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Emergency Obstetrics for the Emergency Medicine Provider

Maxwell Ian Cooper, MD*, Dimitrios Papanagnou, MD, MPH, Mike Meguerdichian, MD, MHPed, Komal Bajaj, MD

*Corresponding author: mcooper86@gmail.com

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Abstract

Introduction: Emergency medicine physicians must have the knowledge and skills to stabilize all life-and-limb-threatening conditions. These skills are especially important considering that the 1989 COBRA act clearly defines active labor as a condition unsuitable to transfer. Given this context, we thought it necessary to create a work that could be used to provide emergency physicians with the necessary skills to assist in deliveries both routine and complex. **Methods:** The total time requirement for the workshop is 4 hours. Before the session begins, learners are asked to fill out a survey. Learners complete two 40-minute small-group sessions on the topics of normal vaginal delivery and shoulder dystocia with hands-on training with birthing manikins. After a short break learners complete a 65-minute small-group session for breech delivery with hands-on training. Each small-group session is preceded by a whole-group demonstration of required skills lasting 15 minutes as well a mini lecture on maternal hemorrhage and estimation of blood loss. **Results:** Our workshop has been shown to successfully educate emergency physicians with a range of obstetric experience and improve their knowledge base and hands-on skills. One hundred percent of our learners felt this workshop was appropriate for them and met its stated goals. **Discussion:** While this is not the first workshop to educate on obstetric deliveries and their possible complications, it is the first to be created with the emergency medicine provider as the intended audience and the first to create a curriculum around uncomplicated delivery, shoulder dystocia, breech delivery, and postpartum hemorrhage.

Keywords

Workshop, Simulation, Shoulder Dystocia, Emergency Medicine, Postpartum Hemorrhage, Obstetrics, Breech Delivery, Spontaneous Vaginal Delivery

Educational Objectives

By the end of this module, the learner will be able to:

1. Describe and demonstrate the steps and maneuvers to safely deliver a child by spontaneous vaginal delivery.
2. Describe and demonstrate the steps and maneuvers to safely deliver a child whose birth is complicated by shoulder dystocia.
3. Describe and demonstrate the steps and maneuvers to safely deliver a child whose birth is complicated by breech presentation.
4. Describe and demonstrate the steps to manage a birth complicated by postpartum hemorrhage.
5. Describe how to estimate the volume of maternal blood loss using common household objects and through size of floor spill.

Introduction

Emergency medicine (EM) physicians must have the knowledge and skill to stabilize all life-and-limb-threatening conditions. This is especially true in regard to childbirth, as there are two patients involved. The 1989 COBRA act clearly defines active labor as a condition unsuitable to transfer. The reasoning behind this definition is to protect women from being transferred in an unstable state. However, it has the

Appendices

- A. Knowledge Survey.docx
- B. Schedule.docx
- C. Spontaneous Vaginal Delivery Topic Sheet.docx
- D. Shoulder Dystocia Topic Sheet.docx
- E. Breech Delivery Topic Sheet.docx
- F. Hemorrhage Control Topic Sheet.docx
- G. Shoulder Dystocia Simulation Case.docx
- H. Postpartum Hemorrhage Simulation Case.docx
- I. Knowledge and Opinion Survey Data.docx
- J. Estimated Blood Loss Presentation.pptx
- K. Postworkshop Opinions Survey.docx

All appendices are peer reviewed as integral parts of the Original Publication.

added effect of necessitating emergency physicians to attempt high-risk obstetric procedures that might have better outcomes if performed by obstetricians.

While precise data on emergency department births are unknown in the United States, there has been a trend over the last decade of an increasing number of out-of-hospital births, increasing from 0.86% to 1.36% of total live births from 2004 to 2012.¹ Among live births there is estimated to be a 0.6%-1.4% chance of the birth being complicated by shoulder dystocia, defined by the American Congress of Obstetricians and Gynecologists and the Royal College of Obstetricians and Gynaecologists as “any birth requiring additional obstetric maneuvers when gentle downward traction has failed.”^{2,3} Additionally, the rate of breech presentation is estimated to be 2.6%-4.9% in singleton pregnancies.^{4,5} If these estimations are correct, between one out of 31 and one out of 16 live, singleton, term pregnancies are complicated by shoulder dystocia or breech presentation.

