

A Case Report of Uterine Myometrial Defect Following Hayman and Square Sutures for Postpartum Hemorrhage

✉ Yasemin Doğan¹, ✉ Lale Aksoy², ✉ Ömer Doğukan Saraç³, ✉ Mehmet Zeki Türe⁴, ✉ Ercan Koçkaya⁵

¹Kocaeli University Hospital, Department of Obstetrics and Gynecology, Clinic of Perinatology, Kocaeli, Turkey

²Alanya Alaaddin Keykubat University Training and Research Hospital, Department of Obstetrics and Gynecology, Antalya, Turkey

³Kocaeli City Hospital, Clinic of Obstetrics and Gynecology, Kocaeli, Turkey

⁴Private Clinic, Clinic of Obstetrics and Gynecology, Mardin, Turkey

⁵Şirnak State Hospital, Clinic of Obstetrics and Gynecology, Şirnak, Turkey

ABSTRACT

Uterine atony due to postpartum hemorrhage (PPH) is an important factor in maternal morbidity and mortality. Various compression suture techniques have been described in order to manage PPH. Here, we describe a case complicated by myometrial necrosis following Hayman and square sutures. Here, we describe a case complicated with myometrial necrosis after Hayman and square sutures to control hemorrhage due to uterine atony after cesarean delivery (C-section). A 32-year-old female patient with a history of chronic hypertension and in vitro fertilization pregnancy after primary infertility was admitted to our clinic with vaginal bleeding on her 33rd week of gestation. Fetal bradycardia was observed, and emergency C-section was performed. PPH occurred due to uterine atony and hemorrhage was managed with Hayman and square sutures. Postpartum 1st year ultrasound revealed myometrial defect in uterine fundus. Patients should be informed about possible complications of compression sutures and postoperative follow-up is necessary to confirm uterine wall integrity. We suggest a national database in order to document the efficiency and long-term complications of the procedure.

Keywords: Postpartum hemorrhage, uterine atony, Hayman suture, square suture, uterine necrosis

INTRODUCTION

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality worldwide.^{1,2} Primary PPH (24 hours postpartum) occurs approximately in 4-6% of pregnancies and 80% of cases are caused by uterine atony.³

Various medical and surgical techniques are used to manage PPH. These techniques can be identified as bimanual uterine compression, use of uterotonic agents (oxytocine, carboprost tromethamine, methylergonovine, misoprostol, carbetocin), tranexamic acid, uterine tamponade and uterine balloon tamponade, ligation of uterine artery and hypogastric artery, uterine artery embolization and hysterectomy. In 1997, B-Lynch et al.⁴ developed an alternative technique to cesarean hysterectomy and successfully performed this technique on 5 patients. In 2000, Cho et al.⁵ reported a case series of 23 patients with primary PPH who were surgically treated with multiple square sutures to contract anterior and posterior uterine walls. In 2002, Hayman described a new technique

in which 2 vertical sutures were placed on both sides of the uterus.⁶

Following a few reports of case series, B-Lynch and other compression suture techniques have been widely used in PPH due to uterine atony.⁴⁻¹² Here, we present a uterine atony followed by PPH and treated with square suture in which myometrial defect was observed 1 year after the cesarean delivery (C-section).

CASE REPORT

A 32-year-old female patient with a history of chronic hypertension and in vitro fertilization pregnancy after primary infertility was admitted to our clinic with vaginal bleeding on her 33rd week of gestation. It was seen that the patient's bleeding extended beyond her pad and fetal heart rate was 50/min on ultrasonographic (USG) examination. An emergency C-section was decided due to a probable placental abruption. 1480 gr fetus with no cardiac activity was delivered by a lower uterine segment incision and was handed over to pediatricians.



