

Visualization and Propagation Characteristics Analysis of Endometrial Peristaltic Waves in Uterine Adhesions: Application of a Novel 3D-TVUS Modality

Jinwei Zhang, Cheng Chen, Min Wang, Jing Tang, Suzhen Ran

Department of Ultrasound, Women and Children's Hospital of Chongqing Medical University



Objective

To visualize and analyze the endometrial peristaltic waves (EPWs) in intrauterine adhesions (IUA) using endometrial peristaltic wave analysis (EmPA) technology.

Methods

We analyzed data of 97 patients diagnosed with IUA through clinical and three-dimensional transvaginal ultrasound (3D-TVUS), identifying 159 EPWs within the IUA group. The control group included 72 healthy women during the same period, yielding 140 EPWs. Differences in EmPA parameters were analyzed among individual patients and EPWs between the two groups. We performed subgroup analyses of EmPA parameters based on severity classifications determined through 3D-TVUS and hysteroscopy in the IUA group.



Results

Compared with the control group, the IUA group exhibited significantly lower EPW intensity, more prolonged interval times between EPWs, and higher proportion of backward EPWs. Loss of endometrial continuity correlated with reduced EPW intensity and increased interval time. Irregular endometrial morphology correlated with significantly reduced EPW intensity. The presence of abnormal endometrial echogenicity bands within the uterine cavity also led to significant prolongation of EPW interval time. Moreover, reduced EPW intensity and extended interval time significantly correlated with patients' pregnancy history, menstrual patterns, and severity grading by the American Fertility Society.

Conclusion

EmPA enables the visualization and analysis of EPW propagation characteristics in IUA.

