THE ROLE OF 3D ULTRASOUND IN ‘PROBLEM SOLVING’ GYNAECOLOGICAL IMAGING

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PURPOSE

The role of both transabdominal and transvaginal 2D ultrasound is well established in gynaecological imaging. However, often despite good quality scans, further cross-sectional imaging is required as these scans only produce axial and sagittal images with no coronal imaging possible.

This review aims to show cases where use of a 3-dimensional ultrasound probe has produced high quality images by acquiring a volume set data which combined with post-processing techniques provides better delineation of the uterine cavity as well as uterine masses and IUCDs. This therefore avoids repeat ultrasound scanning as well as more costly and invasive procedures such as HSGs (hysterosalphingogram) and MRI scans.

METHODS AND MATERIALS

A number of routine gynaecological cases scanned with both a 2D and 3D probe showing how acquisition of the volume data and post processing allows uterine anomalies like T-shaped uterus, bicornuate and arcuate uterine configurations to be confidently diagnosed as well as showing malaligned IUCDs and differentiating uterine fibroids from polyps.

RESULTS

As these cases clearly demonstrate, the use of a 3D probe produces high quality images in 3 planes, including the coronal plane, which adds important information and thus improving diagnosis.

IUCD POSITION

- Abnormally positioned IUCDs can be difficult to assess clinically, often presenting with pain or abnormal bleeding.
- These conventional 2D sagittal images demonstrate the IUCD to be intra-cavitory, however the 3D reformatted coronal images clearly illustrate the true position of the coil, exquisitely delineating the lateral arms as well as the central bar in the endometrial cavity. This is critical as rotation and myometrial penetration can be estimated on the coronal image which has implications for coil retrieval and contraceptive effectiveness.
- In addition, if the coil has extruded into the peritoneal cavity this may be identified although a plain radiograph is still advised for confirmation.

ENDOMETRIAL MASS ASSESSMENT

- Soft tissue masses in the cavity are a common finding on transvaginal ultrasound and 3D images can help in differentiating submucosal fibroids from cavitary fibroids and endometrial polyps which can aid the surgeon not only in diagnosis but also in the best surgical operative approach.

UTERINE ANOMALIES EVALUATION

- These 3D coronal images have been produced by post processing the 2D image data from a routine TV ultrasound and are comparable to MRI images in depicting the uterine cavity without the time and cost implications.
- The ‘stand-alone’ sagittal/transverse static 2D images are difficult to assess by the gynaecologist with the 3D coronal images invaluable in mapping out surgical intervention.
- In particular 3D imaging can differentiate the relatively common arcuate uterus from the more clinically serious septate uterus which has been traditionally challenging on a standard 2D transvaginal scan avoiding the need for more invasive and uncomfortable procedures like HSGs as well as MRI scans.

CONCLUSION

3D ultrasound imaging is invaluable in delineating the uterine anatomy, uterine lesions and IUD alignment. It is a fast and cost effective addition to the gynaecological ultrasound examination which is well tolerated by patients and often obviates the need for repeated scanning as well as the use of invasive, expensive and limited resources, for example HSGs (hysterosalphingograms) and MRI scans of the pelvis.