Address for Correspondence: Yasemin Doğan, Kocaeli University Hospital, Department of Obstetrics and Gynecology, Clinic of Perinatology, Kocaeli, Turkey

Phone: +90 262 303 65 37 **E-mail:** perinatolojldr@gmail.com **ORCID ID:** orcid.org/0000-0002-2614-4411

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Approximately 40% of the placenta was observed to be abrupted. Twenty unites of intravenous (IV) oxytocin and 0.2 milligrams of methylergonovine maleate intramuscular was administered and uterine incision was sutured. Uterine tonus was consistent with uterine atony, uterine massage was performed and an addition of 10 units of IV oxytocin and 800 mcg rectal misoprostol tablets administered. Despite the perioperative medical treatment, uterine contractions and uterine tonus could not be obtained, therefore Hayman technique was applied, and C-section was completed. The patient was taken to recovery area in the operating room (OR). During the 1st hour observation in the OR, vaginal bleeding and uterine atony persisted and relaparotomy decision was given. Under general anesthesia, the Pfannenstiell incision, subcutaneous and peritoneal sutures were cut. Bleeding was seen due to atonic uterus; therefore, uterine artery was ligated bilaterally. Since the uterus was still atonic, multiple uterine square sutures were made with Vicryl®. Five units of erythrocyte suspension, 3 units of fresh frozen plasma, 2 units of pooled thrombocyte and 4 flacons of fibrinogen concentrate (Haemocomplettan P) was administered.

After bleeding control, the abdominal layers were sutured properly, and the operation was completed. The patient was transferred to the intensive care unit (ICU). Active vaginal bleeding was not observed during postoperative follow-up in the ICU and the patient was extubated on postoperative day 1.3 days after admission to the ICU, she was transferred to obstetrics and gynecology clinic where she was discharged on her postoperative 20th day.

One year after the C-section, the patient applied to our clinic for an embryo transfer procedure. Endometrial irregularity was seen during transvaginal USG therefore, diagnostic diagnostic hysteroscopy and diagnostic laparoscopy (L/S) was scheduled. During the hysteroscopy endometrium was atrophic, right tubal ostium was normal, but the left tubal ostium could not be visualized. Synechia on lateral uterine walls and fundus was dissected with hysteroscopic scissors. Laparoscopic visualization of the uterus revealed loss in integrity of the myometrium and large bulging appearances were observed at the fundus. Hydrosalpinx was seen in the left fallopian and chromopertubation with methylene blue dye showed no passage thorough the left fallopian tube. With the patient's consent, laparotomy for the uterine defect was scheduled for repair at a further date.

The patient was reoperated 6 months after the L/S operation with the plan of myometrial defect repair and salpingectomy. Under general anesthesia, a laparotomy was performed through Pfannenstiell incision in the low lithotomy position. Hydrosalpinx in the left tuba, left ovary and tuba adhered to each other, myometrial defects of 5 cm and 3 cm in diameter were observed on the uterine surface (Figures 1, 2), and endometrial tissues could be seen between the defects. Methylene blue was injected into the endometrial cavity with a Foley catheter. Then, the defects observed on the anterior posterior and fundal surfaces of the uterus were partially repaired with 1 vicryl. Left salpingectomy was performed with the use of advanced bipolar tissue sealer device and the procedure was terminated. The patient was discharged on

postoperative day 3. Informed consent was obtained for this case report at the post-discharge outpatient clinic controls.

DISCUSSION

Nulliparous women, patients who have uterine overdistension (fetal macrosomia, multiple pregnancy, polyhydramnios), prolonged or augmented labor, obesity, operative delivery, chorioamnionitis and history of PPH in previous pregnancy are known to be in risk for uterine atony resulting in PPH.¹ Even though these risk factors are well defined to anticipate patients at risk, it is not always possible for clinicians to predict primary PPH. Recognition of bleeding in early stages, taking prompt action and multidisciplinary approach are crucial to manage PPH. It's estimated that one in every three women with uterine atony will undergo hysterectomy due to failure to respond to uterotonic agents, and nulliparous women account for one-quarter of these.¹³

Good results have been obtained with compression suturing techniques in terms of reducing maternal morbidity and mortality in uterine atony cases as well as preserving fertility.