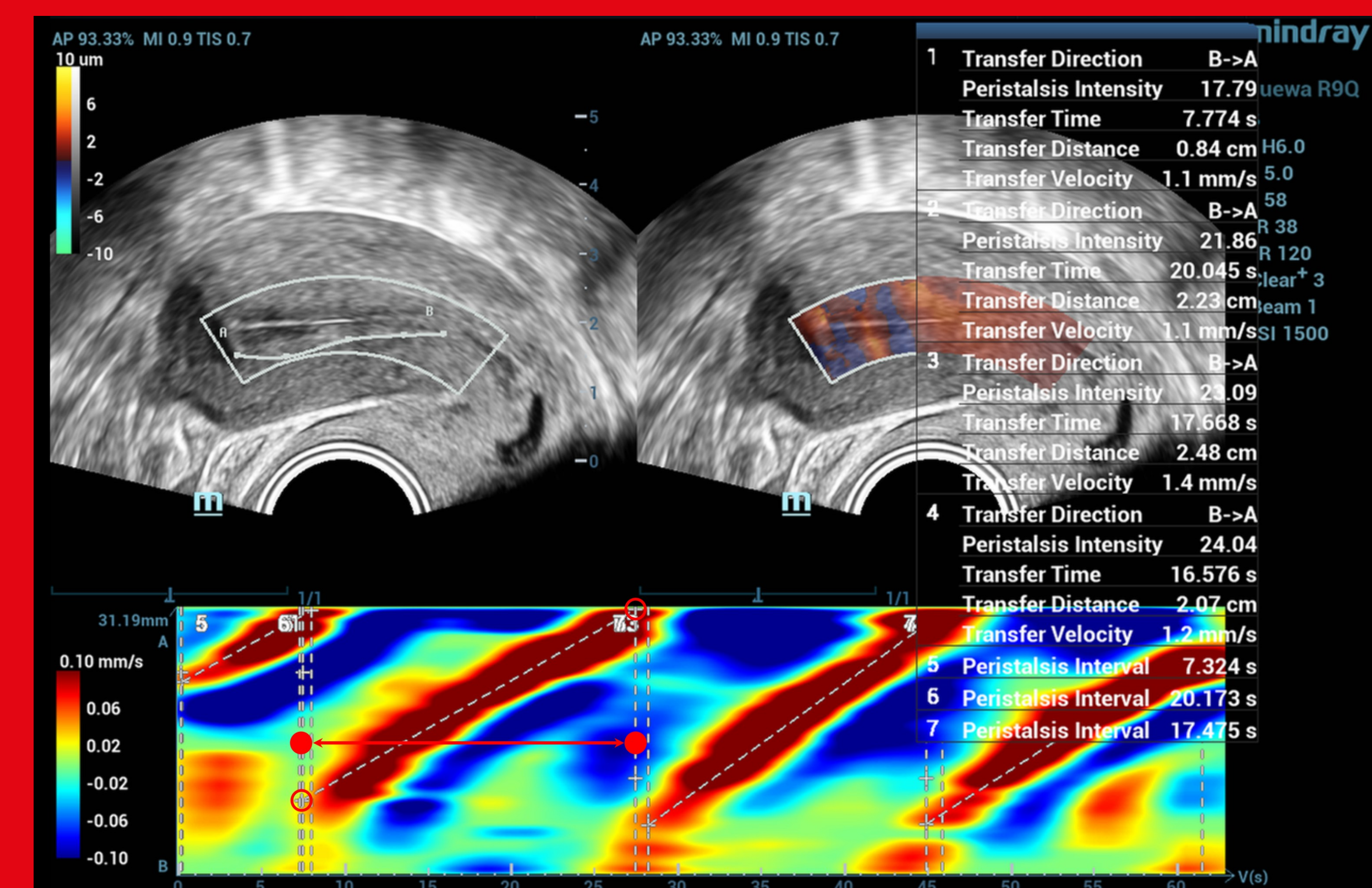


Figure 1. Visualization and analysis of propagation characteristics of EPWs using EmPA.

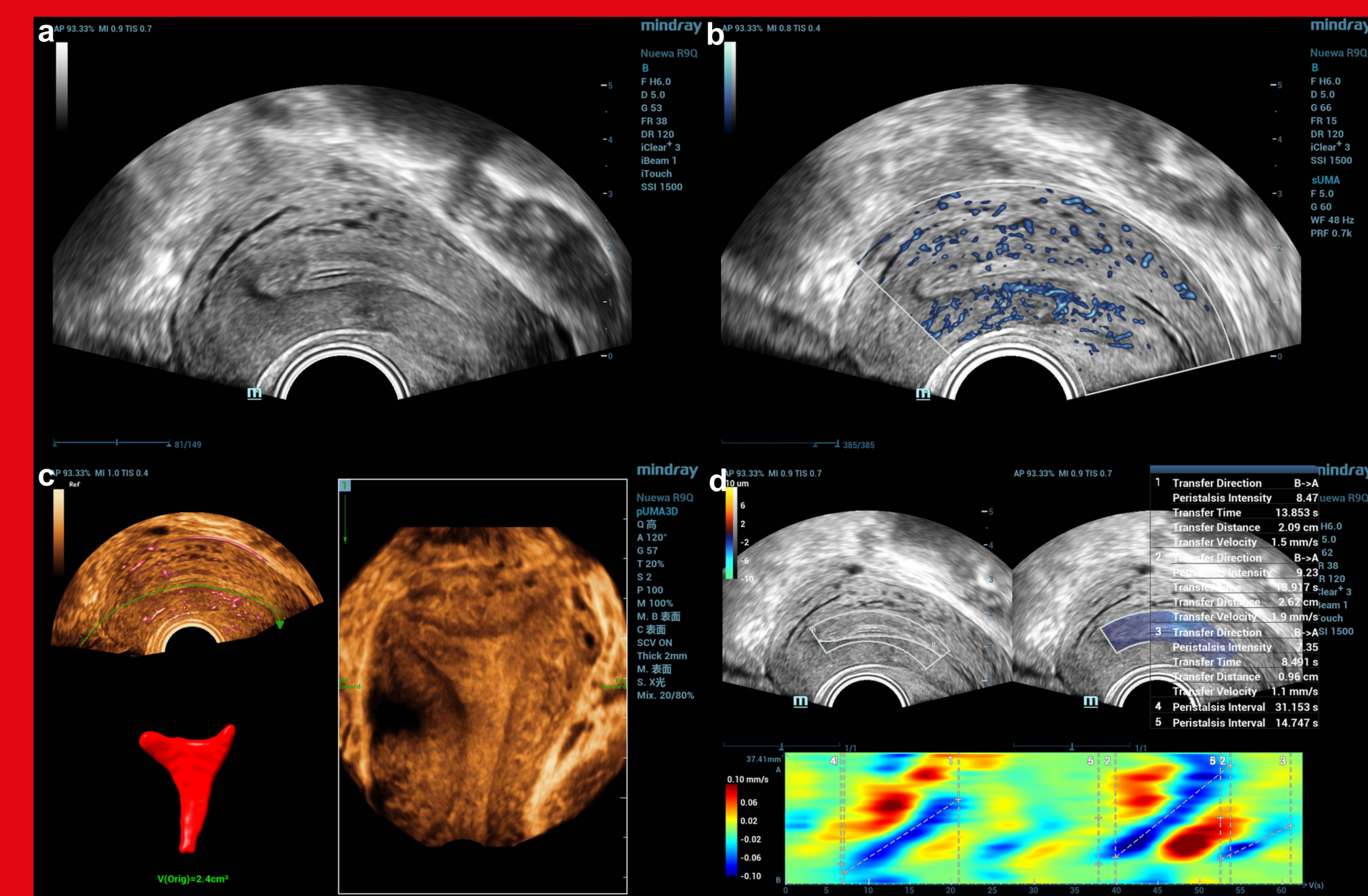


Figure 2. Combined diagnosis of static and dynamic ultrasound features in IUA using 3D-TVUS.