Afr. J. Med. Med. Sci. (2021) **50,** 49-56

Intraoperative uterine packing with abdominal mops as adjunct management of postpartum haemorrhage in a low resource setting

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Abstract

Background: Postpartum haemorrhage (PPH) remains a leading contributory factor to maternal morbidity and mortality especially among women undergoing caesarean deliveries. Despite concerted efforts being made towards prevention, recurrent limiting factors in low-resource settings warrant the adoption of mechanisms that would further assist in combating the scourge. This study reviewed the outcome of intra-operative uterine packing of bleeding uteri in limiting blood loss from PPH.

Methods: We reviewed the hospital records of patients who had postpartum haemorrhage over a period of five months retrospectively and present the outcome of 17 consecutive cases which were managed with intrauterine packing with abdominal mop as an adjunct measure. Structured proforma was used to obtain information on age, parity, socioeconomic status, mode of delivery, indications for surgery and history of intrauterine packing from the hospital records while data analysis was done using the statistical package for social sciences, SPSS, version 23.0.

Results: Most common cause of intraoperative PPH was uterine atony, 13 (76.5%), and the mean blood loss was 1841.2±1165.4mL. Mean duration of intrauterine packing was 36.7±15.0 hours and average number of days on admission was 4.0±2.5.An average of 2 abdominal mops was used per packing and most procedures were performed by the medical officers (10, 58.8%). Overall, there was no case of maternal mortality among the patients managed and no abnormality was detected on follow up at 6 weeks.

Conclusion: Uterine gauze packing is effective in reducing blood loss from intra-operative PPH in low resource-settings. It, therefore, deserves a re-consideration as an addition to the armamentarium of available resources for reducing mortalities from PPH in developing countries.

Keywords: *Atony, Caesarean delivery, intrauterine packing, Postpartum Haemorrhage.*

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Résumé

Contexte: L'hémorragie du post-partum (HPP) reste l'un des principaux facteurs contribuant à la morbidité et à la mortalité maternelles, en particulier chez les femmes qui accouchent par césarienne. Malgré des efforts concertés de prévention, les facteurs limitatifs récurrents dans les pays à faibles ressources justifient l'adoption de mécanismes qui contribueraient davantage à lutter contre le fléau. Cette étude a examiné les résultats de la compression utérine peropératoire des saignements utérins en limitant la perte de sang due à l'HPP.

Méthodes: Nous avons revu rétrospectivement les dossiers hospitaliers des patientes ayant eu une hémorragie post-partum sur une période de cinq mois et présentons le résultat de 17 cas consécutifs qui ont été gérés avec un emballage intra-utérin avec une vadrouille abdominale comme mesure d'appoint. Un formulaire structuré a été utilisé pour obtenir des informations sur l'âge, la parité, le statut socio-économique, le mode d'accouchement, les indications pour la chirurgie et les antécédents d'emballage intra-utérin à partir des dossiers de l'hôpital, tandis que l'analyse des données a été effectuée à l'aide du progiciel statistique pour les sciences sociales, SPSS, version 23.0.

Résultats: La cause la plus fréquente d'HPP peropératoire était l'atonie utérine, 13 (76,5%), et la perte sanguine moyenne était de 1841,2 ± 1165,4 ml. La durée moyenne de l'emballage intra-utérin était de 36,7 ± 15,0 heures et le nombre moyen de jours d'admission était de 4,0 ± 2,5. Une moyenne de 2 vadrouilles abdominales a été utilisée par emballage et la plupart des interventions ont été effectuées par les médecins (10, 58,8%). Dans l'ensemble, il n'y a pas eu de cas de mortalité maternelle parmi les patientes prises en charge et aucune anomalie n'a été détectée au suivi à 6 semaines.

Conclusion: L'emballage de gaze utérine est efficace pour réduire la perte de sang due à l'HPP peropératoire dans les milieux à faibles ressources. Il mérite donc d'être réexaminé comme un ajout à l'arsenal de ressources disponibles pour réduire les mortalités dues à l'HPP dans les pays en développement.