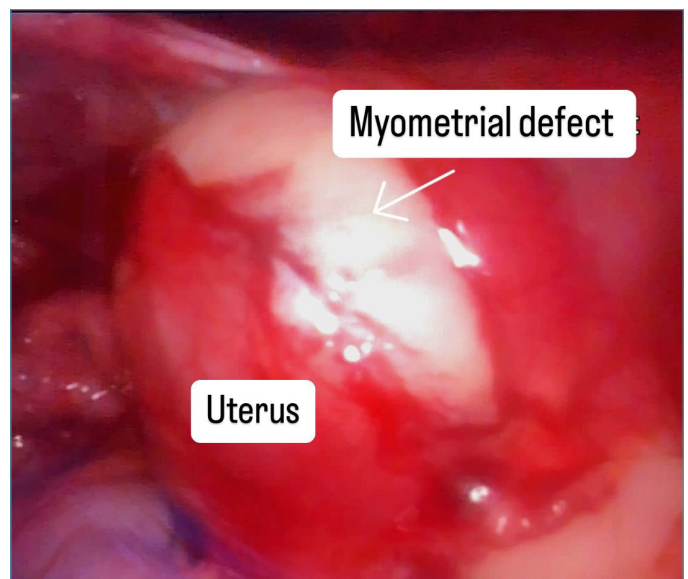


Figure 1. Five cm myometrial defect on the uterine surface

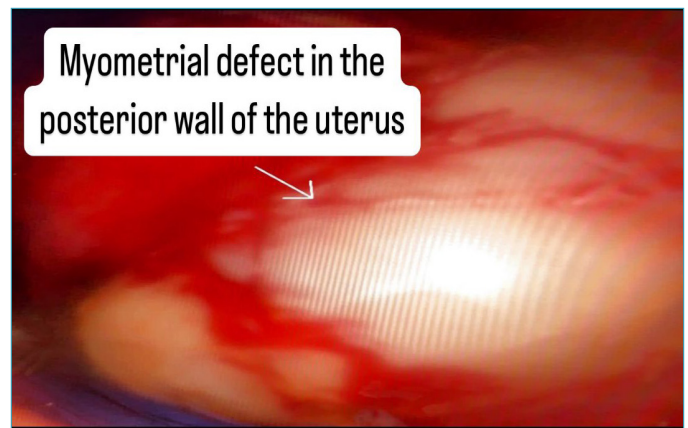


Figure 2. Myometrial defect in the posterior wall of the uterus

B-Lynch and square sutures are favorable since these techniques can be performed with ease (less hypogastric or uterine artery ligation is required, and operation time is reduced) and they are associated with fewer serious complications than devascularization procedures.¹⁴ The square suture technique is superior to B-Lynch in controlling bleeding in cases of placenta previa. Thus, in PPH due to atony when medical treatment is insufficient to manage the hemorrhage alone, use of compression sutures have been widely accepted.

There are not enough studies on the superiority of compression sutures in terms of maternal morbidity in long-term follow-up. In their review, Doumouchtsis et al.¹⁵ have demonstrated that compression sutures had a success rate of 92%. It is difficult to determine the exact efficacy of compression sutures in bleeding due to uterine atony due to the low number of reported cases and the possibility of underreporting of failed procedures. In a case series of 11 patients, Allahdin et al. reported that B-Lynch suture was performed with a 72% success rate in controlling secondary hemorrhage, with three cases proceeding to hysterectomy.¹⁶ In a study of 35 patients who underwent B-Lynch after atony by Grotegut et al.,¹⁷ 3 patients experienced failure and the success rate of the technique was 91.4%. Ferguson, on the other hand, suggested that B-Lynch technique may be associated with the risk of damage to uterus caused by over-compression of the uterus with uterine compression sutures.⁷

Another suturing technique, Hayman suture was investigated by Nanda and Singhal¹⁸ and was found to be successful in 93.75% of the patients. The technique was rapid and easy to perform, requiring less experience.¹⁸ In a study by Alouini et al.¹⁹ the Cho square suture technique was reported to be efficient in 93% of the patients. However, it was demonstrated that intrauterine adhesions varying between thin to severe occurred in 60% of the patients.

