Indian Journal of Obstetrics and Gynecology Research 2022;9(3):421–424

Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Case Report

Conservative management of uterine necrosis following bilateral uterine vessels ligation and B-Lynch suture: Long term follow up

Paapa Dasari [1,*]

[1] *Dept. of Obstetrics and Gynaecology, Jawaharlal Institute of Postgraduate Medical, Puducherry, India*

ARTICLE INFO

Article history:
Received 23-02-2022
Accepted 27-02-2022
Available online 08-08-2022

Keywords:
Emergency caesarean section
PPH
Uterine vessel ligation
BLynch suture
Uterine necrosis
Re-laparotomy

ABSTRACT

A 29-year-old second gravida, previous abortion with twins, was induced at 32 weeks because of severe pre-eclampsia. Emergency caesarean section was needed for the second of twins, at which time she had an atonic postpartum haemorrhage. Bilateral uterine vessel ligation followed by B-Lynch suture was undertaken due to failure of medical measures. Post-operatively she had a stormy course with high spiking temperature and distension of abdomen and on imaging suspected foreign body in the uterus or uterine necrosis. At laparotomy, there was 6 liters of foul-smelling peritoneal fluid, and there was a deep groove on the uterus with impending perforation and partial necrosis of the uterus. After removing the suture, the perfusion slowly resumed, and hysterectomy was deferred. After five months, she expelled a necrotic tissue of the uterine cast. After six months, she resumed menstruation, and after three years, she had an intrauterine pregnancy, and presently, at five years, she has regular menstruation.

1. Introduction

Postpartum haemorrhage is the leading cause of maternal mortality worldwide. The commonest etiology of postpartum haemorrhage is uterine atony. Atonic PPH not responding to medical measures had been traditionally managed by hysterectomy to save the life of the woman until the innovative treatment of compression sutures. The B-Lynch suture was one such innovation, and the first series was published in BJOG in 1997.[1] Since then, many modifications of this technique are being practiced to conserve the uterus, and a review reported complications in 25%, and these included persistent vaginal bleeding, endometritis, and pyometra.[2] Uterine necrosis is a very rare complication that may necessitate hysterectomy. Here a case of uterine necrosis managed conservatively and followed up for five years is reported. Literature search did not show a similar case of conservative management of uterine necrosis, which was followed up for a long time.

2. Case Report

A 29-year-old G2A1 at 31 + 3 wks of gestation with diamniotic and dichorionic, twins was admitted through the emergency department as threatened preterm labour. She had a first trimester Medical termination of pregnancy (MTP) by medical methods for personal reasons three years prior to this pregnancy. The current pregnancy was after ovulation induction for secondary infertility, and she received regular antenatal care elsewhere. She was given corticosteroids for fetal lung maturity and tocolytics for 48 hours, and the contractions subsided.

She had an episode of fever and acute gastroenteritis, which was controlled in 48 hours by conservative measure and antibiotics. Her haemoglobin at admission was 8.6 gm%; WBC count was40,000/mm.[3] Blood Urea was 69 mg%; serum creatinine- 1.6 mg%. She had

* *Corresponding author*.
E-mail address: dasaripapa@gmail.com (P. Dasari).

https://doi.org/10.18231/j.ijogr.2022.080

mild hypertension and her subsequent haemogram and liver function tests revealed features of partial HELLP (Haemolysis, elevated liver enzymes, and low platelet counts) syndrome; hence she underwent induction of labour at 32 weeks. Cervical ripening was undertaken with extra-amniotic saline infusion followed by a single dose of prostaglandin (PGE2) gel. She received a high dose oxytocin protocol, and her first baby was delivered by low forceps for fetal distress and the second fetus was in a transverse lie, and the cervix collapsed to 4 cm following the delivery of the first baby. Evaluation in Operation Theatre revealed FHR of 70/min and collapsed cervix of 4 cm dilatation. Hence, emergency caesarean section was performed by the consultant on call. The delivery interval between the first and second baby was 40 min. There was atonic PPH, and the uterus remained flabby after medical measures of 2 doses of 0.2 mg of intravenous methylergomerine, 250 micrograms of intramuscular PG F2 α, and 800 micrograms of rectal misoprostol and hence B –Lynch compression sutures were applied after performing bilateral uterine vessel ligation. There was approximately 500 ml of ascites, and hence intra-peritoneal drain was kept. Vaginal tears and episiotomy were sutured, and the vagina was packed.