Mots clés: *Atony, accouchement par césarienne, emballage intra-utérin, hémorragie post-partum.*

Introduction

Postpartum haemorrhage (PPH) is an obstetrics emergency that can follow vaginal or caesarean deliveries (CDs). It is a leading cause of maternal mortality and remains a serious complication of child birth globally [1-7]. In developing countries, it accounts for about one-fourth of maternal deaths per annum compared to less than 0.1% of total deliveries in the developed world [4,8,9]. Primary PPH is responsible for almost 100,000 deaths every year with 99% occurring in low-income and middle-income countries (LMICs) [9,10]. Approximately 2 - 5% of deliveries result in PPH - defined as blood loss from the genital tract in excess of 500ml for vaginal delivery or 1000 mL for CD within the first 24 hours [8,11]. Uterine atonyis the commonest cause of PPH especially in women at risk [2,12-14]. However, primary haemostasis could be achieved from the placental bed by compression of the uterine vessels as they pass through the myometrium [2,14,15].

Primary PPH is among the major causes of maternal mortality globally [8,9]. Kaunitz and colleagues, in a review of over 2000 maternal deaths in the United States, reported that 13% of such mortalities were attributed to PPH [1,2,16]. Therefore, in countries such as Nigeria where PPH remains responsible for a large number of maternal deaths, any simple intervention that can readily be performed to control bleeding by tamponade would be of high value.

Several methods have been previously adopted in the management of intra-operative PPH ranging from the administration of uterotonics to performing surgical procedures like application of B-Lynch brace stitches, bilateral ligation of the uterine arteries and hysterectomies [4,8-10,17-22]. Uterine tamponade with an abdominal gauze or mop was in place until the 1960s when it was abandoned on account of suspected increased risk of infections [21]. However, with advancement in anti-biotherapy, it appears to be a reasonable alternative to surgical interventions especially in patients with haemorrhage unresponsive to medications [2,14,21]. The procedure could also be adhoc pending transfer of the patient to another centre with facilitiesfor advanced surgical interventions.

Aside, other forms of uterine packing such as condoms and purpose-built devices, uterine balloon tamponade is also increasingly being used as an effective and low-cost treatment option with success rates ranging between 88.6% and 100% [15,20,22]. However when treatment failure occurs with uterine balloon tamponade, uterine packing with an abdominal mop has been found useful and less technical [16,20]. Unlike bilateral uterine arteries ligation and application of brace sutures which require expertise and training, insertion of intrauterine pack is much simpler all members of the obstetrics team can be taught with ease [2,14,16,21]. We hereby present the outcome of 17 cases ofintra-operative PPH managed successfully with intrauterine packing during a 5–month period in a low-resource setting.

Methodology

Mother and Child Hospital, (MCH),Akure is a busy obstetrics unit with an average rate of 300 deliveries per month. The hospital is a non-fee-paying centre

Figure 1: The abdominal MOP used for Intrauterine Tamponade

for maternal and child healthcare services in Ondo State, Southwest Nigeria. Ethical approval for the study was obtained from the Ethics and Research Committee of the hospital [MCHA/EC/2018/005]. We reviewed the records of all patients managed between August 1st and December 31st, 2016 retrospectively and isolated cases of intraoperative PPH requiring intrauterine packing with an abdominal mop – main indication for intrauterine packing being persistent uterine bleeding despite the use of oxytocics. Using a structured proforma, we obtained information on age of the patient, parity, socioeconomic status, mode of delivery, indications for surgery and history of intrauterine packing. Cases with incomplete data were excluded from the study. In addition, we retrieved information on duration of packing, days on admission, cadre of surgeon, type of anaesthesia, units of blood transfused (if any) and evidence of post-operative infection.A total of 17 cases met the criteria for review and all patients had uterotonics as first line agents following delivery.

