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MINI REVIEW

Significance of perioperative inter-departmental collaboration for obstetric emergency response: A mini-review

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Abstract

This review underscores the crucial role of interdisciplinary collaboration in managing obstetric emergencies such as crisis bleeding. Prompt clinical judgment and coordinated interventions involving various departments are emphasized for the well-being of both the mother and newborn. The review explores the importance of emergency response infrastructure in obstetric facilities and delves into the 2022 Obstetric Crisis Bleeding Guidelines, emphasizing the relevance of a DIC score for severity assessment. The collaborative efforts within the operating room, involving different healthcare professionals, are detailed, stressing meticulous coordination during emergencies like massive bleeding. The necessity of interprofessional collaboration for building a responsive perioperative management team is discussed, with a focus on leadership, followership, and effective communication. The abstract also proposes simulation-based education for inter-departmental training, emphasizing a modified non-technical skill evaluation tool tailored to the unique characteristics of obstetric crisis management in the operating room. Continuous formative assessment of these factors is deemed essential for effective training in various obstetric emergency situations.

KEYWORDS

collaboration, inter-departmental, interprofessional, obstetric emergency, perioperative team

INTRODUCTION

Obstetric emergencies, including obstetric crisis bleeding, can often be lifesaving through prompt clinical judgment and coordinated interventions such as fluid and blood transfusion therapy, medication administration, and surgical procedures. The collaboration between different professions and departments is particularly crucial to protect the lives of both the "mother" and the "newborn."[1,2] In this review, I discuss interdisciplinary and inter-departmental collaboration for the practical application of guidelines on obstetric crisis bleeding emergencies.

EMERGENCY RESPONSE INFRASTRUCTURE IS ESSENTIAL IN ALL OBSTETRIC FACILITIES

Obstetric-designated facilities are expected to have a medical system capable of responding to obstetric emergencies, including massive bleeding, at all times.[3,4] For example, in the case of a cesarean section, there is a risk of massive bleeding in cases of complications such as fibroids in pregnancy or placental previa. Placental adhesion may be predictable, but it is often diagnosed during surgery, becoming a cause of massive bleeding. Additionally, conditions like postpartum

hemorrhage, uterine rupture, and birth canal lacerations are challenging to predict beforehand, necessitating a rapid response system for massive bleeding (Figure 1). Moreover, swift transportation and a cesarean section system are necessary for emergency situations such as urgent cesarean section and postpartum massive bleeding.[5,6] Hemostatic procedures for postpartum hemorrhage, cesarean section, and hysterectomy, as well as life-saving cesarean section during maternal cardiac arrest, require coordinated efforts within a limited timeframe, necessitating smooth coordination throughout the operating room and the entire hospital.[7,8]

FEATURES OF OBSTETRIC CRISIS BLEEDING GUIDELINES AND REQUIREMENTS FOR EACH FACILITY

Despite advancements in medical technology leading to a significant decrease in maternal mortality rates, bleeding remains a major cause of maternal death. Life-threatening bleeding during or after childbirth occurs in approximately 1 in 300 pregnant women, with risk factors including repeated cesarean sections, multiple pregnancies, and anterior or low-lying placenta.[8] Obstetric bleeding resulting from conditions such as early detachment of the normally positioned placenta, uterine fibroids, eclampsia, amniotic fluid embolism, and adherent placenta often leads to disseminated intravascular coagulation syndrome (DIC), even with moderate bleeding.[9] Therefore, a DIC score considering obstetric underlying conditions becomes a crucial indicator for assessing severity, determining treatment strategies, and predicting treatment outcomes.

Injuries such as cervical lacerations and intra-abdominal or retroperitoneal hemorrhage, such as uterine rupture, are challenging to diagnose early. Furthermore, bleeding during cesarean section occurs relatively quickly and mixes with amniotic fluid, making it generally difficult to quickly assess the amount of bleeding. Therefore, physicians are encouraged to recognize various physical symptoms in the initial stage of massive bleeding. Furthermore, physicians should also be aware that abnormal vital signs should be evaluated using the shock index (SI), which is calculated by dividing the heart rate by the systolic blood pressure during the contraction phase.[10] Monitoring circulatory blood volume using SI is useful for fluid and blood transfusion-centered life-saving protocols for massive bleeding.[11] To prevent cardiac arrest due to decreased circulatory blood volume, it is crucial not only to understand the circulatory dynamics using SI but also to have a rapid high-level facility transportation system through early administration of substitute plasma and emphasis on blood products focusing on coagulation, in collaboration with medical control. Smooth medical control activation can achieve rapid transport to high-level facilities leading to better outcomes.