While the specific data on nationwide emergency department birth epidemiology are unknown, emergency physicians know from experience that childbirth does occasionally occur in the emergency department. It is known that the rates of shoulder dystocia and breech birth are 0.6%-1.4% and 2.6%-4.9%, respectively.²⁻⁵ We were therefore curious about how prepared EM physicians were for managing these deliveries. As part of our educational initiative, we conducted a pre- and posttest survey designed to assess who the learners are, how many deliveries they have managed, their confidence to manage a variety of deliveries, and their knowledge base regarding emergency obstetrics. The pre- and posteducational intervention given to our learners is shown in the knowledge survey (Appendix A).

Our surveys demonstrate that our workshop was effective teaching a wide variety of emergency physicians at various levels of training (interns through fellows). Our workshop increased our learners' exposure, improved their knowledge, and increased their confidence in their ability to perform emergency obstetric maneuvers. For a full look at our data, please review the knowledge and opinion survey data (Appendix I).

Previous educational works published in MedEdPORTAL on the topic of emergent obstetric maneuvers have tended to focus on the management of shoulder dystocia. A search of *shoulder dystocia* in MedEdPORTAL yielded four results. The first result, titled “Shoulder Dystocia,”⁶ focuses on giving obstetric providers an opportunity to train in the hand movements required to manage shoulder dystocia. However, the target learners for this activity are obstetric providers, and thus, the course is targeted towards a population of learners more experienced with obstetrics than the EM providers who are the target learners of our course.

The second result of a MedEdPORTAL search for *shoulder dystocia* was a work titled “Shoulder Dystocia in Labor and Delivery: Interprofessional Team Response.”⁷ This work, while including an overview of hand maneuvers needed for effective management of shoulder dystocia, focuses on the management of an interprofessional team of physicians, nurses, scrub techs, and secretaries. Our work focuses more heavily on the necessary maneuvers to manage shoulder dystocia.

The last two results of a MedEdPORTAL search for *shoulder dystocia* were works titled “An Introduction to the Management of Labour and Delivery—A Simulation-Based Obstetrics Workshop for Medical Students”⁸ and “Third Year Emergency Medicine Multiple-Patient Simulation.”⁹ Both of these works cover a variety of topics from introductory obstetrics to proper management of snakebites. They involve simulation for learners to demonstrate understanding of the management of shoulder dystocia, but that is not the focus of these works. Our work dives deeper into the proper maneuvers and management of shoulder dystocia.

The second major topic of our work is appropriate management of a breech delivery. This is a topic not heavily covered in MedEdPORTAL. A search of *breech delivery* yielded zero results, and a search of *breech* yielded two results. The first result, titled “Disclosure of Adverse Events—An OSCE Series for

Ob/Gyn Residents,”¹⁰ focuses on training residents how to properly disclose and discuss bad news with a patient. This occurs in the setting of a breech delivery, but appropriate management of a breech delivery is not the focus of the work. The second work found using these search terms was titled “Spinal Anesthesia (SPA)—A Clinical Skill Bootcamp.”¹¹ This work does not discuss management of shoulder dystocia or breech delivery and is not relevant to our topic.

Methods

The lack of a previously vetted educational workshop to fill the need of emergency providers motivated our team to create the described workshop. As emergency providers, we are not as versed in emergency obstetrics as Ob/Gyn providers. For this reason, we thought it would be pertinent to provide an opportunity to improve our learners’ knowledge base in addition to practicing hands-on maneuvers. In the materials provided, the focus is on educating about maneuvers and giving time to workshop these skills. The topic sheets included attempt to provide a strong knowledge base to illustrate the context with which these maneuvers exist.

The suggested schedule for the workshop is located in Appendix B. The total time requirement for the workshop is 4 hours. Before the session begins, learners are asked to fill out a survey (Appendix A). The schedule allows 40 minutes each for small-group sessions on the topic of normal vaginal delivery and shoulder dystocia. In these sessions, our residents received hands-on training with birthing manikins under the supervision of obstetric and EM staff. Our schedule also allows for 65 minutes of small-group sessions for breech delivery also focusing on hands-on training under the supervision of obstetric/EM staff. Each of these small-group sessions is preceded by a whole-group demonstration of required skills lasting 15 minutes.

