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Twin vaginal delivery: To maintain skill - simulation is required

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ABSTRACT

Background: Although most societies of obstetrics advocate vaginal delivery of twins, there has been a steady rise in the rate of twin cesarean sections. We risk perhaps losing in a single generation our obstetrical learning and skills because of medicolegal and emotionally charged issues.

Methods: We have therefore designed a realistic as possible simulation model of second twin delivery and tested it on residents in obstetrics.

Findings: Between two trials, we noted a significant improvement in the time required for internal podalic version and breech extraction. We also observed a significant improvement in the confidence score between the two trials.

Interpretation: We have designed a simulation device that improves obstetrical skills for second twin delivery and which we hope will participate in the comeback of vaginal delivery for this indication and contribute to the fight against the dangerous trend of rising rates of cesarean delivery for twins. Our model completely fits the paradigm of simulation in medical pedagogy.

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Introduction

Twin delivery has always been a matter of discussion among perinatologists. The first revolution in the 1990s was the notion that active management of second twin delivery was preferable to delayed delivery, which resulted in worse perinatal outcome [1–3]. Meanwhile, medicolegal and social considerations resulted in a dramatic rise in C-section rate [4] and also a loss of obstetrical skills leaving the next generation with caesarean delivery as its sole tool, and even the inability to perform emergency procedures faster than cesarean delivery. In parallel, we now have to face all the complications of undue uterine scars [5]. American consensus guidelines as well as French guidelines recently promoted vaginal delivery of twin pregnancies [6,7]. According to these guidelines, second twin delivery should be actively managed and this depends largely on knowledge of specific obstetrical maneuvers. Training residents in these maneuvers remains a difficult priority and even

leads some authors to speak of “innovate or abdicate”. A parallel goal is to train obstetricians to maintain their skills and teach them to future generations of clinicians. Change in experience may require use of innovative strategies to help improve residents' basic obstetric skills [8].

The most recent analysis of trends in twin delivery demonstrates rising rates of cesarean delivery (as high as 75% in 2008), regardless of the second twin's presentation [4]. Nevertheless, the *Jumeaux Mode d'Accouchement* study of a large prospective cohort in France concluded that noncephalic and cephalic second twin presentations after vaginal delivery of the first twin above 32 weeks of gestation are associated with similar low composite neonatal mortality and morbidity [9], therefore these authors advocate vaginal delivery “as long as the obstetrical skillsets remain available”. Thus, this increase in cesarean rates in twins, despite recommendations to practice vaginal birth, which involves fewer maternal and fetal risks, is due to a lack of obstetricians trained in these maneuvers and who choose the supposed ease of C-sections.

We postulate that young obstetricians should be trained in twin vaginal birth that includes internal podalic version and breech extraction for the delivery of an unengaged (cephalic or not)

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second twin. Nowadays, unfortunately, skills acquisition at the patient's bedside is difficult and even almost unimaginable in the early stages of learning. The admonition “Never the first time on the patient” written in gold letters at the entrance of the Center for Medical Simulation (CMS) in Boston (MA, USA) acquires its full force in this setting [10]. And it is in this context that simulation finds its value [11]. Interestingly, most practicing obstetricians interviewed for a study identified simulator-based training as the preferred mode of training [12]. Simulation plays a key role in medical education for training regarding low-frequency high-acuity events in obstetrics. There is renewed interest in the use of simulation for operative obstetrics [13] and we therefore present our device for second twin delivery simulation and its evaluation.

Materials and methods

Our University (Paris VII Denis Diderot) has recently developed a simulation center (Illumens Paris Diderot) dedicated to the teaching of all types of healthcare courses and to developing both technological and cross-functional procedures. In this context, we set up some second twin vaginal delivery training sessions for residents in obstetrics. The purpose of these sessions was to design a valuable model for extraction of the second twin and to test the hypothesis that we would see an improvement between two sessions in the skills of medical students regarding internal podalic version and breech extraction.

