use of recombinant factor VIIa. Intra-operative surgical measures like B-Lynch compression sutures, ligation of the uterine arteries, embolization of uterine arteries,

etc.<sup>2,3,8,9</sup>

Most of these surgical methods are used for treatment of primary postpartum hemorrhage. Purse-string compression suture is a preventive measure taken during cesarean section, so that primary postpartum hemorrhage will not occur, thus more complex procedures will not be necessary. It is not curative. As the famous saying goes, "prevention is better than cure."

## Methodology

This study was conducted at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt. It was a retrospective study of the intraoperative and postoperative blood loss in women who had cesarean section with predisposing factors for primary post-partum hemorrhage (PPH).

All the folders of women who had cesarean section between January 2014 to December 2020 were called. Those that had purse-string compression sutures were separated and coded. Those that had predisposing factors for PPH, but did not have purse-string sutures applied were also collected and coded. The blood loss during cesarean section and immediate postoperative period were noted for each of these patients. Inclusion criteria was all women who had cesarean section between January 2014 to December 2020, and had purse-string suture inserted during cesarean section.

This data was sorted, coded and analyzed using Statistical Package for Social Sciences (SPSS) IBM version 25.0.

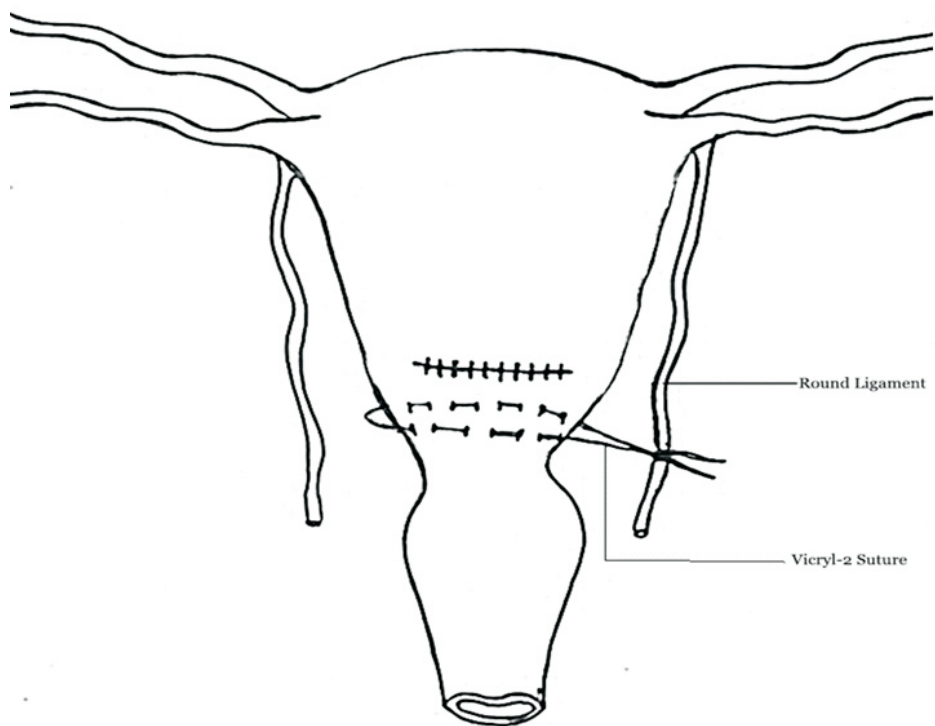
After the closure of the transverse lower segment incision on the uterus, the operator moves laterally to the left round ligament. An absorbable vicryl-2 suture on a round-bodied needle is passed through the round ligament about 2cm below the level of the transverse incision. A knot is tied at the level of the round ligament, and the needle is passed through an avascular space in the left broad ligament, posteriorly to the uterus. At the utero cervical junction level, the needle is passed through the uterine wall in a purse-string fashion on the posterior uterine wall until it gets to the right broad

ligament. The needle is then passed to the anterior uterine wall through an avascular space in the right broad ligament. The needle continues in the uterine wall in a purse-string fashion just below the transverse incision on the anterior uterine wall until it gets to the left round ligament.