Time is given in the middle of the workshop for a short break. Additionally, the workshop’s small-group sessions are broken up by a whole-group mini-lecture on maternal hemorrhage and estimation of blood loss. We created this break to allow our learners to maintain focus in the second half of the workshop. We found that given this break, the learners effectively maintained focus throughout the workshop.

Our whole group consisted of approximately 30 residents. During the whole-group sessions, they organized themselves in a semicircle around the demonstration to observe the necessary skills. We broke our class up in four small groups, each containing seven to eight residents and led by two attending staff, one each from obstetrics and EM, to ensure that the education was from content expert (obstetric staff) and was made clinically relevant to EM residents (EM staff). Additionally, there was a floating EM staff member to ensure the groups maintained the schedule and to provide additional support if any small groups needed extra help learning skills.

This organizational strategy worked well for a group our size but could easily be scaled up or down depending on the number of learners. We found that seven to eight learners per small group was an appropriate number for all learners to get hands-on training in the time allotted. If the workshop is being organized for smaller or larger groups, we recommend maintaining this size of small group and increasing the total number of small groups that the workshop is broken into. If the group gets so large its members cannot all clearly see the whole-group demonstration of skills, we recommend using AV equipment to project this demonstration on a screen while using microphone/speakers so all can see and hear.

The last hour of the workshop is devoted to enacting a sim case that calls upon the learners to utilize some of the skills they have acquired over the previous 3 hours. In this section, volunteers are requested from the audience. They then attempt to care for the simulated patient while the simulation leader provides prompts. After the simulation case, the floor is opened to the whole group to discuss the simulation.

The spontaneous vaginal delivery topic sheet (Appendix C) should be made available to the learners at minimum 24 hours prior to the workshop to allow them the review the relevant information included in the handout. This information is then further reinforced during the large-group demonstration by the workshop leader, with a focus on the maneuvers required for successful vaginal delivery, how to manage nuchal cords, and how to manage the afterbirth. The whole group then splits into its component small groups, and these skills are further reinforced under the supervision of obstetric/EM staff and manikins. Importantly, each of the learners must have time to personally experience and practice these maneuvers on low-tech obstetric simulators.

The shoulder dystocia topic sheet (Appendix D) should be made available to the learners at minimum 24 hours prior to the workshop to allow them the review the relevant information included in the handout. This information is then further reinforced during the large-group demonstration by the workshop leader, with a focus on the maneuvers required for successful shoulder dystocia delivery, including identification of shoulder dystocia, McRoberts maneuver, application of suprapubic pressure, Woodscrew maneuver, delivery of posterior arm, fracture of fetal clavicle, and Zavanelli's maneuver. The whole group then splits into its component small groups, and these skills are further reinforced under the supervision of obstetric/EM staff and manikins. Importantly, each of the learners must have time to personally experience and practice these maneuvers on low-tech obstetric simulators.

The breech delivery topic sheet (Appendix E) should be made available to the learners at minimum 24 hours prior to the workshop to allow them the review the relevant information included in the handout. This information is then further reinforced during the large-group demonstration by the workshop leader, with a focus on the maneuvers required for successful breech delivery, including Pinard maneuver, Bracht maneuver, Loveset maneuver, Mariceau-Smellie-Veit maneuver, and Duhrssen's incision. The whole group then splits into its component small groups, and these skills are further reinforced under the supervision of obstetric/EM staff and manikins. Importantly, each of the learners must have time to personally experience and practice these maneuvers on low-tech obstetric simulators.

The postpartum hemorrhage topic sheet (Appendix F) should be made available to the learners at minimum 24 hours prior to the workshop to allow them the review the relevant information included in the handout. This information is then further reinforced during the large-group demonstration by the workshop leader, with a focus on a discussion of the various causes and treatments (i.e., fundal massage, medical therapy) of postpartum hemorrhage. The group will have a brief opportunity to watch an expert practice fundal massage and practice on a manikin in small groups.