Figure 2 provides an overview of 2022 edition of Obstetric Crisis Hemorrhage Guidelines which focus on not only common essential points such as establishment of command or team toward crisis hemorrhage but also emphasizes obstetrics-specific recommendations related to coagulation, such as platelet counts, coagulation function tests, tranexamic acid administration, and fresh-frozen plasma transfusion.[12]

INTERPROFESSIONAL COLLABORATION IN THE OPERATING ROOM FOR OBSTETRIC EMERGENCY RESPONSE

Anesthesiologists, operating room nurses, obstetricians, and midwives, who protect the safety of patients in the operating room, are members of the perioperative management team. Regardless of the favorable environment for bleeding management through environmental improvement in the operating room, the performance of the perioperative management team conducting emergency response significantly influences the prognosis of both the mother and the child. In the event of an emergency

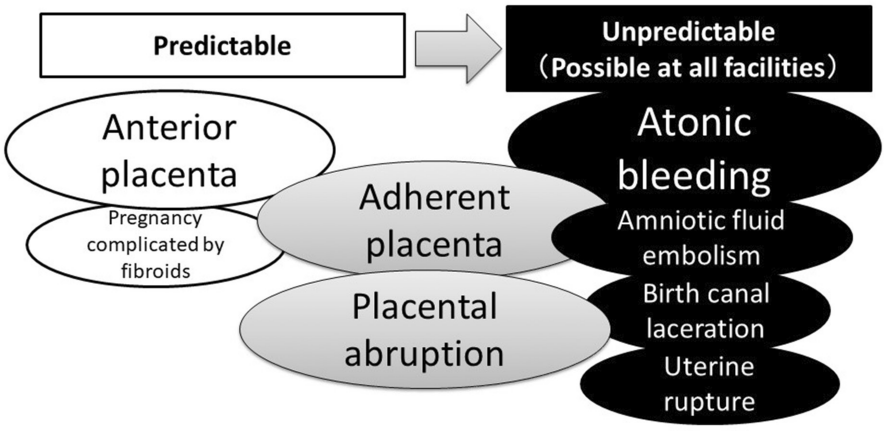

FIGURE 1 Classification of obstetric emergencies causing massive bleeding, etc.

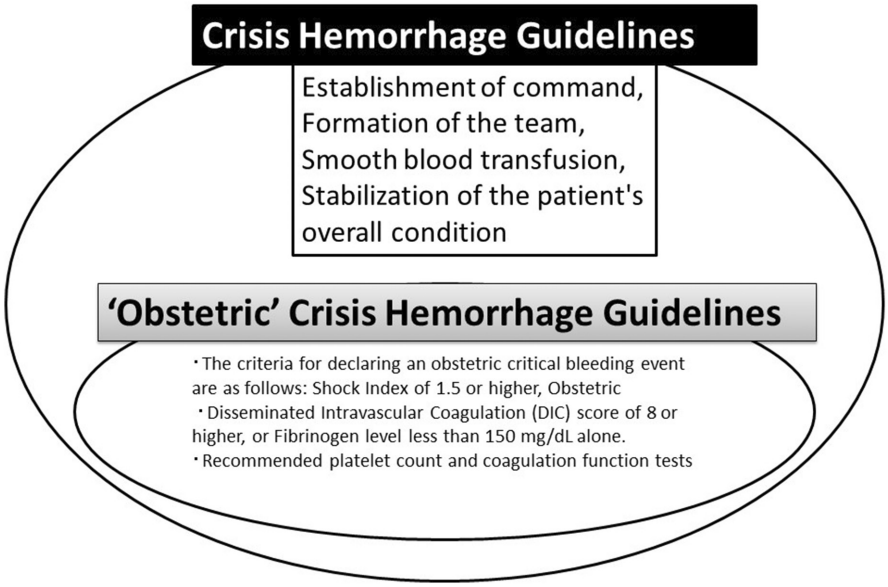

FIGURE 2 Characteristics of obstetric crisis bleeding guidelines.