In a review by García-Guerra et al.,²⁰ 66% of the uterine necrosis cases occurred after B-Lynch suturing technique and 25% of the cases occurred after the Cho suture.

After our literature search, we see that cases of partial myometrial necrosis after compression suture are rare. El-Hamamy²¹ and Joshi and Shrivastava²² have reported cases where partial necrosis of the uterus occurred subsequent to uterine brace compression suture. In 2009, Reyftmann et al.²³ reported a case of partial uterine necrosis which was treated with Cho sutures for PPH. Gottlieb et al.²⁴ reported fundal uterine necrosis 8 days after C-section and implementation of compression sutures. Although partial necrosis of the uterus is rare, combining compression sutures with the uterine artery ligation may increase the risk.

Postpartum pyometritis cases after square suture technique have also been reported.²⁵

Sentilhes et al.²⁶ have estimated that around 5% of the cases to who were treated with compression sutures, are complicated with uterine synechia subsequently. In a study by Poujade et al.,²⁷ 15 women who underwent uterine compression sutures for PPH were investigated for uterine synechiae. Hysteroscopy or hysterosalpingogram revealed that 26.7% of the patients had developed uterine synechiae.²⁷

In order to avoid postoperative complications like uterine necrosis or synechia, the removal of compression sutures 24-48 hours after the first surgery has been suggested and implemented by Hashida et al.²⁸

Our patient in the present case did not show any unusual symptoms in the early or late postpartum period after Hayman and square suture and the mechanism of necrosis in the fundal zone has not been clarified. In the square suture technique, equal compression is applied to the anterior and posterior wall of the uterus at the site of the knot. However, due to the caliber and location of the blood vessels, necrosis due to ischemia may develop in selected areas compressed with sutures.

In another study, uterine erosion was found in an asymptomatic patient who underwent compression suturing due to uterine atony at the 6th week postpartum follow-up.¹⁷ The authors recommend the use of rapid absorbable sutures to prevent this complication. We do not agree that the suture material used plays an active role. In the first postpartum days, the myometrium is released from compression as the uterus involution occurs and contracts rapidly. Therefore, damage due to pressure occurs at an early stage, depending on the duration and degree of stress. On the other hand, late absorbing type of suture material may cause synechiae due to compression of the endometrium and myometrium. Postpartum atonic uterus may trigger necrosis by impairing the function of intrinsic cells as a result of impaired uterine blood supply after compression suture.

CONCLUSION

The use of compression sutures is a simple method to effectively control PPH due to atony and to preserve fertility. However, patients who are treated with compression sutures such as B-Lynch, Hayman, Cho etc. should be informed about possible complications of these lifesaving procedures. We also recommend pelvic USG and sonohysterography for these women postoperatively, to identify uterine wall defects and uterine cavity adhesions. Three-dimensional ultrasound and magnetic resonance imaging are valuable to examine uterine wall integrity. Patients with uterine tenderness and persistent vaginal bleeding after compression suturing should be investigated for uterine wall necrosis.

As clinicians gain experience with compression suture techniques, the efficacy and related complications will be better understood and managed. Creation of a national registry of patients undergoing compression suturing and further research is needed to document the effectiveness and long-term complications of the procedures.

Ethics

Informed Consent: Informed consent was obtained for this case report at the post-discharge outpatient clinic controls.

Authorship Contributions

Surgical and Medical Practices: Y.D., Ö.D.S., M.Z.T., Concept: Y.D., L.A., Design: Y.D., Ö.D.S., E.K., Data Collection or Processing: Y.D., L.A., M.Z.T., Analysis or Interpretation: Y.D., Ö.D.S., Literature Search: Y.D., Ö.D.S., Writing: Y.D.

Conflict of Interest: No conflict of interest was declared by the authors.

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