She received one packed cell and four fresh frozen plasma (FFP) on the day of surgery and three more packed cells and 3 FFPs the next day, and her haemoglobin was10 gm%. She developed altered sensorium and agitation on the first post-operative day, and hence she was kept in the Respiratory Intensive care unit. Hypertension was managed with oral amlodipine (amlodipine besylate) 5 mg twice daily, and she was provisionally diagnosed to have septicemia and metabolic acidosis and started on the intravenous magnex (cefoperazone and sulbactam) 1gm 12 hourly, and acidosis correction was done. The peritoneal drain was removed after 48 hours. She developed distension of the abdomen, and Ultrasound (USG) abdomen by radiologists reported as non-cirrhotic portal fibrosis. Her serology showed Hepatitis A positivity and dengue antigen positivity. She had high febrile spikes of 39.4^0 C, and her antibiotics were changed to intravenous meropenem 1gm 8^{th} hourly and intravenous vancomycin 1 gm 12 hourly. Her blood, urine, peritoneal fluid cultures did not show any microbial growth but wound swab grew acinetobacter and Klebsiella pneumonia. She had massive distension of the abdomen with ascites, and hence review by the Obstetrician was requested on post-operative day 6. Clinically she had caesarean section wound sepsis, and USG abdomen revealed echogenic ascites, and the uterine cavity was distended with a large echogenic area. MRI was performed to know more details regarding the echogenicity in the uterus, and it was reported as suspicion of foreign body and uterine infection. Doppler USG was done in the department of radiodiagnosis and reported decreased blood flow in both uterine arteries, which was expected due to the procedure of bilateral uterine vessel ligation.

As there was no improvement in her general condition and based on the report of MRI and Doppler, suspicion of uterine necrosis was made, and emergency laparotomy was carried out after taking high-risk consent for hysterectomy.

At laparotomy, there was 6 litres of blood-stained foul-smelling peritoneal fluid. The uterus was 18 weeks size and appeared pale, and the anterior wall showed discontinuity of uterine fibres with impending perforation (Figure 1 A), and the sutures were of chromic catgut, which were cut before the uterus was delivered out of the incision. There was a deep groove (Figure 1 B) on the right half of the uterus with preservation of blood supply on the right cornual region, and the left half of the uterus was pale and edematous looked necrotic. There was a gutter formation in the posterior wall (Figure 1 C) with impending rupture. The lower segment appeared necrotic, and the bladder was also edematous. There was a fear of perforation of the uterus if not handled gently and landing in great trouble if hysterectomy is attempted. The peritoneal fluid was drained, and lavage was given with 2 litres of normal saline; the uterus was watched for 20 minutes, and there was evidence of reperfusion partly in the posterior wall and fundus (Figure 2 a & b), and abdomen was closed after inserting a drain. Post-operatively she received multiple transfusions of blood and blood products (4 Packed cells and 13 fresh frozen plasma over two weeks) and she was managed by a multi-disciplinary team consisting of medical gastroenterologists, general surgeons, physicians, and microbiologists. Her ascites resolved completely after two monthsand was discharged home with the two babies. She was on follow-up with surgeons for treatment of non-cirrhotic portal fibrosis.

She presented after three months with complaints of increased discharge per vaginum and passing some tissue. On examination, a membranous tissue was present at the introitus, and the same was removed gently with sponge holding. forceps (Figure 3 A, B, & C). Subsequent follow-up by transvaginal USG showed increased Doppler flow in uterine arteries, and she resumed her menstruation after one month of passage of this tissue. She used barrier contraception, later had an intrauterine pregnancy after three years, and underwent first trimester MTP.

She consulted over the phone in the month of April 2021 for advice regarding the COVID vaccine, at which time she revealed that she subsequently had pulmonary tuberculosis and taken anti-tubercular treatment and got cured. During this time, she consented to the publication of her case.

3. Discussion

Uterine compression sutures have been undertaken for more than three decades to conserve the uterus in severe atonic PPH and were found to be safe and effective in most of the

Fig. 1: Intra-operative pictures immediately after cutting and removing the suture; **A:** Shows the pale uterus with discontinuity in the anterior wall of the uterus, suggesting impending perforation; **B:** Shows the reddish area of the right half of the uterus with cornu where vascularity is present and the gutter demarcation of a tight suture. The other half shows the left half of the uterus, which is pale enlarged, edematous, and avascular; **C:** Shows the posterior wall of the right cornual area. The impending rupture is demarcated in the groove

Fig. 2: Intra-operative pictures 15-20 minutes after removal of the suture; **A:** Shows the minimal return of vascularity on the posterior wall **B:** Shows the gradual return of vascularity on the posterior wall and fundus of the left half of the uterus