in the operating room, the response site is classified into the surgical field and the non-surgical field based on cleanliness. For example, during a cesarean section, the obstetrician concentrates on delivery and hemostasis in the surgical field, and the scrub nurse also focuses on assisting with that. Outside the surgical field, the anesthesiologist collaborates with the circulating nurse for uterine contraction drug administration, hypertensive drug administration, and preparation and administration of fluid and blood transfusion. Thus, since the central focus is on both the surgical and non-surgical fields, meticulous coordination is essential.[13] Additionally, as a third response center, pediatricians and midwives handle neonatal resuscitation, and it is essential for anesthesiologists and circulating nurses to support midwives in maternal and child meetings. Anesthesiologists, as leaders of the perioperative management team, need to confirm the surgical field situation with surgeons and share information meticulously and accurately.[14] During emergencies such as massive bleeding, the coordination between the surgical and non-surgical fields, cultivated through daily clinical practice and training, is essential to exert maximum efforts in lifesaving (Figure 3).

NEED FOR INTER-DEPARTMENT COLLABORATION FOR OBSTETRIC EMERGENCY RESPONSE

So, what is necessary for building a medical system as a perioperative management team that can respond to obstetric emergencies? Table 1 shows the basic considerations that the perioperative management team should collectively discuss for obstetric crisis bleeding response. In addition to collaboration among professionals within the same department, collaboration among departments, including the radiology, transfusion, or testing department, is necessary for establishing an emergency blood transfusion system and testing system.[15] In operation room, medical staff should be aware of the collaboration between operation fields and non-operation fields. Especially, anesthesiologists, who are commanders of obstetrics emergency response in the operation room, should take an initiative role (Figure 4). For example, the commander anesthesiologist should consult other departments such as radiology, laboratory, and transfusion departments in case of massive hemorrhage. As the first step for the perioperative management team for obstetric emergency response, it is crucial to have discussions involving multiple medical departments and professions.[16,17] In an off-the-job environment, free from the tension of clinical duties, discussions on topics related to obstetric emergency response, consensus building, and the smooth operation of the system are necessary.[18]

Currently, most hospitals performing obstetric surgery operate a surgical department management committee. To create a consensus for obstetric emergency response and ensure the smooth operation of the system, not only leaders such as department heads and nursing directors but also the opinions of actively working doctors, nurses, and clinical engineers need to be appropriately reflected and built.[19] The lead author has continued to hold seminars on perioperative crisis management involving multiple professions to understand the roles of other professions and build collaboration.[20] This seminar aims to improve perioperative safety management from various perspectives by discussing a wide range of topics and conducting training on emergency response to postpartum massive bleeding and life-saving cesarean section in collaboration with emergency departments and obstetric wards.[21,22] Such interprofessional trainings contribute to mutual understanding and communication promotion among medical staff. Moreover, conducting joint seminars with educational hospital groups

