Objectives

The use of transperineal (TP) ultrasound (US) for the assessment of the fetal occiput position in the second stage of labor has the potential to derive in a single sonographic step the most relevant data regarding the fetal head station, rotation and position. An Artificial Intelligence-based system for the automated analysis and classification of the position of the fetus could support clinical practice. In this work, we propose the development of an algorithm for the automated assessment of the fetal occiput position at TP US.

Methods

The algorithm will be based on linear and non-linear Neural Networks. During the training phase, the algorithm will be trained by approximately 6000 TP US images collected from over 200 low-risk women at term from 15 medical centers in order to recognize fetal positions previously assessed and recorded. During the Test phase, algorithm performances will be tested and it will be iteratively re-trained until a 95% accuracy is obtained.

Results

The expected result from this research project is an algorithm that will be able to automatically identify the position of the occiput in less than 5 seconds and to distinguish between left and right orientation by a dedicated analysis of the features of the image. The effectiveness could be further improved by acquiring new sample images and employing artificial intelligence algorithm based on convolutional neural networks in order to distinguish between anterior and posterior occiput position.

Conclusions

The application of this method will lead to the development of a non-invasive, repeatable, effective and quick tool for the intrapartum assessment using TP US. An advantage of this tool would be represented by the time saved during the sonographic examination thanks to the avoidance of the transabdominal scan to determine the occiput position.