Teaching amniocentesis through simulation: a cheap, clean and easy to make simulation model

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Objective
The number of gestational invasive tests has decreased dramatically in recent years. This is mainly due to the high detection rates of chromosomopathy risk with the first trimester combined screening test and the spreading of the cell free DNA test as a diagnostic tool. This fact, which is highly positive for the patients, results in a decreased number of tests performed and consequently might reduce the operator's level of training. For this reason, it is very important to have simulation models representing the real conditions of gestation as closely as possible, in order to maintain a high level of training that is safe for both patient and doctor.

Methods
We propose a cheap, easy to perform, reusable amniocentesis simulation model that perfectly simulates the real conditions of an amniocentesis and strengthens the skills needed to perform the technique correctly.

Results
Our model is based on the one designed by Dr. Belén Santacruz, who held a teaching course in February 2016 and shared his experience and on the publication of Tassin et al. (2012). Both models use chicken breast to simulate the maternal abdomen. Other existing models propose the use of gelatin either alone or mixed with soluble fibre (plantago ovata); however, the ultrasound vision offered by these models is very different from the real one. For our model we have used a plastic container, chicken breasts simulating the maternal abdomen, pig liver simulating the placenta, silicone swimming caps simulating the skin, surgical gloves filled with a mixture of ultrasound gel and water simulating amnios and a pressure device to bring the breasts closer to the silicone cap and diminish the air bubbles and the ultrasounds interferences. The model we propose is easy to make and consist of affordable and cheap materials. It is also a clean model, since the liquid that comes out after the punctures is collected in the container. The gel- and water-filled surgical glove is easy to replace, so the model can be used during a full simulation session without problems. We have used it in a simulation course for resident doctors and young assistants, with successful results.

Conclusion
The level of training in invasive prenatal diagnosis is influenced by the decline of the indications of invasive procedures. However, it is necessary to keep a good training level that ensures the competence in this field. Simulation models are useful tools for training and maintaining the skills needed to perform these techniques. Our proposed model has proven to be useful, easy to perform, inexpensive, clean and reusable. It can be a useful tool to complement teaching in this area and improving patient safety.