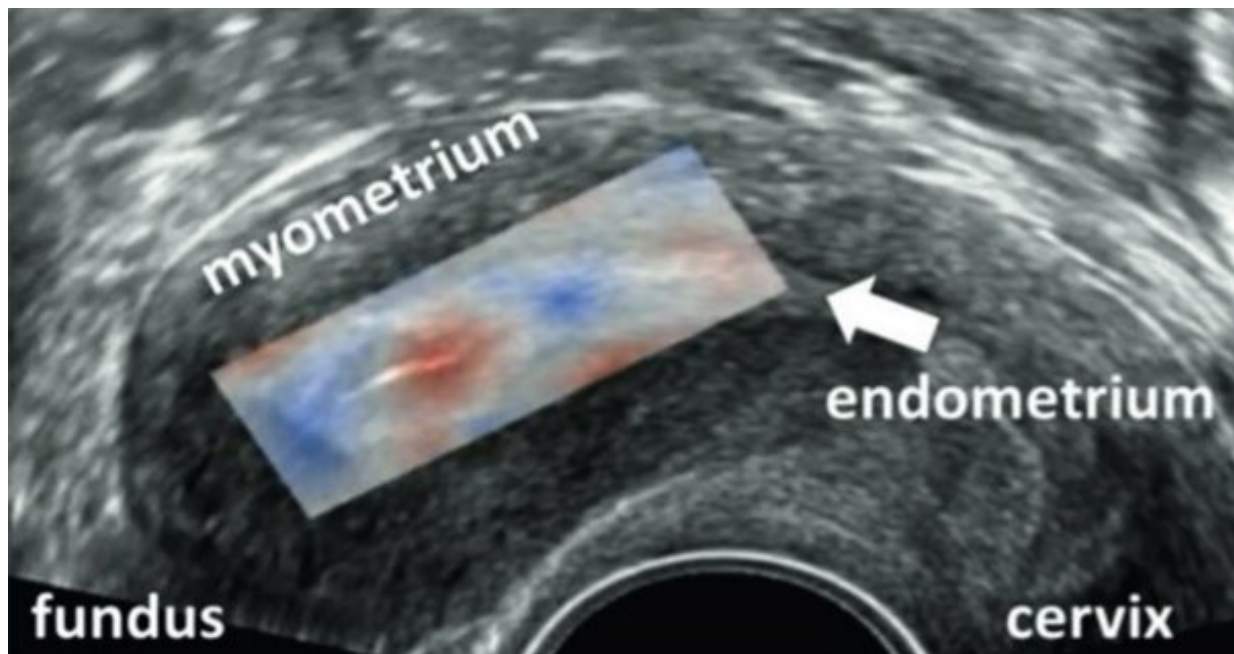


New tool to measure uterine contractions can help predict the success rate of IVF

February 22 2021, by Henk Van Appeven



This image clearly shows the contraction (red) and relaxation (blue) of the uterus. Credit: Eindhoven University of Technology

In groundbreaking work for women with fertility problems, Eindhoven University of Technology (TU/e) and the Catharina Hospital have developed a new method that allows for simple and objective measurements of uterine contractions. Measuring uterine 'waves' correctly is important, as they play a key role in the implantation of an embryo in the uterus. However, the methods available so far to measure

them were not reliable. The new tool, based on a technique used by cardiologists to measure heart motions, gives gynecologists new insights into uterine contractions, and will increase our understanding of their impact on the implantation of an embryo in IVF.

Every [uterus](#) exhibits '[uterine](#) waves' during a monthly cycle: small undulating contractions in the uterus that you don't feel, but can see on, for example, ultrasound images. These waves change direction and intensity during the cycle depending on hormones. During IVF treatment, uterine contractions provide nutrients, prevent the embryo from being expelled from the cavity, and contribute to the positioning of the embryo before implantation.

Increasing the chance of pregnancy

"Understanding these 'waves' is crucial to increase the success of IVF," says researcher Celine Blank, who will receive her Ph.D. from TU/e and Ghent University on Friday, February 26. "Now we have this new tool, we will be able to get to know [uterine contractions](#) better. They can serve as a predictive factor in fertility treatments. The [success rate](#) for women undergoing fertility treatment is now around 30 percent per IVF cycle. That rate really needs to go up! Treating a shortage or surplus of waves with medication, for example, can potentially increase the chance of pregnancy."

The technique used to measure uterine waves was copied from cardiologists. Dick Schoot, gynecologist at Catharina Hospital and Blank's supervisor: "Cardiologists use the Speckle Tracking technique to measure heart motions, which, like the uterus, is also a muscle. That method was adapted for the uterus and then tested extensively. First in a controlled environment on uteruses outside the body, and later in healthy volunteers."

"Slowly but surely, we understand better which mechanical movements of the uterus play a role in pain, irregular bleeding and getting pregnant. But we are still at the beginning of this promising technique," says Schoot.

Less stress for women

He continues, "We combine this examination with electricity measurements of the uterus. Such an examination is not at all stressful for the woman. For the measurements, stickers are placed on the abdomen to measure the contractions. You can compare it to a heart monitor (ECG)."

Blank: "Only now we are not measuring the electricity given off by the heart, but that of the uterus. Using [machine learning](#), a form of artificial intelligence, we were able to use a combination of these two measurement methods to predict the IVF outcome with up to 94 percent accuracy."

More information: Uterine and embryo quality: features and models to predict successful IVF, www.globalacademicpress.com/eb...nk/mobile/index.html

Provided by Eindhoven University of Technology

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