

Abstract

The damage to the supporting structures of these compartments leads to SUI. The degree of the disruption of the urethral ligaments and puboperineal muscles should be estimated in the SUI cases to be diagnosed and managed correctly.

The conventional ways of diagnosis of pelvic floor dysfunction include voiding cystourethrogram, ultrasound and urodynamic but in recent years with advances in technology MRI proved to be the best to detect the degree of the floor dysfunction and to know which structure is damaged as dynamic MRI can detect and grade the pelvic floor relaxation by using HMO system, estimate width of the Levator hiatus and assessment of the iliococcygeal angle.

Endovaginal MRI appears to be the most precise way to know the causing structural damage by imaging the urethra and its anchoring ligaments, detecting and estimating the damage to the pubic component of the Levator ani muscle, and to detect the damage of three levels of fascial support of DeLancey.

Keywords: Arcus tendineus fascia pelvis- Arcus tendineus levator ani- Urogenital hiatus- Levator ani- Levator hiatus- Longitudinal muscle of the anus



Role of MR Imaging in Evaluation of Pelvic Floor Weakness in Stress Urinary Incontinence in Female

Essay

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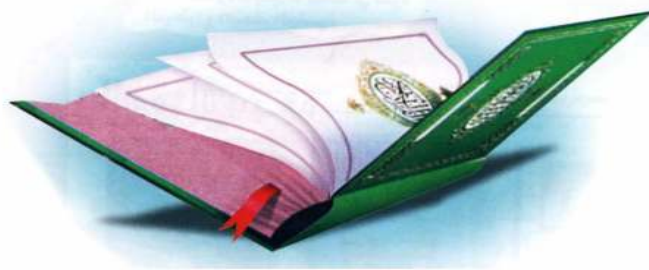
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿قَالُوا سُبْحَانَهُ لَا عِلْمَ لَنَا إِلَّا مَا
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List of Contents

Title	Page No.
List of Tables	i
List of Figures.....	iv
List of Abbreviations.....	vi
Introduction	1
Aim of the Work	12
▪ Chapter (1): Functional Anatomy of Female Pelvic Floor.	13
▪ Chapter (2): Pathophysiology of Female Stress Urinary Incontinence	52
▪ Chapter (3): Diagnosis and Clinical Evaluation of Stress Urinary Incontinence In Female.....	66
▪ Chapter (4): Normal MRI Anatomy of Pelvic Floor	81
▪ Chapter (5): Role Of Endovaginal Mri (EV-MRI) And Dynamic Pelvic Mri (DP-MRI) In Diagnosis Of Female Stress Urinary Incontinence.....	106
Summary	130
References	132

List of Tables

Table No.	Title	Page No.
Table (5-1):	Grading of Pelvic Floor Relaxation.....	109
Table (5-2):	Grading of Pelvic Organ Prolapse	115

List of Figures

Fig. No.	Title	Page No.
Figure (1-1):	The pelvic bones.....	15
Figure (1-2):	Pelvic walls.....	15
Figure (1-3):	Pelvic fascia.....	17
Figure (1-4):	Pelvic diaphragm.....	22
Figure (1-5):	Draw of inferior pelvic floor view.....	23
Figure (1-6):	Draw of connective tissue support of uterus and upper two thirds of vagina. The cut was done to the urethra and vagina just above the pelvic floor muscles	24
Figure (1-7):	Pelvic viscera and Levator ani relations at rest (A) in increase intra-abdominal pressure (B)	25
Figure (1-8):	Drawing of female pelvic wall and floor in lateral view.....	27
Figure (1-9):	The striated pelvic muscles and organs of the pelvic floor.....	28
Figure (1-10):	Urogenital hiatus (UGH), Levator plate changes and vaginal axis change.....	32
Figure (1-11):	Borders and ceiling of the perineum, Boundaries of the perineum And Perineal membrane	33
Figure (1-12):	Ligaments that anchor the neck of the bladder and pelvic part of the urethra to the pelvic bones.....	38
Figure (1-13):	Urethral anatomy.....	39
Figure (1-14):	The female urethra contains an internal sphincter and an external sphincter.	40
Figure (1-15):	Location of various structures along the urethra	41
Figure (1-16):	The diagram demonstrate the synergism of the pelvic floor structures.....	43