The shoulder dystocia simulation case (Appendix G) was simulated with five residents at various stages of training performing various roles in the resuscitation. One resident was chosen as team leader to direct the residents in various jobs assisting in resuscitation. The rest of the workshop observed the case. The sim case used a high-tech simulator (Noelle) as the patient. The sim case could also be performed with a dual-task trainer, which would involve a standardized patient controlling the descent of the fetus in response to appropriate maneuvers. Our group had the opportunity to use Noelle and thought it would be beneficial to be exposed to a variety of simulation experiences. The focus of the case was recognizing that this delivery was complicated by shoulder dystocia and calling upon the techniques just learned to deliver the infant. After the simulation was completed, it was debriefed, and the participants and observers had a discussion regarding what they learned facilitated by the workshop leader.

The postpartum hemorrhage control simulation case (Appendix H) was simulated with five residents at various stages of training performing various roles in the resuscitation. One resident was chosen as team leader to direct the residents in various jobs assisting in resuscitation. The rest of the workshop observed the case. The sim case used a high-tech simulator (SimMom) as the patient. The sim case could also be performed with a dual-task trainer, which would involve a standardized patient verbalizing responses to appropriate interactions. Our group had the opportunity to use SimMom and thought it would be

beneficial to be exposed to a variety of simulation experiences. The focus of the case was recognizing that this postpartum patient was undergoing postpartum hemorrhage and using recently learned techniques and knowledge to control the hemorrhage. After the simulation was completed, it was debriefed, and the participants and observers had a discussion regarding what they learned facilitated by the workshop leader. They were then reminded to fill out and submit the postworkshop opinion survey (Appendix K).

The estimated blood loss PowerPoint presentation (Appendix J) consists of one slide and serves as a backdrop for a discussion the workshop leader has with the learners. The PowerPoint specifically refers to common household objects that can be used to estimate blood loss. These objects should be demonstrated during this presentation. In our demonstration, we poured a standard-sized can of red soft drink onto a medical chuck. The learners were then encouraged to evaluate the chuck so as to see what that volume of blood loss would look like on the floor. Although we chose not to because of time constraints, we would certainly encourage future workshops to demonstrate multiple-sized fluid spills if time allows.

To enact this program, we recommend at minimum one EM faculty and one obstetric-gynecology faculty per eight residents with an additional faculty member available to float between groups and fill in as needed for any who require additional assistance learning and to keep the workshop on schedule. In our workshop, we had 30 residents and nine staff. This included four obstetric-gynecology attendings and five EM attendings.

AV equipment is necessary to provide sufficient visual and audio stimuli for a large group to see the whole-group demonstrations. Additionally, one large room or several smaller rooms are necessary to divide the participants into small groups. In our workshop, we had one large room where we convened for the introduction, wrap-up, whole-group demonstrations, and estimation of maternal blood loss mini-lecture. During the small-group session, we then divided into four small groups. Two small groups remained on opposite sides of the large room described above. The other two went into an adjoining room and worked on opposite sides of the room.

Results

As part of our postsession survey analysis, we included several questions regarding our learners' experience and opinions of the workshop. [Table 1](#) and [Table 2](#) show the results of the survey.

Table 1. Level of Training

Level of Training	Preworkshop % (N) ^a	Postworkshop % (N) ^b
EM-1	35.48 (11)	34.62 (9)
EM-2	22.58 (7)	23.08 (6)
EM-3	35.48 (11)	34.62 (9)
EM-4 or higher	9.68 (3)	7.69 (2)

^aTotal survey respondents = 32.

^bTotal survey respondents = 26.

Table 2. Opinions of the Workshop

Question	Strongly Agree % (N)	Somewhat Agree % (N)	Neutral % (N)	Somewhat Disagree % (N)	Strongly Disagree % (N)
The presenters communicated information clearly.	100 (26)	0 (0)	0 (0)	0 (0)	0 (0)
The presenters seemed knowledgeable on the subject matter.	100 (26)	0 (0)	0 (0)	0 (0)	0 (0)
The workshop was relevant to me.	96.15 (25)	3.85 (1)	0 (0)	0 (0)	0 (0)
The workshop met its stated goals.	100 (26)	0 (0)	0 (0)	0 (0)	0 (0)
The handouts/supporting materials were useful.	80.77 (21)	19.23 (5)	0 (0)	0 (0)	0 (0)
The workshop was an appropriate amount of time.	92.31 (24)	7.69 (2)	0 (0)	0 (0)	0 (0)

The data in the tables indicate that there is a need for a workshop such as this in EM education. A full 100% of respondents agreed that this workshop was relevant to them. A further 96% of respondents said it was very relevant for them. All respondents agreed that the workshop met its stated goals. Furthermore,

all respondents agreed the workshop took an appropriate amount of time, with 92% strongly agreeing. The workshop took place over a 4-hour period during our residents' weekly didactic session. This demonstrates the plausibility of incorporating this workshop into any standard EM curricula.

