

Capacity building in endometriosis ultrasound: are we there yet?

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Transvaginal sonography (TVS) is now established as a first line imaging tool of choice for the preoperative assessment of endometriosis in women planning laparoscopy for surgical treatment of endometriosis.^{1,2} The evolution of TVS in the preoperative assessment of women with suspected endometriosis is a result of the technological advances in gynaecological ultrasound imaging tools and the emergence of women's health specialists with special interest and training in gynaecological imaging.³ As a result, a significant body of research has been generated demonstrating evidence for the diagnostic performance of TVS in the diagnosis of ovarian and extra ovarian endometriosis and their markers of local invasiveness when compared to gold standard laparoscopy.⁴⁻¹³

For example, the real-time dynamic 'sliding sign' on TVS has shown high sensitivity and accuracy for predicting the status of the pouch of Douglas (POD) prior to surgery.¹⁴⁻¹⁶ For bowel deep endometriosis, the diagnostic performance of TVS with or without standoff (enhanced TVS) techniques demonstrates a pooled sensitivity, specificity, LR + and LR - of 91 % (95 % CI, 85-94%), 98 % (95 % CI, 96-99%), 38.4 (95% CI, 20.2-73.1) and 0.09 (95% CI, 0.06-0.16) respectively.¹³ POD obliteration and bowel deep infiltrating endometriosis (DIE) are phenotypes of higher stage endometriosis that require a multidisciplinary team approach for optimal surgical management.^{11,17} Thus, preoperative knowledge of the presence of these phenotypes of higher stage endometriosis can enhance theatre list planning, improve patient counseling and facilitate the triage of women with higher stage endometriosis to centers of excellence for endometriosis surgery as recommended by the World Endometriosis Society.^{11,18}

Unfortunately, despite this growing body of evidence on the clinical value of pre-operative TVS in the work up and triage of women with higher stage endometriosis, there remains an apparent delay in the uptake of these advanced gynecological imaging techniques for the diagnosis and surgical management of women with higher stage endometriosis.^{11,19} The reasons for this delay in utilising TVS in the pre operative work up of women with suspected higher stage endometriosis may be related to the current lack of practice guidelines for endometriosis ultrasound from the various governing bodies for ultrasound. Indeed, to date ASUM, COGU, ISUOG, AIUM, WFUMB have not published any practice guidelines on the use of ultrasound in women with suspected higher stage endometriosis.¹¹

It may also be related to the limited awareness among

gynecologists of these emerging concepts and new techniques in the management of women with suspected endometriosis.²⁰ In addition, the limited numbers of personnel with the requisite expertise for performing advanced gynecological imaging for endometriosis may also contribute to the limited number of workshops available for capacity building in endometriosis ultrasound. Its flow on effect is the limited opportunities available to sonographers for up skilling in advanced gynecological imaging for endometriosis. Thus it's not surprising that the uptake and practice of advanced gynecological imaging for endometriosis among sonographers remain patchy and inconsistent.

Although improving the uptake and practice of advanced gynecological imaging for endometriosis requires additional training and expertise beyond that available for performing routine gynecological imaging,¹⁹ the introduction of an evidence based, structured capacity building program with a 'protocolized' approach to teaching these techniques can increase the pool of sonographers with expertise in advanced gynecology imaging for endometriosis. Such a program(s) should incorporate an objective system for assessing sonographer competency and also provide ongoing support for those sonographers who demonstrate the requisite proficiency in the assessment of women with suspected higher stage endometriosis with TVS.

Recent published data now provides the evidence for developing and introducing such capacity building program (s). For example, Menakaya, *et al.* demonstrated the value of offline interpretation of videos of real time dynamic 'sliding sign' in the prediction of POD obliteration among individuals with varying levels of prior gynecological ultrasound experiences.²¹ Piessens, *et al.* demonstrated that competency in the diagnosis of DIE can be achieved within one week of training.²² Others have reported on the learning curve for detecting POD obliteration and DIE of the bowel and the inter observer agreement of non-invasive diagnosis of endometriomas and DIE using TVS.^{23,24} Thus, developing a capacity building program that includes didactic lectures, online virtual reality training with simulated sonography prior to live sonography is now feasible for endometriosis ultrasound. This proposed approach to up skilling and training of sonographers is consistent with current paradigms around acquiring new clinical skills.^{23,25,26}

Furthermore, the road map to a 'protocolized' approach to advanced gynecological imaging in endometriosis was recently proposed by Menakaya, *et al.* when they described a systematic approach to the evaluation of the pelvis in women with suspected

Table 1: Five domain based TVS approach for the evaluation of the pelvis in women with suspected endometriosis, correlating sono-morphologic features with predicted phenotypes of endometriosis.

Domains		Objective	Sonologic Sign(S)	Phenotypes of Endometriosis
I		Routine assessment of the uterus and adnexa	Myometrial cysts, streaky echogenic lines, thickened posterior myometrium, loss of endometrial/myometrial interface on 3D Thick walled ovarian cysts with homogenous low level internal echos "Ground glass appearance"	Adenomyosis Endometriomata
II		Tenderness guided assessment	Site specific tenderness	Possible Peritoneal endometriosis
III	IIIa	Assessment of Organ mobility Ovarian mobility	Ovarian immobility	Ovarian adhesions
	IIIb	Status of the Pouch of Douglas (POD)	Real time dynamic 'sliding sign'	POD obliteration/Adhesions
IV		Assessing for Non Bowel deep infiltrating endometriosis (DIE) Anterior, lateral and posterior pelvic compartment	Nodules – Solid hypo echoic rounded shape lesions Linear thickenings – Hypo echoic linear thickening Plaques – Hypo echoic lesions With irregular shape.	Extra ovarian non bowel deep infiltrating endometriosis (DIE)
V		Assessment for bowel deep infiltrating endometriosis	Non compressible hypo echoic lesion on muscularis propria (May infiltrate the mucosa layer)	Extra ovarian bowel DIE

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endometriosis using a five domain TVS based sonography.²⁷ This approach provides a consistent, reproducible and systematic way to evaluate the pelvis in women with suspected endometriosis. It builds on the techniques currently employed for a routine gynecological ultrasound but raises the benchmark required for reporting both ovarian and extra-ovarian endometriosis (Table 1).

Indeed, the domain based TVS approach facilitates an objective stratification of competency in the expertise required for performing advanced gynecological imaging in women with suspected higher stage endometriosis.²⁷ In addition to its role as a tool for triaging women with higher stage endometriosis to the most appropriate expertise for optimal surgical treatment,²⁸ this approach could also be utilised to develop and adapt training modules for sonographers to improve their uptake and practice of advanced gynecological imaging for higher stage endometriosis. No doubt, this will improve the quality of care we provide to women with suspected endometriosis.

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