The intrauterine tamponade was achieved by using a thick, 36cm by 20cm,abdominal mop with a 'tail' (Figure 1). Following the delivery of the placenta at CD or hysterotomy and for all cases of primary PPH in which the uterus continued to bleed persistently despite administration of uterotonics, the mop is inserted into the uterine cavity starting from the fundus. When more than one is required, the tail of one is tied to the body of another through a hole created towards the edge. The mop will continue to be inserted with one tied to another until the uterine cavity is filled and the tail of the last one is dropped into the cervical canal. The uterine wound edges are held with Green amytages and are carefully closed in layers. During vulvar cleansing, the tail in the cervical canal is pulled out of the cervix into the upper part of the vagina.

The intrauterine mops were left in situ for a minimum of 12 hours with active monitoring of the patient's vital signs such as pulse, blood pressure and oxygen saturation. All patients were prophylactically commenced on broad spectrum antibiotics for a minimum of 48 hours and any evidence of worsening clinical parameters such as persistent bleeding will warrant re-exploration often with increased potential for hysterectomy. The intrauterine mops were removed on the bedside when patients became clinically stable with no further evidence of uterine bleeding although the theatre is usually prepared, as back-up, for urgent intervention in case patients begin to bleed following removal of the mop.All patients were followed up weekly for 6 weeks for any sign of haematological abnormalities until they were discharged from the postnatal clinic.

Data analysis was done using the statistical package for social sciences, SPSS, version 23.0 (IBM, Armonk, NY, USA). Frequency tables were generated for socio-demographic characteristics while mean values were used to describe the measures of central tendency among the variables.

Results

During the5–month period under review, there were 1648 deliveries out of which 400 had surgical interventions – caesarean deliveries and exploratory laparotomies.There were 1618 live births and 5 maternal deaths. Of the group that had surgical interventions, 18 (4.5%) had intractable intraoperative haemorrhage out of which 17 were eligible for review.

The mean age of the patients was 31.4±6.1 years while the mean gestational age at delivery was 36.4±3.9 weeks and median parity was 1. Emergency CD was performed in 14 (82.4%) of the patients, of which the commonest indication was major placenta praevia (Table 1). Exploratory laparotomy for primary PPH following vaginal delivery was performed on three, 17.6% (Table 1). Uterine atony,unresponsive to uterotonics,was the commonest cause of PPH necessitating packing and was seen in 13 (76.5%) of the patients. The average blood loss was 1841.2 mL ± 1165.4 mL (Table 2). Most of the cases, 10 (58.8%), were performed by the medical officers on duty.

Uterine packing was successful in all the patients with 12 (70.6%) of them requiring two abdominal mops and the remaining, just one. The uterine packs were left in situ for an average of 36.7±15.0 hours while the number of days spent on admission ranged from three to 12 days, with an average of 4.0±2.5days. Twelve, 70.6%, of the respondents required blood transfusion and it ranged between 1 and 9 units per patient (mean = 3.3±3.4 units).All patients were given prophylactic parenteral antibiotics with none having any clinical evidence of infection throughout the follow-up period. All the patients were discharged successfully.

There were no statistical associations between the cadre of surgeon and duration of surgery, duration of packing, blood loss, number of units transfused and number of days on admission. However, patients who had general anaesthesia (6, 35.3%) were transfused with more than 5 units of blood (X^2 =17.000, p=0.001; Table 3) while other variables such as duration of surgery, duration of packing, blood loss and number of days on admission were not statistically significant irrespective of type of anaesthesia.

Table 1: Socio-demographic data of the participants

Variable	Frequency	Percentage
Age group (years)		
<25	1	5.9
25 – 29	6	35.3
30 – 34	6	35.3
≥35	4	23.5
Mean age: 31.4±6.1, range 23-45 years		
Parity		
0	7	41.2
1	5	29.4
2	2	11.8
3	2	11.8
4	1	5.9
Modal parity - 0; range 0-4		
GA at surgery (weeks)		
< 32	4	23.5
32 – 34	1	5.9
35 – 37	2	11.8
38 – 40	8	47.0
> 40	2	11.8
Mean GA: 36.4 ± 3.9; mode = 38; range 29-42		
Type of surgery		
Emergency CD	14	82.4
Exploratory laparotomy	3	17.6
Indications for surgery		
Placenta praevia	7	41.2
Abruptio placenta	4	23.5
Foetal distress	3	11.8
Poor progress in labour from uterine inertia	1	5.9
PPH Post Vaginal Delivery	3	17.6

