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Series Editor: Eric A. Klein

Gopal H. Badlani *Editor*

Minimally Invasive Therapy for Urinary Incontinence and Pelvic Organ Prolapse

Humana Press

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Editor
Gopal H. Badlani
Department of Urology
Wake Forest University
Winston-Salem, NC, USA

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Eric A. Klein, MD, Series Editor
Professor of Surgery
Cleveland Clinic Lerner College of Medicine Head,
Section of Urologic Oncology
Glickman Urological and Kidney Institute
Cleveland, OH

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Preface

Anything that gives us new knowledge gives us an opportunity to be more rational.

Herbert Simon (1916–2001)

Pelvic floor dysfunction is a major healthcare problem, affecting millions of women throughout the world. Incontinence has a larger economic impact than many chronic conditions and diseases. One in every nine American women will undergo surgery for a pelvic floor disorder in her lifetime, with 30 % of those women requiring additional surgical procedures for recurrence of the same condition. Moreover, it is thought that the demand for surgery for pelvic floor disorders will increase by 45 % in the next 30 years.

Evolving understanding on this subject and technological advancements has led to availability of a number of minimally invasive treatment options. The gap in knowledge base is keeping up with these techniques and their complications. The aim of this book is to provide a detailed insight into "when, why, what and how" of various minimally invasive surgical procedures for surgical management of SUI, OAB and POP. The goal would be to provide detailed diagrammatic/pictorial step-by-step description of the techniques and management of complications related to these procedures. Thus, this book is intended to be an up-to-date, one-stop reference for anything pertaining to MIT of these pelvic disorders.

The book is designed for both urologist and urogynecologist treating patients with urinary disorders and pelvic organ prolapse. The utilisation of kits and devices has expanded; however, the training has lagged behind. There is a relatively large number of urologists and gynaecologists who have not undergone fellowship training, but due to the ease of the kits are entering the field of female urology, male incontinence and prolapse. This book could be a handy guide for them. Improving the quality of life without doing harm should be the goal of every physician or healthcare provider treating women with pelvic floor disorders.

I would like to thank Dr. Mayank Agarwal for helping me put this project together and Dr. David Koslov for putting on the finishing touches. Kathryn Drinkuth, my able administrative assistant, kept me going. Most of all the contributing colleagues have made this a reality and I owe them a debt of gratitude.

Winston-Salem, NC, USA — Gopal H. Badlani

Contributors

Tamer Aboushwareb, M.D., Ph.D. RSS Urology, Mid Atlantic, Allergan Medical Affairs, Irvine, CA, USA

Oussama El Yazami Adli, M.D. Department of Urology, McGill University, Jewish General Hospital, Montreal, QC, Canada

Mayank Mohan Agarwal, M.S., D.N.B., M.R.C.S.(Ed.), M.Ch. Department of Urology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Yogesh R. Barapatre, M.S., M.Ch. Department of Urology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Jerry G. Blaivas, M.D. Department of Urology, Weill Cornell Medical College of Cornell University, New York, NY, USA

Department of Urology, SUNY Downstate College of Medicine, Brooklyn, NY, USA

Institute for Bladder and Prostate Research, New York, NY, USA

Timothy Boone, M.D., Ph.D. Department of Urology, Houston Methodist Hospital, Houston, TX, USA

Jane Cho, M.D. Department of Urology, University of California Irvine, Orange, CA, USA

Denise Chow, M.D. Division of Pelvic Medicine and Reconstructive Surgery, Department of Urology, University of California, Los Angeles, CA, USA

Jacques Corcos, M.D., F.R.C.S.(S). Department of Urology, McGill University, Jewish General Hospital, Montreal, QC, Canada

Anurag K. Das, M.D., F.A.C.S. Department of Urology, Center for Neuro-urology and Continence, Beth Israel Deaconess Medical Center, Boston, MA, USA

Prokar Dasgupta, M.B.B.S., M.Sc. (Urol.), M.D., D.L.S., F.R.C.S. (Urol.), F.E.B.U. Department of Urology, Guy's Hospital, MRC Center for Transplantation, King's College London, King's Health Partners, London, UK

G. Willy Davila, M.D. Department of Gynecology, Cleveland Clinic Florida, Weston, FL, USA

Gamal M. Ghoniem, M.D., F.A.C.S. Department of Urology, University of California Irvine, Orange, CA, USA

Alienor S. Gilchrist, M.D. Department of Urology, Medical University of South Carolina, Charleston, SC, USA

E. Ann Gormley, M.D. Department of Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA

Jay Iyer, M.B.B.S., M.D., D.N.B., F.R.C.O.G., F.R.A.N.Z.C.O.G. Division of Urogynecology, Department of Obstetrics and Gynaecology, The Townsville and Mater Hospitals and James Cook University, Townsville, QLD, Australia

