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CLINICAL ARTICLE

Provider experience of uterine balloon tamponade for the management of postpartum hemorrhage in Sierra Leone

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ABSTRACT

Objective: To understand healthcare providers' experience of incorporating uterine balloon tamponade (UBT) into the national postpartum hemorrhage (PPH) clinical pathway after UBT training. *Methods:* In a qualitative study, semi-structured interviews were undertaken with healthcare providers from 50 centers in Freetown, Sierra Leone, between May and June 2014. All eligible healthcare providers (undergone UBT training, actively conducted deliveries, and treated cases of PPH since UBT training) on duty at the time of center visit were interviewed. *Results:* Sixty-one providers at 47 facilities were interviewed. Bleeding was controlled in 28 (93%) of 30 cases of UBT device placement. Participants reported that UBT devices were easy to insert with only minor challenges, and enabled providers to manage most cases of uncontrolled PPH at their own facility and to refer others in a stable condition. Reported barriers to optimal UBT use included insufficient training and practical experience, and a scarcity of preassembled UBT devices. Facilitators of UBT use included widespread acceptance of UBT, comprehensive and enthusiastic training, and ready availability of UBT devices. *Conclusion:* UBT—used either as a primary endpoint or en route to obtaining advanced care—has been well accepted and integrated into the national PPH pathway by providers in health facilities in Freetown.

1. Introduction

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality and morbidity worldwide, with the vast majority of PPH-related deaths occurring in low- and middle-income countries [1–4]. Even before the Ebola crisis, Sierra Leone's maternal mortality statistics were among the worst in the world, with an estimated 860 maternal deaths per 100 000 live births [2,5].

In peripheral facilities, second-line treatments for uncontrolled PPH—e.g. bilateral uterine artery ligation or embolization, B-Lynch sutures, and emergency hysterectomy—are often unavailable because they have to be managed by highly skilled professionals and are expensive [6]. Uterine balloon tamponade (UBT) has recently gained considerable attention as a promising intervention for uncontrolled PPH, and has been both endorsed by the International Federation of Gynecology and Obstetrics, and recommended by WHO as a second-line intervention for severe uncontrolled PPH [7–11].

Through partnership with the Sierra Leone Ministry of Health and Sanitation, Massachusetts General Hospital has been implementing and evaluating a PPH package with UBT called "Every Second Matters for Mothers and Babies–UBT" (ESM-UBT) [12]. Although there are preliminary quantitative data on the use of UBT, little is known about provider experience or strategies for optimal implementation of ESM-UBT in Sierra Leone.

The aim of the present study was to understand the experiences of health providers who have been managing PPH subsequent to implementation of the ESM-UBT package. The specific goals were to determine the feasibility of incorporating ESM-UBT into the existing PPH management protocol, providers' experiences with the use of ESM-UBT during uncontrolled PPH, and barriers to and facilitators of optimal PPH management.

2. Materials and methods

In a qualitative study in Freetown, Sierra Leone, information was collected from healthcare providers managing cases of PPH and who had received UBT training by means of semi-structured interviews between May 1 and June 30, 2014. Approval for the study was obtained from the Partners Healthcare Human Research Committee, Boston, MA, USA, and the Sierra Leone Ministry of Health and Sanitation. Informed verbal consent was obtained from all participants.

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In December 2013 and January 2014, Massachusetts General Hospital, in conjunction with the Sierra Leone Ministry of Health and Sanitation, conducted eight 3-hour workshops on PPH in-service training (ESM-UBT). The training components of ESM-UBT included active management of the third stage of labor (AMTSL), basic PPH management, and the use of a condom-catheter ESM-UBT device as a second-line treatment for uncontrolled PPH [13]. Two representatives from each of 50 health facilities—usually a facility head and an experienced midwife—were asked to attend a session and subsequently disseminate the knowledge to all members of the facility who are involved in conducting deliveries. The 50 health facilities had been selected by the Ministry of Health and Sanitation predominantly on the basis of need. Each facility was provided with two PPH instruction manuals, a pictorial wall chart, and several ESM-UBT devices. By March 2014, all the original facility representatives reported that all members of their facility had been trained.

Approximately 6 months after the initial training session, qualitative data were collected from providers at the trained facilities via semi-structured interviews. Purposive sampling within the facilities was used to capture both providers who had experience using the UBT and providers from facilities that had managed cases of PPH. At each health facility, a facility leader was asked to identify all health providers on duty who had been trained in ESM-UBT, actively conducted deliveries, and had treated cases of PPH since the ESM-UBT training. All health providers on duty at the time of visit who met these criteria were invited to participate in the study.

Researchers conducted semi-structured interviews regarding provider management of PPH since the training. All interviews were conducted at the facility and ranged from 15 to 60 minutes. Interviews were documented using a standard interview guide. All interviews were voice-recorded and transcribed. Interviewers began by collecting general statistics about the facility and provider. Participants were then asked to describe the specifics of both managing PPH and using the UBT device since their training to understand whether PPH management was done in accordance with training and whether UBT was used appropriately within the training algorithm. Providers were asked about their experience managing PPH, challenges to managing PPH, perception of the UBT device, and recommendations for improving the implementation of ESM-UBT training.