**GA – gestational age; PPH – Postpartum Haemorrhage; CD – Caesarean Delivery*

Discussion

PPH has remained a challenge globally with more catastrophic outcomes in low resource settings. Prevention of PPH via the active management of the third stage of labour remains the gold standard but when it occurs, management options include oxytocics, prostaglandins, genital tract exploration, ligation or angiographic embolization of uterine/ internal iliac arteries or hysterectomy [1,2,11,23]. After excluding uterine rupture, genital tract lacerations, and retained placental tissue, efforts are often directed towards contracting the uterus by bimanual compression and oxytocics before switching to surgical alternatives. Majority of the patients in this series were high risk for PPH with clinical conditions such as major placental praevia and abruption placentae.

For women who had vaginal deliveries, uterovaginal packing with gauze is a quick and easy option that may be used to control bleeding by tamponade effect and stabilize the patient until a surgical procedure could be arranged [1,2]. Occasionally, bleeding may subside with this step such that additional intervention becomes unnecessary [2,5,13,14,16,24,25]. In cases of CDs as reported in this series, intrauterine packing with gauze is effective in controlling haemorrhage from placental site especially in cases of placenta praevia or accreta [26].

The commonest indications for emergency CDs among our patients were major placentae praevia and abruption placentae. This is similar to the findings of Ge *et al* [25] but differ from that of Bello *et al*, [27] in which suspected fetal distress was the main indication. The differences in the indications for emergency CD are probably influenced by the fact that Bello et al, conducted their study in a tertiary institution with facilities for earlier intervention. Uterine atony affected 94% of the patients that required intrauterine packing and remains the commonest cause of PPH with an average blood

Table 2: Intraoperative events

Variable	Frequency	Percentage
Duration of surgery (minutes)		
≤60	11	64.7
>60	6	35.3
Mean duration of surgery (minutes) = 54.4 ± 17.9; mode = 40; range 27 – 87		
Cadre of surgeon		
Consultant Obstetrician	7	41.2
Medical Officers	10	58.8
Indication for intrauterinetamponade		
Atony	16	94.1
Adherent placenta	1	5.9
Type of anaesthesia		
General	6	35.3
Regional (Spinal)	11	64.7
Number of abdominal mops used		
1	5	29.4
2	12	70.6
Duration of the abdominal mop (hours)		
24	9	52.9
48	7	41.2
72	1	5.9
Mean duration = 36.7 ± 15.0		
Estimated Blood Loss (EBL)		
<1000	5	29.4
1000 - 1999	5	29.4
2000 - 2999	2	11.8
3000 - 3999	4	23.5
≥ 4000	1	5.9
Mean EBL = 1841.2 ± 1165.4; range 750 – 4500		
Units of blood transfused		
0	5	29.4
1 - 2	4	23.5
3 - 4	2	11.8
≥5	6	35.3
Number of days on admission		
<5	13	76.5
≥5	4	23.5

loss of over 1.8 litres per pregnant woman. This is similar to 1.78 litres reported by Ge *et al* [25], a little above the 1.5 litres reported by Nwagha *et al* in 2005 [6] but less than 2.2 litres reported by Hsu *et al* [23].

Uterine packing requires no special equipment or expertise, is less technical to perform and should easily come to the mind of the obstetrician whenever he or she encounters PPH [1,4,16,25]. Most of the CDs in this series were performed by medical officers and the overall feto-maternal outcome was similar between the medical officers and specialist obstetricians and this is in tandem with the report from Ali *et al* [4]. This emphasizes the simplicity of the intrauterine packing and the benefits of encouraging its adoptionin limited-resource centres as it is capable of reducing the impact and/or of complications from PPH although additional, appropriately-designed studies will be required to further validate this point.The success rate in our study was 100% compared with the 84%–95.6% overall success rate reported in the literature [7,14,23,25].

