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'How About on the Use of Integrated Total Pelvic Floor Ultrasound in the Patients with Pelvic Floor Pathology'

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Introduction

Understanding pelvic anatomy is an integral part of determining the underlying aetiology of pelvic floor pathology. Pelvic floor dysfunction (PFD) is prevalent globally and within the UK. Approximately five million women experience PFD, with 40% occurring in their 60s [1]. The scale of the problem is far reaching for both the patient and the already overstretched healthcare service. An estimated 6.5 million people live with bowel issues and 14 million with urinary symptoms [1]. The presence of urinary incontinence doubling the risk of care home referrals and over 60,000 acute hospital admissions due to constipation [2,3]. Symptoms are debilitating and often have a substantial impact patient quality of life [4]. The drive for accurate diagnosis and interventions is becoming increasingly recognised.

Both impaired activity and overactivity of pelvic floor muscles create disabling symptoms for patients. The complex integrated system of smooth and striated muscle which work together with ligaments, tendons and fascia to support the pelvic viscera [5]. Pelvic floor pathology most commonly presents as urinary incontinence, faecal incontinence or constipation and pelvic organ prolapse [2]. The multifactorial aetiology and complex anatomy has resulted in difficulty achieving a diagnosis and treating PFD. Increasing recognition of a multimodal integrated use of pelvic floor ultrasound with a targeted history and clinical examination is being increasingly recognised as the optimal approach.

Integrated Total Pelvic Floor Ultrasound

Diagnosing PFD and deciphering the aetiology can take on average up to a year in the NHS [1]. Access to services can vary greatly and patients are predominantly managed in the community or district general hospitals before complex cases are referred on for specialised MDT discussion. This emphasises the need to have an accessible efficient investigation modality in order to diagnose specific pathology and to direct subsequent treatment plans.

Traditionally the deep pelvic structures have been compartmentalised into three areas (anterior, central and posterior) [2]. The development of ultrasound technology and techniques has allowed concurrent visualisation of compartments in a cost and time efficient manner. Integrated total pelvic ultrasound is used for dynamic assessment of pelvic floor pathology. Alternative options do exist such as defaecation MRI and proctography [6]. However, defaecation proctography only allows visualisation of the posterior compartment and both tests require a separate radiology appointment and necessitate the expulsion of rectal paste which can be embarrassing.

Transvaginal Ultrasound (TVS)

Transvaginal scanning provides sagittal views of patient anatomy including bladder neck support anteriorly, and posteriorly has the ability to show rectocoele, enterocele or intussusception whilst bearing down [2]. During the Valsalva manoeuvre the bladder neck should not descend >2cm in relation to the pubic symphysis [7]. Abnormal descent is associated with urinary incontinence. There is an increasing trend in the use of permanent vaginal wall mesh repairs for prolapse within the anterior compartment. Polypropylene is highly echogenic on ultrasound when compared to CT and MRI which can help identify any potential mesh migration [8]. The three-dimensional cross-sectional view allows for identification of the levator plate, superficial perineal muscles and perineal body with defects in muscle integrity easily seen through malalignment [2].

Transperineal Ultrasound (TPUS)

Dynamic multicompartment visualisation is achieved through TPUS, enabling visualisation of all three compartments and the anorectal angle to be measured [9]. A rectocoele can be seen during rest and accentuated during straining and may also

may show the presence of trapped stool indicating obstructive defaecation. Research has shown that whilst TPUS has advantages identifying a rectocoele, it has limited use in differentiating between enterocoele and a sigmoidocoele [7]. However, grading of an enterocoele or cystocoele is possible.

Endoanal Ultrasound (EAUS)

EUAS is used to establish the anatomy of the anal canal, the 360o rotational probe allows images to be formulated in 3D with multiplanar imaging [7]. It is the gold standard in assessing anal sphincter muscle architecture and enables the diagnosis of sphincter injury which often clinical presents are faecal incontinence [2]. However, patients may experience faecal incontinence with intact sphincters and symptoms may be attributed to muscle degeneration atrophy or pudendal neuropathy [10]. This highlights the importance of history taking and clinical examination as ultrasound findings cannot be interpreted in isolation to elicit pathology aetiology.

Discussion

Each aspect of integrated total pelvic floor ultrasound has added benefits in identifying pathologies of each pelvic compartment. Therefore, when used in conjunction, adequate multicompartmental images are produced allowing for diagnosis of potentially multiple pathologies causing PFD [11]. A small number of studies have examined patient preference comparing pelvic ultrasound to proctography and found that patients deemed ultrasound significantly more comfortable ($p<0.001$) and proctography was less tolerated in 87% of patients [12]. Findings highlight the patient acceptability of ultrasound with significantly more patients preferring to undergo a repeat ultrasound than a proctogram ($p<0.0003$) [13].

Research has shown adequate accuracy of integrated total pelvic floor ultrasound to both clinical findings and defaecatory imaging especially in the evaluation of obstructive defaecation [14]. The cost effective, easy to use modality can also be used to evaluate the results of treatment in an outpatient setting which can help navigate management plans. It enables the stratification of patients to those with pathology that can be managed in the community and those that are likely to require more invasive intervention.

Conclusion

When assessing pelvic floor pathology, history and clinical examination should be used congruently with integrated total pelvic floor ultrasound. Isolated evaluation of pelvic compartments using ultrasound disregards the complex and integrated anatomical relations of the pelvic floor musculature. Abnormalities in one area often influences nearby structures creating a challenge in the interpretation of results is only one isolated compartment is imaged. The quick, feasible nature of the modality makes it a superior option for first line investigations that can easily be performed in an out-patient setting. In doing so, patients can have targeted management plans in order to relieve symptoms or direct surgical planning when required.

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