Below are a collection of responses from our residents describing the workshop in their own words.

- What was the best aspect of the workshop?
 - "Summarized."
 - "Describing the various maneuvers."
 - "Hands on experience, ability to practice, low pressure environment."
 - "It was great to have our OB colleagues involved in the workshop."
- What aspect of the workshop needs improving?
 - "More concise handouts."
 - "Provide handouts in advance."
 - "If the final sim done at the end was available for everyone or more people, that would have improved the experience."

When asked what aspects of the workshop the learners felt were best, many responded that they liked the hands-on session with the obstetric simulators. Others commented on the stepwise approach provided in our didactic sessions and the ability to work in tandem with obstetric staff as being valuable aspects of the workshop. Some further praised the handouts as being particularly useful.

When asked what aspects of the workshop the learners thought most needed improvement, many said no improvements were needed. Of those who thought there could be improvements, some thought the handouts could be simplified. Others suggested earlier access to the topic sheet handouts. Suggestions were also made about the AV equipment we used. The original plan for our session was to have a video camera record the group leader demonstrating obstetric maneuvers and project it on a large screen for the audience. During our workshop, the AV equipment was not functioning properly, and we instead had our workshop participants gather in a semicircle around the lead instructor as the obstetric maneuvers were demonstrated.

Further analysis of our learners' knowledge and experience pre- and postworkshop was conducted. This demonstrated that our learners significantly increased their knowledge base and experience with hand maneuvers by attending our workshop. For this more detailed analysis, please review Appendix I.

Discussion

From inception to completion, the goal of this workshop was to provide an opportunity for emergency providers in training to improve their skills with emergency obstetrics. According to our learners, this goal was accomplished. Our workshop balances the need to provide a strong background in knowledge with providing time to improve techniques to assist in birthing. No workshop is without limitations or ways it can be improved upon. Some thoughts on limitations of our workshop and methods of future improvement are below.

The workshop requires several sets of simulators. Our group used one simulator set up in the central part of the room to demonstrate obstetric maneuvers to the group. We used a further three simulators (for a total of four) when divided into small groups. The last section of our workshop was a simulated obstetric emergency. The patient had shoulder dystocia complicated by postpartum hemorrhage. Our simulation used a Noelle simulator for this scenario. In total, our workshop used four low-tech obstetric simulators and one high-tech simulator (Noelle). We had a dedicated sim center in which we conducted this workshop. A group attempting to replicate this workshop would need these resources. Inability to access

appropriate simulation tools would greatly limit the ability of this workshop to be replicated. If access to low-tech simulators but not high-tech simulators is achievable, the program could be successfully implemented.

A further limitation of the workshop is the expertise necessary to staff it. We designed our small groups to be staffed by both emergency physicians and obstetric physicians so as to provide a clear perspective from each specialty. Attempts to limit the staffing to either emergency staff only or obstetric staff only would likely limit the educational benefit of the workshop.

To further improve the workshop, we recommend additional simplification of the topic sheets to fit the learning styles of the learners in question. Furthermore, some of our learners believed that earlier access to the topic sheets would provide a richer learning environment.

Maxwell Ian Cooper, MD: Emergency Medicine Physician and Former Resident, Sidney Kimmel Medical College at Thomas Jefferson University

Dimitrios Papanagnou, MD, MPH: Associate Professor of Emergency Medicine, Sidney Kimmel Medical College at Thomas Jefferson University; Vice Chair for Education, Sidney Kimmel Medical College at Thomas Jefferson University; Assistant Dean For Faculty Development, Sidney Kimmel Medical College at Thomas Jefferson University

Mike Meguerdichian, MD, MHPed: Clinical Co-director, Simulation Center, NYC Health + Hospitals; Medical Director, Simulation Center Harlem, NYC Health + Hospitals

Komal Bajaj, MD: Associate Professor of Clinical Obstetrics & Gynecology and Women's Health, Albert Einstein College of Medicine

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Ethical Approval

Reported as not applicable.

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