

Feasibility of automated sonographic tubal patency evaluation using three-dimensional Coded Contrast Imaging

C. Exacoustos¹, A. Di Giovanni¹, B. Szabolcs¹, M.E. Romanini¹, H. Binder Resinger², C. Gabard², E. Zupi¹, D. Arduini¹

¹Department of Obstetrics and Gynecology, Università degli Studi di Roma "Tor Vergata" ITALY, Roma, Italy; ²GE, Healthcare, Zipf, Austria

Objectives: To evaluate the feasibility of a new automated three dimensional contrast-enhanced ultrasound technology called "Coded Contrast Imaging" (3D CCI) (GE Healthcare) in the evaluation of tubal patency and visualization of tubal course.

Methods: Patients undergoing transvaginal hystero-salpingo-contrast-sonography (TVS HyCoSy) with automated 3D CCI were prospectively evaluated. The CCI allows the detection of an ultrasound contrast agent in the tube by discriminating the harmonic response of contrast bubbles from the ultrasound echoes of other tissues. 3D TVS allows the visualization of tubal course. In order to evaluate the feasibility of this method we considered first the tubal patency and the 3D visualization of tubal course after two consecutive contrast agent injections. The visualization with CCI of the contrast agent around the ovaries, the need for more than one fluid injection to assess tubal patency, the detection in 2D real time of the bubbles movement around the ovaries, and the side effects and pain during and after the procedure were assessed.

Results: Fifty two patients underwent automated 3D CCI HyCoSy; 40 women had bilateral tubal patency and 12 had tubal occlusion (4 cases bilateral, 8 unilateral). The 3D tubal course automated reconstruction was achieved in 33 cases (63%) after the first contrast injection, while in 12 cases (23%) further injection was needed. 2D real time evaluation was performed in all cases to confirm tubal status and it was helpful to assess tubal patency in those 7 patients in whom 3D reconstruction wasn't sensitive enough to achieve a diagnosis. For the 88 patent tubes, in 86 cases CCI clearly showed the contrast agent around the ipsi-lateral ovary.

Conclusions: Automated 3D-CCI HyCoSy allows for a reliable assessment of tubal patency in 86% of cases. Automated 3D volume acquisition allows less experienced operators to easily evaluate the tubal course.