Fig. 3: Uterine cast: **A:** Shows the expulsion of the membrane-uterine cast; **B:** Shows the membrane, which is stretchable and elastic; **C:** Shows the expelled uterine cast

studies reported. The success rates have been reported to be more than 91% in a systematic review published in 2007.[3] In 2011, the UK Obstetric surveillance system reported the success rate as 75%, and they found that the success depends on the time between delivery and application of compression suture. The success rate was 84% when it was performed within one hour of delivery and a delay of 2 to 6 hours leads to 4 fold increased risk for hysterectomy.[4] This lady had PPH at the caesarean section for the second of twins, and the decision to undertake the procedure was less than an hour, and she survived from PPH.

Though the success rates are good, the complications of these surgical procedures are not most often discussed. A large review between 1997 -2010 reported uterine necrosis, haematometra, pyometra, thread erosion, and uterine rupture during subsequent pregnancy.[5] Uterine necrosis is potentially life-threatening and may necessitate hysterectomy, especially when associated with sepsis. The review found 8 cases of uterine necrosis following uterine compression sutures, mostly following B-Lynch suture. The cause of uterine necrosis following compression suture was attributed to "compression tightness" and uterine penetration at the time of application by Shigeki M and colleagues after analyzing the techniques of various types of compression sutures.[6] This is evident in the present case, where there was gutter formation due to excessive tightness. Whether the cause was compression suture or ligation of uterine vessels is an argument as uterine necrosis was reported 21 days following uterine artery embolization for PPH.[7] The combination of techniques of vessel ligation and compression sutures that lead to uterine necrosis are on record.[8,9] Uterine necrosis following compression suture alone without vessel ligation was also reported.[10,11] In both these cases, compression sutures were undertaken for atonic PPH at the caesarean section. Treloar[10] did BLynch, and Reyftmann[11] performed Cho sutures. In the current lady, initially, vessel ligation (bilateral uterine vessels] was undertaken, followed by B-Lynch compression suture. Uterine necrosis following caesarean section without any compression sutures or vessel ligation was also on record, and it was attributed to intrapartum sepsis.[12]

The clinical presentation of uterine necrosis following compression sutures was fever, persistent pain abdomen, and evidence of sepsis.[8–11] The pre-operative diagnosis of uterine necrosis was difficult in this case as well as in other cases reported in the literature. On USG, the echogenicity in the uterine cavity mimicked retained products of conception,[10,11] and an attempt at evacuation was made in the case reported by Treloar and colleagues. Interpretation of presence of gas bubbles in the myometrium on USG and CT, MRI is essential for arriving at diagnosis.[8,13] This was initially missed in this woman by MRI, and misinterpretation was that of a foreign body. The management has been laparotomy and hysterectomy in the

cases reported literature.[8–13] Reports regarding conservative management of uterine necrosis are sparse, but in a recent publication, necrosis was diagnosed preoperatively by CT 10 days after caesarean section, and the woman was managed by laparotomy, excision of the necrotic margins of the ruptured uterine incision, and suturing after draining the pus.[14] In the present woman, there was no dehiscence of the uterine incision, and the necrosis involved the body of the uterus. Pregnancy after uterine compression sutures was reported to be in the range of 32%[6] to 44%,[15] and there are no reports of pregnancy after conservative management of uterine necrosis.

Prevention of complications is important for any surgical procedure, and choosing the appropriate technique of compression suture[6] for the woman's clinical condition, along with the acquisition of correct surgical skills, is essential. Follow-up after the procedure and evaluation by hysteroscopy to rule out uterine necrosis in case of suspicion can prevent the delays in management.[5]

4. Conclusions

1. Uterine necrosis is a rare complication but can occur following caesarean section, especially after compression sutures.
2. A high index of suspicion is essential for diagnosing uterine necrosis, and MRI is the standard for pre-operative diagnosis.
3. Conservative management can be given if the uterus is found to turn pink (reperfusion) after removal of the suture.
4. Appropriate pressure while placing compression suture is essential, along with the skill to prevent iatrogenic uterine necrosis.
5. Complete recovery is possible with conservative management and women can achieve pregnancy after long term once the menstrual function becomes normal.

5. Source of Funding

None.

6. Conflict of Interest

None.

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Author biography

Paapa Dasari, Senior Professor https://orcid.org/0000-0003-1022-2750

Cite this article: Dasari P. Conservative management of uterine necrosis following bilateral uterine vessels ligation and B-Lynch suture: Long term follow up. *Indian J Obstet Gynecol Res* 2022;9(3):421-424.