The duration of the abdominal mop in the uterine cavity varies according to the overall clinical picture of the patient which is in tandem with the report of Maier *et al* and other researchers [5,23,25,26,28]. Interval for removal of pack has to be individualized and in this series, the average duration of intrauterine mop was 36 hours although the pack was removed by 24 hours in most cases while some were kept for up to 72 hour. Maier had

Table 3: Relationship between type of anaesthesia and selected variables

Type of Anaesthesia Variables		Regional (Spinal)	General Anaesthesia	Chi-Square statistics	P-value
Total units of blood transfused	0	5	0		
	1 – 2	4	0	17.000	0.001
	3 – 4	2	0		
	5 and above	0	6		
Duration of Surgery, in minutes	<60	8	3	0.600*	0.339
	≥60	3	3		
Duration of Packing, in hours	24	6	3		
	48	4	3	0.736	0.692
	72	1	0		
Estimated blood loss, in mls	<1000	4	1		
	1000-1999	4	1	6.710	0.152
	2000-2999	0	2		
	3000-3999	3	1		
	4000-4999	0	1		
Number of days on admission	<5	9	4	0584	0.445
	≥5	2	2		
Total		11	6		

**Fisher's exact test*

reported earliest removal of pack at 5 hours and latest at 96 hours [5].

About one-third of our study population required no blood transfusion thus further elucidating the usefulness of intrauterine packing in limiting blood loss during CDs. The only significant factor contributing to the number of units of blood transfused is the type of anaesthesia used. It should however be noted that the choice of anaesthesia for caesarean delivery is also dependent, among other things, on the premorbid state of the patient.In spite of this, over three-quarters of the study population spent less than five days on admission before being discharged. This implied that the use of intrauterine packing poses no additional risk to the overall number of days parturients spent post-operatively following CD. Thus, uterine packing needs to be remembered as a management option before performing surgical procedures in PPH resulting from placental site bleeding or atony. It may control the problem completely or give time to organize a definitive procedure, which may include transportation to another center with advanced care [1].

Overall, management of intra-operative PPH with uterine packing using gauze is a reasonable alternative to further surgical intervention in patients with intractable haemorrhage especially in low resource settings and this is similar to recent report by Deffieux *et al* [16], Marwaha *et al* [28] and Okafori *et al* [29]. However, Aderoba *et al* [20] and Kandeel *et al* [30] introduced intrauterine balloon tamponade using condom catheter as an important alternative for selected cases. Wei *et al* [31], in China, recently reported from a randomized controlled, open label trial that an intrauterine double-balloon tamponade have similar effect as gauze packing and may be considered as an alternative in our environment. From our study however, it was observed that uterine packing required less expertise compared to other options of management of PPH including the extreme of peripartum hysterectomy.

Although the strength of this study lies on its provision of locally relevant solution to a global challenge in obstetrics care, it is unfortunately not powered enough to provide the required evidence for generalization and applicability. However, the study has been able to show the potentials of appropriate use of abdominal mops in the management of PPH in resource-constraint countries where there are limited options for adequate care.Intrauterine packing should be considered when medical options fail to provide the needed respite in the management of PPH. Every obstetrician should be familiar with this simple method, as it may prevent the need for hysterectomy and thus preserve reproductive capability, as well as diminish operative morbidity.

Conclusion

In conclusion, it is noted that uterine packing is a safe, quick and effective procedure for control of

intraoperative PPH resulting from uterine atony and placental site bleeding caused by placenta praevia or placenta accretain resource-limited environments. It should be noted that effective management, in an ideal set-up, requires teamwork, coordination, speed and adequate facilities for life saving, access to blood and blood products as well as laboratory facilities.

Acknowledgement

We are grateful to the members of the Department of Obstetrics and Gynaecology and other members of staff of Mother and Child Hospital, Akure, for their contributions to data collection

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Received = 23rd January 2020
Accepted = 15th July 2020