Role of Dynamic and Static MR Imaging in Assessment of Pelvic Floor Dysfunction

Thesis

Submitted for Partial Fulfillment of Master Degree in Radiodiagnosis

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2010

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Acknowledgement

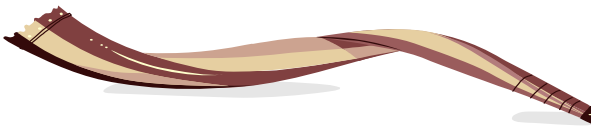
First and foremost, I feel always indebted to ***Allah,*** *the most gracious and the most merciful, who guided me to bring this work to light.*

I am deeply grateful for the support and constructive guidance of many people, whose valuable assistance made this study possible.

I find no words by which I can express my profound gratification to ***Prof. Dr. Sahar Naeem Mohammed****, Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University for her grateful support. Without her assistance, keen support and motherly attitude, this work would not have been possible. It is great honor to work under her guidance and supervision.*

I am eternally grateful to ***Prof. Dr. Maha Khaled A. Ghaffar****, Assistant Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for her help in choosing this topic, continuous encouragement, faithful guidance and for her kind patience. Without her help this work would have never been completed.*

Last but not least, I wish to extend my thanks to my great family, specially my mother and my husband, without their help and support this work would have never been accomplished.



Soha Mohammed Gamal M. Rabie

Dedication


To My Mother for pushing me forward through all my life
To my Husband for supporting and understanding
To my lovely kids
To the spirit of my Father

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ
الْحَكِيمُ

صدق الله العظيم

سورة البقرة الآية (32)

Introduction

Pelvic floor dysfunction is a general term applied to a varied variety of clinical conditions; most commonly stress incontinence, pelvic organ prolapse, and anal incontinence ***(Bump ad Norton, 1998).***

It affects up to 50% of middle aged and older parous women presenting with pelvic pain, pressure, dyspareunia, incontinence, incomplete emptying and gross protrusion ***(Harris, 1990 and Ruch, 1995).***

Some women develop pelvic floor dysfunction so sever that they require surgery whereas exact mechanisms are subjected to depute risk factors include age, multiparty, complicated vaginal deliveries, obesity, collagen related disorders, hysterectomy and menopause ***(Mouristen, 2005 and Fielding, 2002).***

In assessment of pelvic floor dysfunction MR Imaging seems to be an innovative technique that doesn't expose patient to ionizing radiation. MRI can reveal relative positions of various organs during different maneuvers. The type and the degree of anterior, medial, or posterior prolase, and the morphology of levator ani muscle. It also medicates the presence of an incidental lesion involving the uterus ovaries or digestive tract ***(Maubon et al., 2003).***

MRI clinically is relevant in patients who complain dichasia and don't respond to 1st line of treatment, or pre-operatively when pelvic static disorder is suspected. Another indication of MRI is the global assessment of pelvic floor after urogenical surgery when new symptoms appears.

Dynamic MRI pelvic floor with fast sequences enables functional evaluation to assess pelvic floor relaxation and pelvic organ descent ***(Fielding, 2003 & Kelvin and Pannu, 2003).***

Static MEI is utilized to delineate components of pelvic organs support system including anal Sphincter Complex ***(Delancey, 2002 and Kim et al., 2003).***

So combined analysis of dynamic and static MRI of pelvic floor reveals that certain anatomic defects on static images are associated with specific functional abnormalities on dynamic images.

Aim of the Study

To assess role of dynamic and static MRI in pelvic floor dysfunction.

Anatomy of Pelvis and Pelvic Floor

The female pelvis divided into three compartments supported by three components of the pelvic sling: anterior compartment (bladder and urethra), middle compartment (vagina, cervix, uterus and adenexa), posterior compartment (anus and rectum).

The pelvic floor is a complex, integrated, multi-layer system that provides active and passive support. Facia and ligaments provides passive support, while the muscles of the pelvic floor, mainly levator anai, provide active support. The facia is attached to the bone ring of the pelvis, with the ligaments formed from the facial condensation. The pelvic floor has three layers from cranial to caudal: the facial layer (endopelvic facia), the intermediate pelvic diaphragm, and urogenital diaphragm, with their associated supportive structures, which are intimately related to urogenital region, urethra, anal sphincter, and vagina in women ***(Pannu, 2000).***

The Bony Pelvis:

The bony pelvis (Fig.1) consists of the 2 innominate bones, or hip bones, which are fused to the sacrum posteriorly and to each other anteriorly at the pubic symphysis. Each innominate bone is composed of the ilium, ischium, and pubis, which are connected by cartilage in youth but fused in the adult.

The pelvis has 2 basins: the major (or greater) pelvis and the minor (or lesser) pelvis. The abdominal viscera occupy the major pelvis; the minor pelvis is the narrower continuation of the major pelvis inferiorly. The inferior pelvic outlet is closed by the pelvic floor ***(Soames, 1995).***

The female pelvis has a has a wider diameter and a more circular shape than that of the male (Fig.2). The wider inlet facilitates head engagement and parturition. The wider outlet predisposes to subsequent pelvic floor weakness. Numerous projections and contours provide attachment sites for ligaments, muscles, and fascial layers. Of note is the thin and triangular sacrospinous ligament, which extends from the ischial spines to the lateral margins of the sacrum and coccyx anteriorly to the sacrotuberous ligament ***(Soamcs, 1995).***

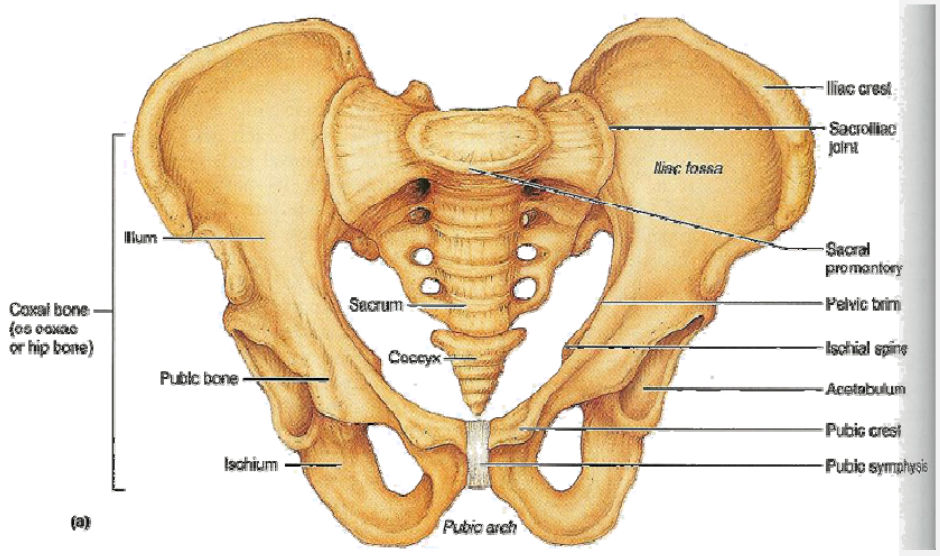


Figure (1): Bony pelvis.

Figure (2): Male and female pelvis superior view.

Pelvic Fascia:

The fascia of the pelvis may be resolved into:

a. The fascial sheaths of the Obturator intemus, Piriformis, and pelvic diaphragm.

b. The fascia associated with the pelvic viscera.

The fascia of the obturator internus (Fig.3) covers the pelvic surface of the muscle. Above, it is loosely connected to the back part of the arcuate line, and here it is continuous with the iliac fascia.

In front of this, as it follows the line of origin of the obturator internus, it gradually separates from the iliac fascia