List of Figures

Fig. No.	Title	Page No.
Figure (1-17):	Structure - The suspension bridge analogy.....	44
Figure (1-18):	Trampoline analogy- Function	45
Figure (1-19):	Hammock hypothesis.....	46
Figure (1-20):	Scheme of urethrovesical unit at rest	48
Figure (1-21):	The vagina transmits muscle forces to close urethra and bladder neck.....	49
Figure (1-22):	Micturition (Scheme) figure corresponds with the situation shown.....	50
Figure (2-1):	The nine main connective tissue structures needing surgical repair.	56
Figure (2-2):	Stress incontinence – lax PUL fails to hang the urethra.	58
Figure (3-1):	MESA Urinary incontinence questionnaire	71
Figure (3-2):	Lateral view dynamic cystoproctography in a 62 yrs.	79
Figure (4-1a,b):	R anatomy of the normal vagina on T2 images without coils.....	83
Figure (4-2 a,b):	T2 sagittal images without coils of two different healthy pre-menopausal women.....	85
Figure (4-3 a,b):	MRI without coils of a 40 yrs.....	86
Figure (4-4a,b):	A.12 - images of a 26 year old nulliparous woman (midline section) Position of pelvic organs at rest.....	87
Figure (4-5): (a)	T2 MR image Coronal view scanned through the anterior anal sphincter with an endoanal coil (b) corresponding draw in a 30 yrs. female volunteer demonstrate.....	88

List of Figures

Fig. No.	Title	Page No.
Figure (4-6):	(a) T2 MR image transverse view scanned through the upper part of the anal sphincter with an endoanal coil (b) draw in a 30 yrs. female volunteer show the	89
Figure (4-7):	(a) T2 MR image transverse view scanned through the lower part of the anal sphincter with an endoanal coil (b) draw in a 25 yrs. asymptomatic female	90
Figure (4-8):	(a)T2 MR image in sagittal view scanned with endoanal coil (b) draw in a 30 yrs. female volunteer	91
Figure (4-9):	MR scans in axial view without coils of female pelvic floor structures of a volunteer woman who is nullipara.	92
Figure (1-1):	Axial section without coils at the level of middle urethra showing difference in levator ani muscle thickness and configuration.	94
Figure (4-10):	Levator ani muscle thickness	94
Figure (4-11):	Levator hiatus.....	95
Figure (4-12):	Axial views at the level of the middle urethra without coils.	97
Figure (4-13):	MR midsagittal views of the female pelvis without coils.....	99
Figure (4-14):	The following reference lines have gained acceptance.....	102
Figure (4-15):	Images for normal MR anatomy identification on the axial view without coils.	103
Figure (4-16):	Coronal MR views from MR scans without coils of the female pelvic floor structures.....	104

List of Figures

Fig. No.	Title	Page No.
Figure (5-1):	Midsagittal T2 view scanned in a female patient has done hysterectomy, showing the HMO classification system.....	108
Figure (5-2):	Dynamic T2 MRI in the three orthogonal planes.	110
Figure (5-3):	MRI sagittal views without coils show Grade 1 pelvic floor relaxation, grade 2 cystocele, urethrocele.....	113
Figure (5-4):	Severe uterine prolapse in a 41-year-old woman. Sagittal images obtained.....	115
Figure (5-5):	MRI in axial oblique view with Endovaginal coils. Curved arrow shows the compressor urethrae	117
Figure (5-6):	Intrinsic sphincter deficiency and a short urethral sphincter at MR imaging in a 55 yrs. woman.....	118
Figure (5-7):	Variable anatomic appearances of urethral diverticula.....	119
Figure (5-8):	Coronal MR views from MR scans of the pelvic floor in newly primiparous women demonstrating changes in the puborectalis after delivery	121
Figure (5-9):	Axial views of puborectalis “bowing” after a single vaginal delivery showing marked downward bowing of the puborectalis.....	122
Figure (5-10):	(A) Symmetric pubococcygeus muscle in a 38 yrs woman without urinary dysfunction. Axial view shows normal symmetric H shaped vagina	123

List of Figures

Fig. No.	Title	Page No.
Figure (5-11):	Axial views show examples of grade 1, 2, and 3 unilateral defects. The score for each side is indicated on the figure, and the black arrows indicate the location of the missing muscle.....	124
Figure (5-12):	Sagittal images of the right hemipelvis,.....	124
Figure (5-13):	Axial views with Endovaginal coils show normal anatomy of urethra and its supporting structures in 34 yrs continent woman.	126
Figure (5-14):	Axial view show complete disruption of the periurethral ligament in a 54 yrs woman with urethral hypermobility and incontinence.	127
Figure (5-15):	Axial views without coils show fascial defect of level III of DeLancey.	128
Figure (5-16):	Fascial defect of level I and II of DeLancey.	129

