

CTG simulation with practical relevance



Passion for simulation.

SKILLOUBE

A case study

A 32-year-old female patient was admitted to our obstetric clinic at 39 weeks' gestation after complaining of persistent pain and vaginal bleeding. The admission examination revealed a cervical dilatation of 4 cm and sonographically confirmed premature placental abruption. Continuous CTG monitoring showed repetitive late decelerations of variable intensity, indicating fetal hypoxia. Under intensive monitoring and careful consideration of maternal and fetal risks, an emergency caesarian was performed, resulting in the delivery of a hypoxic newborn. Assisted ventilation was given, to which the infant responded adequately. There was improvement in hypoxia. Admission to the neonatal intensive care unit was made for further monitoring.



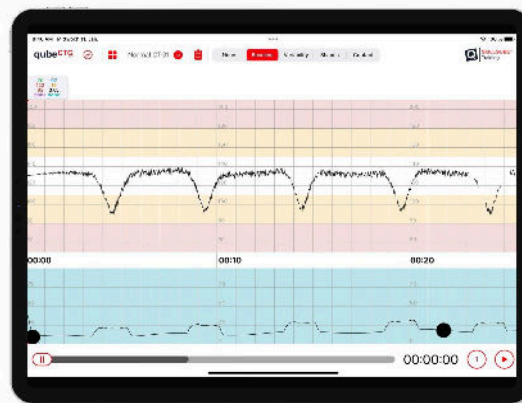
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Birth training simulation



That's what the summary of an obstetrical simulation scenario might sound like. Midwives, nurses and gynecologists work closely together to perform initial diagnostics and determine the treatment pathway. The anesthesiology team is responsible for providing anesthesia during the cesarean section and stabilizing the mother's vital signs as needed. The neonatology team, which is called at an early stage, carries out the treatment of the newborn following delivery.

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[Here](#) you can find out more about our simulator for premature infants!

Systematic training

The scenario and the large number of specialists who need to be coordinated show how complex the care of mother and child can be in critical situations. Targeted training of basic knowledge and skills increases patient safety, reduces the risk of complications and saves costs. Incorrect or complication-prone treatments can cause widespread harm. In the focus are mother and child, whose health can be directly affected. However, it should also be noted that after such critical situations, treating professionals are often under high psychological stress, which can lead to sick leave. Systematic training therefore offers several advantages for patients, organizations and employees.

Learners group and their needs

In advance of a training course, trainers and coaches must check what needs and requirements their learners group has. In our scenario, the target group was very heterogeneous. Anesthesia professionals have other perspectives than obstetric or pediatric staff. Thus, the first step was to consider which part of the target group had individual learning needs and which content could be taught in a generalized way. The respective focus and type of training must also be determined. For this purpose, we at **SKILLQUBE** like to orient ourselves on the cycle of learning.

The cycle of learning

If the focus is on knowledge transfer, it should be checked whether all participants have a similar basic knowledge on which a joint exercise can be built. For example, do all participants know the relevant processes and algorithms?

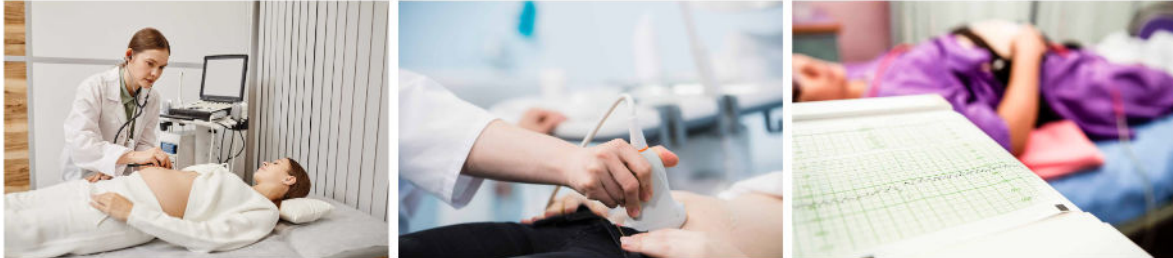
Skill training differs depending on the specialty. While anesthesia professionals focus on airway management, among other things, obstetric staff have their own diagnostic and therapeutic techniques that can be taught during skills training.

The case scenario we described relates primarily to the areas of "decision-making" and "team training", so it is intended for an advanced group of learners. In advance of a training course, trainers and coaches must check what needs and requirements their learners group has. In our scenario, the target group was very heterogeneous. Anesthesia professionals have other perspectives than obstetric or pediatric staff. Thus, the first step was to consider which part of the target group had individual learning needs and which content could be taught in a generalized way. The respective focus and type of training must also be determined. For this purpose, we at **SKILLQUBE** like to orient ourselves on the cycle of learning.



Three diagnostics procedures are particularly important in the context of an obstetric emergency:

1. The physical examination
2. The ultrasound examination
3. The cardiotocography (CTG)



In this handout, we provide tips on the use of simulated cardiotocography (CTG). CTG is a procedure that can be used to register fetal heart rate and labor activity. Fetal heart rate is measured with a Doppler ultrasound and is expressed in beats per minute. Labor activity is detected by a pressure sensor called a tocodynamometer. Evaluating a CTG requires expertise and experience. If there is a drop in heart rate (decelerations), this may indicate a critical situation. This is particularly true if the decelerations occur following a contraction (late decelerations). In our case scenario, it was therefore necessary to act quickly. Every move had to be right and every decision had to be sustainable.

Typical pitfalls in obstetric simulation using a CTG simulator

1. **Pitfall: Unclear learning objectives**
 - Define clear, specific and measurable learning objectives for each training scenario. Include your expectations regarding CTG use.
 - Use the SMART criterion to ensure your learning objectives are specific, measurable, achievable, relevant, and time-bound.
2. **Pitfall: Unexpected technical problems**
 - Conduct a comprehensive check for the CTG simulator and other simulators and materials before each training session
 - Implement a maintenance schedule for all your simulation equipment to minimize downtime.
3. **Pitfall: Lack of communication within the team**
 - During training, emphasize the importance of communication and the use of standardization communication protocols. Also address the importance of technical language (“The CTG shows late decelerations. This means that... We must now proceed as follows...”). This is the only way other professionals (such as the anesthesia team) can understand what the patient’s condition is and how to proceed.
 - Implement regular team training where clear communication and role responsibilities are practiced.

4. Pitfall: Unrealistic scenarios

- Create realistic simulation scenarios based on clinical practice. For this, choose the typical events that all team members should understand after the training (e.g., fetal bradycardia due to oxygen deprivation).
- Create your scenarios based on current clinical guidelines and real-world experiences to ensure authenticity.

5. Pitfall: Lack of structured debriefings

- Conduct structured debriefings after each scenario to reflect on what you've learned and identify opportunities for improvement. If doing so, consider the role of the technical content (e.g., reporting a CTG) and the role of the communication components (e.g., team coordination in an emergency situation).

Realistic simulation environment

In order to train in a sustainable way, it is important to work in a realistic simulation environment. While we started developing [monitoring simulators](#) many years ago and have expanded our portfolio with ventilation simulators, we can now also provide obstetricians and midwives with realistic training tools such as the **qubeCTG**. In the context of scenario training, the decision to perform an emergency cesarean can be made quickly and realistically on the basis of deceptively real patient data. All members of a multiprofessional team benefit from this additional realism and are prepared for an actual emergency situation even better.



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