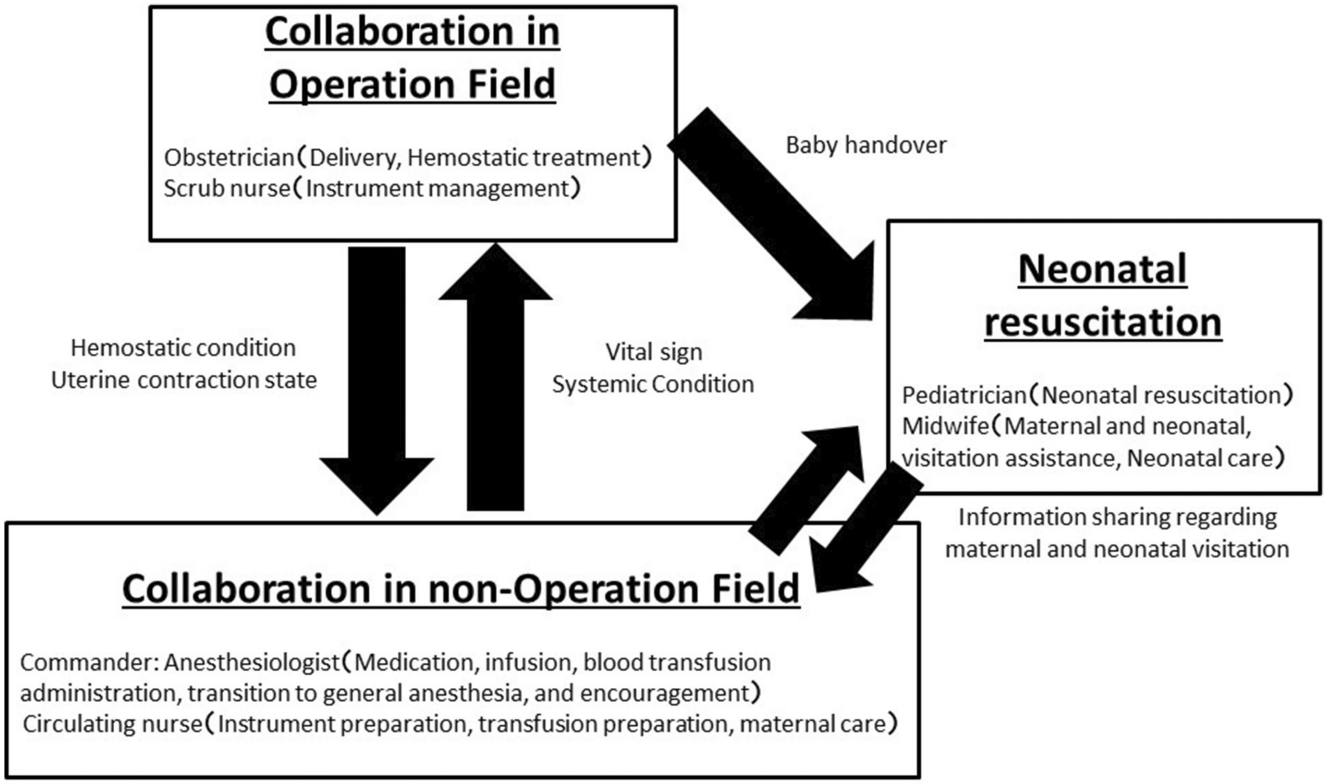

FIGURE 3 Collaboration within the operating room during emergency cesarean section.

TABLE 1 Considerations for improving obstetric emergency response in each facility.

- Early recognition and response system for massive bleeding including physical symptom
- Establishing command and control network as soon as possible
- Sharing recommendation of Obstetric Hemorrhage Guidelines
- Establishment of testing and emergency blood transfusion systems focusing on coagulation ability
- Collaboration among obstetrics, anesthesia, operating room nurses, and midwives (interprofessional collaboration)
- Collaboration among obstetric ward, operating room, ICU, transfusion department, testing department, and emergency department (inter-departmental collaboration)

allows us to gain new knowledge based on the diversity of approaches among hospitals and to share insights gained from joint training sessions with each hospital to improve maternal and child healthcare safety.[23,24]

LEADERSHIP, FOLLOWERSHIP, AND COMMUNICATION AS THE FOUNDATION FOR OBSTETRIC EMERGENCY RESPONSE

In interprofessional collaboration education, leadership alone is not enough; followership as a team member is also necessary.[25] Anesthesiologists take on leadership roles in emergency response in the operating room.[13] On the other hand, the obstetrician determines the classification of emergency cesarean sections, and their leadership needs to be respected. When entering the operating room, leadership for obstetric emergency response is delegated from obstetricians to anesthesia physicians. Leadership and respect for followership in these situations are fundamental to interprofessional collaboration. Obstetric emergency response may be impossible in some cases depending on the condition upon arrival. However, even in cases with unfortunate outcomes, by maintaining a mutually respectful attitude as the perioperative management team and providing the best possible response, deterioration of relationships between medical departments and professionals is less likely to occur in the future.

Since most of the faces of operating room healthcare providers are covered by masks, making it difficult to understand each other's expressions, communication through meta-language is challenging. In recent years, the importance of "orality," where the speed and intonation of speech significantly influence communication, has been emphasized.[26,27] Therefore, efforts should be made to greet and share information as cooperatively and politely as possible. Even the author, who is not good at communication, is making diligent efforts to express "please" during the timeout, and say "thank you" and "good job" as positively as possible at the end of surgery and when leaving, especially to midwives who have less frequent contact than operating room nurses. Additionally, efforts are made to talk to pregnant women at eye level instead of talking from above. Developing a collaboration foundation through communication is crucial, especially in routine cesarean section cases.