The transcribed data were analyzed using standard qualitative methods [14]. Two researchers (A.N. and A.M.W.) independently analyzed the data via NVivo version 10 (QSR International, Doncaster, VIC, Australia). After first-pass independent analysis, a code book was created. Major codes pertinent to the research question were agreed by the researchers. Coding of the data was iterative, and provider responses were triangulated with data cards completed and verified after each use of a UBT. Transcripts were recoded and any discrepancies were resolved. After review of the interview data, provider comments were organized into three main domains—experiences with UBT use, barriers to UBT use, and facilitators of UBT use—and the major themes that emerged were reported.

3. Results

Providers at 47 (94%) of the 50 facilities were interviewed. Three (6%) facilities were not visited because of difficult terrain. All health providers on duty who met the study criteria were interviewed. No providers refused to participate in the study.

It was known from the multicountry study database that 30 women had UBT devices placed over the prior 5 months (mean age 26.7 years [range 16–37]). Fifteen (50%) of these women were either confused or unconscious and had recorded systolic blood pressures of less than 90 mm Hg at the time that their UBT devices were placed, consistent with severe blood loss and advanced shock.

Of the 61 health providers interviewed, 17 (28%) were midwives, 19 (31%) were maternal and child health aides, 9 (15%) were state-enrolled child health nurses, 14 (23%) were clinical health officers or assistants, and 2 (3%) were medical doctors. The mean years of experience and number of deliveries conducted per month were 9.3 (range 0.5–35) and 32.0 (range 1–200), respectively. Twenty-four (39%) of the 61 providers had participated in at least one of the 30 cases of UBT device use. UBT devices had been used at peripheral health centers and hospitals by all levels of the interviewed providers, including maternal and child health aides, midwives, medical doctors, and state-enrolled child health nurses (Table 1).

Major themes emerging from the interviews are summarized in Supplementary Material S1. Interviewed providers reported the use of UBT appropriately as a last resort and within the national PPH management algorithm. For 28 (93%) of the 30 women who underwent UBT device placement for uncontrolled PPH, providers inserted the UBT device only after administering both prophylactic and treatment doses of uterotonic drugs. Other treatable causes of PPH, in addition to an atonic uterus, were sought in each of the 30 cases of UBT device use before device placement.

The 61 interviewed providers described 31 cases of PPH for which UBT devices were not used. In 29 (94%) of these cases, providers were able to arrest the hemorrhage with the use of uterotonic agents or cause-specific management (e.g. repairing a tear or expelling retained products). Most providers who had managed less serious PPH cases stated that they would have used the uterine balloon had the bleeding continued.

The interviewed providers reported that PPH was successfully controlled for 28 (93%) of the 30 women in whom UBT devices were placed for severe uncontrolled PPH. The two women who died despite initial UBT device placement had been promptly referred to the nearest referral hospital from the health center where they delivered. One of the deaths was attributed to disseminated intravascular coagulation subsequent to fetal demise (severely macerated stillbirth). In the second case, the woman had delivered twins and then immediately hemorrhaged profusely despite appropriate care. A UBT device was placed after she was already confused and in advanced shock, and the uterine balloon was displaced when the patient became severely agitated and restless during transfer to a referral facility. Unfortunately, the uterine balloon was not replaced and the women continued to hemorrhage and died.

Twelve (40%) of the 30 women who underwent UBT were transported to a referral facility, and displacement of the UBT device occurred in 2 (17%) of these 12 women during transport. Of these, one woman had a new uterine balloon placed, received a transfusion and survived; the other woman died, as previously described. Providers universally responded that use of a UBT device was not a barrier to accessing higher levels of care when referral was needed.

All interviewed providers who inserted a UBT device found it to be a valuable additional tool to manage uncontrolled PPH. Providers commonly described the uterine balloon as critical for arresting bleeding when other measures failed, particularly in situations when resources were limited (e.g. uterotonic drugs). Two providers who inserted UBT devices for critically hemorrhaging patients in remote facilities, with lengthy transfer to the nearest referral facility, stated that they had

Table 1
Uterine balloon tamponade use by type of facility and provider.

Facility or provider	No. (%)
Facility (n = 30)	
Maternal and child health post	2 (7)
Community health post	1 (3)
Community health center	20 (67)
Hospital	7 (23)
Provider (n = 24)	
Midwife	5 (21)
Maternal and child health aide	10 (42)
State-enrolled child health nurse	4 (17)
Clinical health officer/assistant	2 (8)
Medical doctor	3 (13)

each recently cared for a hemorrhaging woman who would have died without the availability of UBT.

Although providers were encouraged in the ESM-UBT workshops to leave the balloon in place for 12–24 hours, there was wide variability in the length of time that UBT devices were left in place, with a mean duration of 8 hours (range 1–23). The most common reason that UBT devices were not left in place longer was the provider perception that a uterine balloon could be removed once bleeding had subsided. One provider reported that he removed a UBT device early owing to patient discomfort. Hemorrhage did not resume in any of the cases for which a UBT device was removed early.