On reaching the left round ligament, the needle is passed through the round ligament about

1cm above the starting point. The two edges of the suture are then tied together under tension and knotted. The sutures are cut, and the uterus examined to ensure hemostasis. The uterus is returned into the peritoneal cavity, and the anterior abdominal wall is closed in layers, as is usual during cesarean section.

**Figure 1: Illustration of purse-string suture**



**Results**

**Table 1**

Table 1 below shows the total number of patients that had purse-string sutures applied by the

investigators of this study (1005). The total number of patients who had cesarean section was 3,450.

**Table 1:**

Total No. of C/S	Those that had Purse-string Compression Sutures (Total No. of PSCS in %)	Absence of Primary PPH (% without 1° PPH)	1° PPH (% with 1° PPH)
<b>3,450</b>	<b>1005 (100%)</b>	<b>997 (99.2%)</b>	<b>8 (0.8%)</b>

**Table 2:**

Blood loss >1000ml	Blood loss <1000ml
<b>832 (80%)</b>	<b>208 (20%)</b>

Table 2 below represents patients that had predisposing factors to primary postpartum hemorrhage (PPH), but no purse-string suture.

A total of 3450 cesarean sections were done between 2014-2020. Two thousand and forty-five (2045) of them had predisposing factors for primary postpartum hemorrhage. One thousand and five (1005) of these women had purse-string sutures applied during the cesarean section procedure. 997 (99%) had post-operative blood loss of less than 1000ml. Only 8 (<1%) had post-operative blood loss of >1000ml. One thousand and forty (1040) women who had predisposing factors for primary postpartum hemorrhage did not have this procedure done during their cesarean section.

Blood loss in this group showed 832 (80%) Intraoperative and postoperative blood loss of >1000ml. Only 20% of these women had blood loss less than 1000ml (208 women).

It was obvious that the purse-string suture during cesarean section had prevented primary postpartum hemorrhage in the women that had this procedure.

### Discussion

Purse-string compression suture (PSCS) during cesarean section is a form of prevention of primary postpartum hemorrhage in women that are

predisposed. Other surgical methods for management of obstetric hemorrhage are mainly used as treatment, not prevention. These procedures are carried out when the problem is already established.<sup>3,8</sup>

The procedure is relatively simple and does not require an experienced surgeon or a specialist to carry it out. It can be used in developed and developing countries all over the world. In poor resource settings, or countries where, due to financial constraints, most women cannot afford medications like Carbetocin (an Oxytocin derivative), Recombinant Factor VIIa, Carboprost (Hemabate), a simple preventive procedure like this will be lifesaving for these women and very cost-effective.<sup>2,6,7</sup>

Application of purse-string compression sutures during cesarean section causes compression of the uterus at the utero-cervical junction as well as vasoconstriction of the major uterine vessels as they ascend the lateral walls of the uterus.

This reduces blood flow to the uterus, and thus prevents excessive blood loss after surgery. The collateral circulation around the uterus prevents ischemia to the uterus. The suture used is Vicryl-2 suture, which is absorbable, thus constriction of the vessels and compression of uterus is temporary.

The compression suture is an effective alternative to more complex procedures like hysterectomy

and hypogastric artery ligation.<sup>2,4,7,10</sup>

From our work in the Rivers State University Teaching Hospital, application of the sutures led to the remarkable reduction in the incidence of primary postpartum hemorrhage in our cesarean section cases. Thus, there was a reduction in the incidence of maternal death due to primary postpartum hemorrhage.

Simple transverse purse-string compression suture is limited to only patients that undergo cesarean section, because that is when the utero-cervical junction will be accessible to apply the

sutures. Patients who have high risk for primary postpartum hemorrhage, but had vaginal delivery cannot benefit from this procedure.

### Conclusion

Purse-string compression suture (PSCS) is recommended for use in cases where cesarean section is the mode of delivery in a woman that has predisposing factors to primary postpartum hemorrhage. This preventive measure will help to reduce the incidence of maternal deaths from this cause.

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