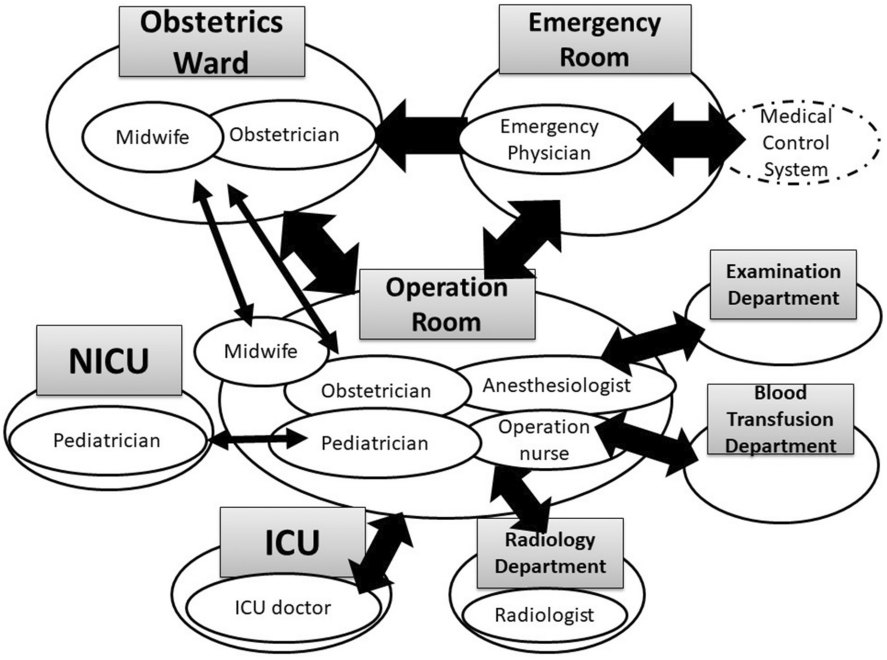

FIGURE 4 Necessity of inter-departmental collaboration in obstetric emergency response.

POSSIBILITY FOR SIMULATION-BASED EDUCATION FOR INTER-DEPARTMENT TRAINING FOR OBSTETRICS EMERGENCY

Simulation-based training improves patient safety in the operating room.[28] It not only enhances technical skills but also develops non-technical skills like situation awareness, cooperation, decision-making, leadership, and communication in emergency situations. "Perioperative team" training is crucial for crisis management, especially in scenarios like intraoperative bleeding and cardiac arrest.[29]

To maximize survival rates and prognosis, the entire perioperative team needs advanced non-technical skills in both cognitive and interpersonal aspects. Training in non-technical skills for emergency medicine and rapid response teams is well-described.[30] Evaluation tools like Oxford NOTECHS and Anesthesiologists' Non-Technical Skills (ANTS) were developed for surgical team non-technical skills.[31,32] The Oxford NOTECHS scale was developed from an aviation instrument for assessment of non-technical skills. The ANTS are behaviors that an anesthesiologist exhibits in an operating room environment that are not directly related to drugs, equipment, and medical expertise. However, I believe these systems may not fully cover factors relevant to the obstetrics emergency response.

Obstetric crises are often identifiable, and there is restricted non-verbal communication due to masks and goggles. This calls for a modified non-technical skill evaluation tool based on the operating room's unique characteristics. Obstetric crisis management teams among various departments such as emergency rooms or operating rooms have distinct features, requiring a modified evaluation tool. Operative and non-operative personnel have specific roles, maintaining collaboration within their designated spaces. While the Oxford NOTECHS system recognizes roles, it lacks consideration for inter-department cooperation, focusing more on generic teamwork skills. I propose assessment methods recognizing distinct roles and collaboration between operative and non-operative personnel in real and simulated intraoperative crisis management in obstetrics.

I previously suggested modifying crisis management evaluation elements in the Oxford NOTECHS or ANTS tools to include assessment for interaction and collaboration between operative and non-operative field personnel.[32] This could involve evaluating "shared situational awareness between operative and non-operative fields" and "effective verbal communication between operative and non-operative fields." Recently, I believe such modifications should extend to inter-department collaboration among the operating room, obstetric ward, or emergency department. Shared situational awareness and effective communication within the entire hospital or obstetrics emergency response network can improve resuscitation rates for both mother and baby.

I believe that continuous formative assessment of these factors could further enhance the effectiveness of perioperative team management simulation training for resuscitation in various obstetric crisis situations.

CONCLUSION

I have discussed the significance of interprofessional collaboration in obstetric crisis bleeding response, covering guidelines, facility requirements, and leadership. I also explored the potential of simulation-based education for effective

inter-department perioperative team management during various obstetric crises, emphasizing the need for continuous assessment to enhance overall performance.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

Approval of the research protocol: N/A.
Informed consent: N/A.
Registry and registration no. of the study/trial: N/A.
Animal studies: N/A.

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