List of Abbreviations

Abb.	Meaning
ATFP	Arcus tendineus fascia pelvic
ATLA	Arcus tendineus levator ani
UGH	Urogenital hiatus
LA	Levator ani
LH.....	Levator hiatus
LMA	Longitudinal muscle of the anus
LP	Levator plate
MOS	Modified Oxford Scale
MRI	Magnetic Resonance Imaging
PCM.....	Pubococcygeus muscle
PFM.....	Pelvic Floor Muscle
PFD.....	Pelvic Floor dysfunction
PUL	Pubouterthral ligament
SUI	Stress urinary incontinence
UI	Urinary incontinence
UUI	Urge urinary incontinence

INTRODUCTION

Stress urinary incontinence (SUI) is defined as the involuntary leakage of urine on effort, exertion, sneezing, or coughing. Urodynamic SUI is defined as the involuntary leakage of urine during filling cystometry associated with increased intra-abdominal pressure in the absence of a detrusor contraction (*Haylen et al., 2010*). SUI is the most common cause of urinary incontinence in younger women and the second most common cause in older women (*Fant et al., 1996*).

Impairment of the pelvic floor and supporting structures due to aging, obesity, pregnancy, and vaginal delivery can lead to urinary incontinence by weakening the support on the urethra (*Herzog and Fultz, 1990*).

Weakening of the female pelvic floor results in abnormal descent of the urinary bladder, the uterovaginal vault, and the rectum, resulting in urinary incontinence, fecal incontinence, and pelvic organ prolapse. Pelvic floor weakening affects approximately 50% of women older than 50 years (*Law and Fielding, 2008*).

The pelvic floor is divided into three compartments. The anterior compartment contains the urinary bladder and the urethra; the middle compartment contains the uterus, cervix, and vagina; and the posterior compartment contains the rectum. The support for these structures arises from the attachment of

the muscles, fascia, and ligaments to the bony pelvis. The degree of distortion in the periurethral, paraurethral, and pubourethral ligaments, the vesicourethral angle, the retropubic space, and the thickness of the puborectal muscle should be precisely imaged for treatment selection (*Tasali, 2012*).

The specific anatomic defect in a specific patient with SUI should be defined using innovated imaging techniques for both diagnosis and treatment decision (*Law and Fielding, 2008*).

Traditional imaging methods in assessment of pelvic floor weakness include urodynamics, voiding cystourethrography, ultrasonography of the bladder neck and anal sphincter, and fluoroscopic cystocolpodefecography. In the past decade, MRI has emerged as a competitor to these techniques in the assessment of pelvic floor dysfunction (*Law and Fielding, 2008*).

In recent years, MRI has been shown to be effective in revealing pelvic floor dysfunction. It allows concomitant visualization of all three compartments of the pelvic floor and at the same time allows direct visualization of the pelvic support muscles and organs (*Law and Fielding, 2008*).

With advances in technology. Endovaginal MRI (EV-MRI) is the best imaging technique to visualize the urethra and dynamic pelvic MRI (DP-MRI) helps determine the relaxation of the pelvic floor structures at rest and during Valsalva maneuver using ultrafast sequences (*Kim et al., 2003*).

The use of ultrafast T2-weighted sagittal MRI allows noninvasive dynamic imaging of the pelvic floor, providing anatomic and functional information that will be useful to urogynecologists and surgeons. In addition, the use of high resolution axial T2-weighted sequences of the pelvis allows identification of torn muscles and ligaments in patients with pelvic floor dysfunction who require surgery using of three lines, 1st the pubococcygeal line which extends from the inferior border of the pubic symphysis to the last joint of the coccyx and represents the level of the pelvic floor (*Yang et al., 1991*).

The 2nd line is H line which is drawn from the inferior aspect of the pubic symphysis to the posterior wall of the rectum at the level of the anorectal junction representing the anteroposterior width of the levator hiatus. The 3rd is M line which is drawn as a perpendicular line dropped from the pubococcygeal line to the most posterior aspect of the H line and represent the vertical descent of the levator hiatus (*Pelsang and Bonney, 1996*).

These reference lines in the interpretation of the MR images are a simple method of identifying pelvic organ descent. For complete assessment of the severity of pelvic organ prolapse, MRI findings should be correlated with the severity of the patient's clinical symptoms (*Law and Fielding, 2008*).