An important theme that emerged was the provider perception that a UBT device is easy to insert by providers of all levels of training. The challenges that providers experienced were minor. Eighteen (75%) of the 24 providers who inserted a UBT device reported no challenges during the process and frequently described the uterine balloon as "simple" and "easy to use." Technical challenges associated with inserting the uterine balloon were most common among first-time users: 3 (13%) of the 24 providers had difficulty locating the cervix, and 2 (8%) encountered difficulty keeping the uterine balloon in place while filling it with water. Additionally, placement was described as "quite challenging" for 2 (8%) combative patients. Even in the instances for which providers reported challenges, 22 (92%) of the 24 providers were able to successfully insert UBT devices and arrest bleeding. Providers additionally volunteered strategies that they thought improved their ability to perform UBT, including using a speculum to visualize the cervix and a forceps to keep the uterine balloon in place while filling the balloon with water.

Although the ESM-UBT protocol states that all women who have UBT devices inserted should be referred, the challenges of transfer meant that 18 (60%) of the 30 women who had UBT devices placed were not transferred, but were instead managed at the community facility level. ESM-UBT providers reported that one of the great strengths of UBT is that it allowed many severe PPH cases to be successfully managed at this level. Before the introduction of ESM-UBT, providers in peripheral health centers reported a tendency to quickly refer patients with severe PPH. Providers perceived that transportation represented a risky prospect for patients owing to vehicle availability, costs, and significant delays. Another important theme was that, after the ESM-UBT training, providers felt that they were able to manage most women with PPH at their own facility, rather than rely on risky referrals.

Although UBT was widely accepted by providers, provider and institutional barriers to optimal use emerged during the interviews. Barriers to optimal UBT included insufficient training, minimal practical experience, and a scarcity of ESM-UBT devices. For example, a few providers who had not completed the practical component of ESM-UBT training or had not inserted a UBT device in a patient expressed a desire for more practice to increase confidence. Additionally, poor availability of UBT devices emerged as a barrier in a few facilities. Several providers reported that the UBT devices were not readily accessible in the labor ward, and two providers described specific cases of PPH that occurred at night when the uterine balloon could not be used because it was locked in a cupboard. Providers also described challenges to ensuring that all members of their facility were trained owing to high staff turnover and a lack of protected time to conduct the training.

Facilitators of UBT included widespread acceptance of ESM-UBT, comprehensive and enthusiastic training, and ready availability of ESM-UBT devices. Overall, ESM-UBT was widely accepted by facility-based providers of all levels and was considered to be a useful and valuable tool for managing PPH that was easily incorporated into the national PPH clinical pathway. Even providers who had not yet used the uterine balloon described it as a useful strategy for managing uncontrolled PPH and expressed commitment to its use when indicated.

It was universally reported that repeat ESM-UBT training sessions, led by each of the community facility UBT champions, was essential for optimal use of UBT. Lastly, the availability of the UBT devices during the time of delivery was described as vital to assure timely use of a uterine balloon when needed. Although not universal, several facilities described intentionally leaving UBT devices in the open labor ward or intentionally handing over the kits at the end of each shift so that they could be accessed during times of emergency.

4. Discussion

The present study found that a condom-catheter UBT device is a valuable, well accepted, and easy-to-use tool that can be incorporated into the existing PPH management protocol by providers of all levels of training. Overall, most providers who used UBT devices reported that it was useful in minimizing blood loss, served as an endpoint to bleeding, and reduced the number of referrals to higher-level facilities.

Previous studies of UBT have demonstrated that a condom-catheter UBT device can be used by doctors in higher-level facilities [8]. The present study contributes to the growing body of literature supporting the feasibility of introducing a UBT device among lower-level facilities [12–14]. Most (87%) interviewed providers who inserted UBT devices were lower-level providers who were able to perform UBT with minimal training. Other qualitative studies in Kenya and South Sudan have demonstrated similar findings among lower level providers [13,15].

The findings from the present study strongly suggest that, for ESM-UBT implementation to be optimally effective, increasing hands-on practical experience for providers—both initially and through ongoing in-service refresher training at the facilities—is critically important. Particular attention to emphasizing accessibility in the labor ward will be required to promote timely use during the moment of hemorrhage.

The study has several limitations. Providers could have had difficulty recalling specific details about the cases of PPH that they had managed. To help mitigate this recall bias, case information was triangulated using previously collected data cards (from the ongoing multicountry study). During the interviews, social desirability bias could additionally have been a limitation if interview respondents provided answers that they believed the study researchers wanted to hear. The study attempted to minimize this bias by encouraging interview respondents to provide information about both the successes and the failures of the intervention.

Postpartum hemorrhage continues to be a leading cause of maternal mortality worldwide. In addition to the traditional management of PPH, UBT can play a crucial part in a wide range of health facilities where uncontrolled PPH might lead to maternal death.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ijgo.2015.10.026.

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Conflict of interest

The authors have no conflicts of interest.

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