We evaluated 10 obstetrics residents at the Illumens Simulation center in two sessions separated by one month. We used the simulator SimMom (Laerdal©) (Fig. 1). This simulator is a realistic human-sized mannequin that allows for multiple medical procedures including instrumental fetal extraction and obstetrical maneuvers. We modeled an amniotic sac very simply with the help of a thin and transparent plastic trash bag filled with water at 37 °C. A fetus model representing a twin of about 2500 g was placed in the bag, which was simply closed by a knot while carefully removing the air (Fig. 2). The whole amniotic cavity with the fetus was placed in the abdominal structure of the SimMom model whose volume represented a gravid uterus. The fetus was placed by the teacher-trainer in an unengaged cephalic presentation with its back to the left or right of the patient (Fig. 3). The student was not aware of the exact presentation.

Maneuvers were also evaluated with the Gaumard manikin©, which is also a possibility for such simulations (results with this model are not presented in this study). The sessions were divided into three parts: briefing, simulation exercise and debriefing.

Before the maneuver, each student was briefed about the procedure for second twin delivery, which was based principally on what we developed previously on an interactive CD-ROM based on obstetric techniques focused on the management of twin pregnancies, including three-dimensional models and interactive sequences (Obstetric techniques for twin pregnancies, Guigoz Laboratories, Marne-la-Vallée, France). Particular attention was



Fig. 1. SimMom manikin (Laerdal©).



Fig. 2. Amniotic cavity building.



Fig. 3. Intra-abdominal placement.

paid to the means of identifying the fetus's foot and the technique of rotation. Before the procedure, the student was also asked to concentrate and to try and act as if he/she was in a real clinical situation.

We evaluated in the 2 sessions each student's performance in the obstetric maneuvers and his/her feelings. The obstetric maneuvers were evaluated from when the student's hand entered the patient's vulva to when the fetal foot exited the vulva (Fig. 4), but also to when the fetal head was brought to the vulva. This covered, therefore the time needed to complete internal podalic version and breech extraction (Movie 1). The internal view of the procedure was also done (Fig. 5). Time needed to complete delivery was chosen as a judgment criteria because it reflects somehow an ease in the procedure but also because it has been shown a continuous pH decline in the cord blood of the second twin as time to delivery increases [14].

During the debriefing of the session, each student's feelings were evaluated using a confidence score for the performance of the maneuvers and an anxiety score, respectively from 0 to 10 and from 0 to 5. We also asked the student to rate the reality (0–10) of the procedure and for those who had already performed the procedure in real life to say to what extent the procedure simulated reality.

Results

Comparison of the two sessions showed an improvement in the time needed for internal podalic version and breech extraction of the second twin. The time to bring the fetal foot to the vulva was significantly reduced in the second session. However, we did not find any significant difference (despite a trend) in the duration of complete delivery, but the whole procedure including breech may be not as realistic as the descent of the foot to the vulva. The anxiety score did not vary significantly between the two sessions, whereas the confidence score improved. The realism of the device itself was deemed satisfactory (Tables 1 and 2).

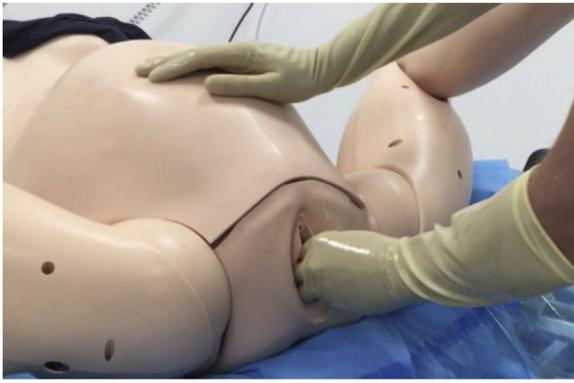


Fig. 4. introduction of the obstetrician's hand and descent of the foot to the vulva concomitantly with "amniotic" membrane rupture.



Fig. 5. Intrauterine view of the procedure.

