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 urodyamic 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.

Kewardes: Arcus tendineus fascia pelvic- Arcus tendineus levator ani- Urogenital hiatus- Levator ani- Levator hiatus- Longitudinal muscle of the anus

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

Essay

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Presented by

Ahmed Osman Mohamed Mohamed

(M.B.B.Ch)

Under Supervision of

Dr. Mohamed Shukry Mohamed Shoeb

Assistant Professor of Urology
Faculty of Medicine - Ain-Shams University

Dr. Mahmoud Ahmed Mahmoud

Lecturer of Urology
Faculty of Medicine -Ain-Shams University

Faculty of Medicine
Ain-Shams University
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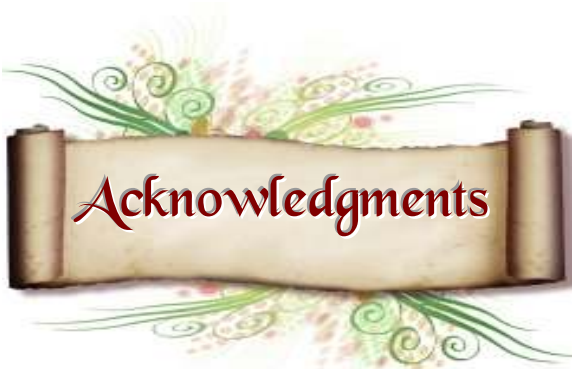

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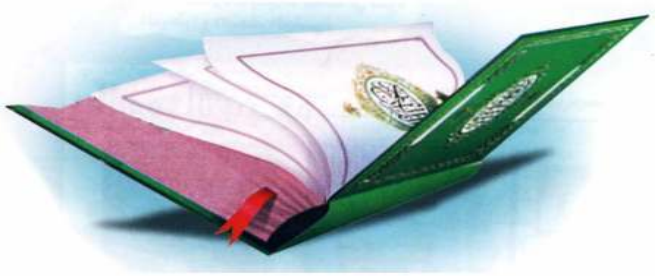
Ahmed Osman

بسم الله الرحمن الرحيم

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

﴿سورة البقرة: ٣٢﴾



List of Contents

Title Page No.

List of Tables

List of Figures

List of Figures

List of Figures

List of Figures

List of Figures

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	Puboutherthral 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)***.