Comment

Following the recommendations for continued training by simulation [15], the establishment of simulation centers seems mandatory. The aim of the simulation procedure is to improve knowledge, technical skills and interprofessional communication. With simulators, there is no risk to patients; the practice is standardized, regular and repeated for rare or occasional obstetric situations such as internal podalic version and breech extraction of the second twin. One of the main points is that no patient has to pay the tribute of being a junior doctor's first experience, which is especially important in obstetrics where numerous medicolegal, social and emotional factors have to be considered. Simulation programs in obstetrics have already been tested for shoulder dystocia [16–19] and breech delivery [20]. For example, for shoulder dystocia, trained residents had significantly higher scores including timelines of their interventions, performance of maneuvers, and overall performance. They also performed the delivery in a shorter time than control subjects (61 versus 146 s, $P = .003$) [19]. On the other hand, for breech delivery, trained residents showed significantly higher performance in the delivery and safety during the delivery also improved significantly ($P = .001$ for both) [20].

Strong programs include didactic briefing, simulation, and debriefing sessions. The didactic briefing helps ensure that participants have baseline knowledge about the subject matter. The simulation allows attendees to have practical hands-on experience. The debriefing allows attendees to evaluate their own performance and to discuss system issues that impair optimal outcomes.

Recently, Birsner [21] developed a device for internal version, but the description was far less realistic and no evaluation has been furnished. But it was the first device allowing the tactile sensation of fetal part identification of a floating fetus and the grasping of the fetus through an amniotic sac.

In our experience, we have set up a simulator that is simple to implement. We have demonstrated that these simulation sessions

Table 1
Students' feelings and times in maneuvers: comparison between the two sessions (10 students).

	Session 1	Session 2	p
Anxiety (0–5)	3.17+/-1.5 (1–5)	2.33+/-1.4 (0–5)	NS
Confidence (0–10)	5+/-0.33 (4–6)	6.83+/-1.16 (5–8)	0.0003
Fetal foot to vulva (in seconds)	52.6+/-21.64 (25–108)	28.8+/-6.5 (17–39)	0.0213
Complete maneuver (in seconds)	112.2+/-40.84 (57–182)	81.8+/-36.5 (42–139)	NS

Table 2
Description of student population (10 students) and subjective assessment of the realism of the method.

Resident	Year of residency	Experience with second twin delivery	Similar to reality (among 5)	Impression of reality (0–10)
1	2–4	Yes	Yes	8
2	2–4	Yes	Yes	8
3	1	No		7
4	1	No		8
5	2–4	No		8
6	2–4	Yes	intermediary	8
7	2–4	No		8
8	1	No		8
9	5	Yes	Yes	8
10	5	Yes	Yes	7

are useful for learning and perfecting obstetric maneuvers. We believe that simulation learning could maintain “the art” of obstetrics and thus limit the increasing number of cesareans, not all of which are justified.

It is interesting to note in the results of this study that despite greater self-confidence in performing this obstetric maneuver, the feeling of anxiety is constant. We can therefore translate these results into the future reality of these students who will be anxious facing this clinical situation because each case is different, but confident in their ability to achieve a successful delivery. Indeed, there is no simulation without evaluation. The Kirkpatrick model has four levels of learning evaluation. Level 1 is the reaction just after the simulation session during the debriefing; level 2 is the technical skills learned during the session; level 3 is the ability to use what has been learned during the simulation session on patients; and level 4 is the evaluation of the impact of simulation on patient health [22]. We believe that our simulation sessions allow students to reach level 2, and that further studies are needed to evaluate the sessions at levels 3 and 4.

We have presented here a simulation model of internal podalic version and breech extraction of the second twin. This model is easy to implement and we demonstrate its effectiveness in the skills acquisition of young obstetric residents. It simulates a fetus floating in an amniotic cavity which allows the learner to perform the maneuver with realistic tactile sensations. Our model fits completely with the paradigm of simulation in medical pedagogy.

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Conflicts of interest

The authors report no conflict of interest.

Appendix C. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:10.1016/j.ejogrb.2018.12.038.

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