Forrest Jellison, M.D. Division of Pelvic Medicine and Reconstructive Surgery, Department of Urology, University of California, Los Angeles, CA, USA

Jaspreet Joneja, M.D. Department of Urology, University of Illinois at Chicago, Chicago, IL, USA

Saad Juma, M.D., F.A.C.S. Incontinence Research Institute, Encinitas, CA, USA

Ravi Kacker, M.D. Division of Urology, Department of Surgery, Beth Israel Deaconess Medical Center, Boston, MA, USA

Michael J. Kennelly, M.D. McKay Department of Urology, Women's Center for Pelvic Health, Charlotte Continence Center, Carolinas Medical Center, Charlotte, NC, USA

Muhammed Shamim Khan, F.R.C.S. (Urol.), F.E.B.U. Department of Urology, Guy's Hospital, MRC Center for Transplantation, King's College London, King's Health Partners, London, UK

Rose Khavari, M.D. Department of Urology, Houston Methodist Hospital, Houston, TX, USA

Kathleen C. Kobashi, M.D. Department of Urology, Virginia Mason Medical Center, Seattle, WA, USA

Ervin Kocjancic, M.D. Department of Urology, Pelvic Health and Reconstructive Urology, College of Medicine, University of Illinois at Chicago, Chicago, IL, USA

Courtney Lee, M.D. Center for Female Urology and Reconstructive Pelvic Surgery, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA

Dominic Lee, M.B.B.S. (Hon.), F.R.A.C.S. (Australia) Department of Urology, University of Texas Southwestern Medical Center, Dallas, TX, USA

Karan Motiani, M.D. Department of Surgery, University of Cincinnati, College of Medicine, Cincinnati, OH, USA

Gaspar Msangi, M.D. Department of Urology, Oakland University, William Beaumont School of Medicine, Royal Oak, MI, USA

Bhavin N. Patel, M.D. Department of Urology, Virginia Mason Medical Center, Seattle, WA, USA

Kenneth M. Peters, M.D. Department of Urology, Oakland University, William Beaumont School of Medicine, Royal Oak, MI, USA

Andrew C. Peterson, M.D., F.A.C.S. Division of Urology, Duke University Medical Center, Durham, NC, USA

Leon N. Plowright, M.D. Department of Gynecology, Cleveland Clinic Florida, Weston, FL, USA

Rajveer S. Purohit, M.D., M.P.H. Department of Urology, Weill Cornell Medical College of Cornell University, New York, NY, USA

Ajay Rane, M.B.B.S., M.Sc., M.D., F.R.C.S., F.R.C.O.G., F.R.A.N.Z.C.O.G., C.U., P.H.D., F.I.C.O.G. (Hon.), F.R.C.P.I. (Hon.) Department of Obstetrics and Gynaecology, James Cook University, Townsville, QLD, Australia

Shlomo Raz, M.D. Division of Pelvic Medicine and Reconstructive Surgery, UCLA School of Medicine, Los Angeles, CA, USA

Department of Urology, UCLA School of Medicine, Los Angeles, CA, USA

Eric S. Rovner, M.D. Department of Urology, Medical University of South Carolina, Charleston, SC, USA

Arun Sahai, Ph.D., F.R.C.S. (Urol.) Department of Urology, Guy's Hospital, MRC Center for Transplantation, King's College London, King's Health Partners, London, UK

John P. Selph, M.D. Department of Urology, UNC School of Medicine, Chapel Hill, NC, USA

Jai Seth, B.Sc., M.Sc., M.R.C.S. Department of Uro-Neurology, National Hospital for Neurology and Neurosurgery, London, UK

Martijn A.C. Smits, M.D. Department of Urology, Maastricht University Medical Centre, Maastricht, The Netherlands

Philip E.V. van Kerrebroeck, M.D., Ph.D., M.M.Sc. Department of Urology, Maastricht University Medical Centre, Maastricht, The Netherlands

Sandip Vasavada, M.D. Center for Female Urology and Reconstructive Pelvic Surgery, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA

Philippe Zimmern, M.D. Department of Urology, University of Texas Southwestern Medical Center, Dallas, TX, USA

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Part I

Introduction/Basics

1 Basic Urologic History and Questionnaires and the Role of Imaging in Female Pelvic Medicine and Reconstructive Surgery

Courtney Lee and Sandip Vasavada

The initial evaluation of a patient with suspect urinary incontinence or pelvic organ prolapse should be quite detailed as there are many aspects to these disorders that tie in to other disease processes throughout the body. A complete and thorough history and physical exam will help the clinician optimize the correct approach to the patient, be it observation or more interventional approaches to management.

Initial assessment of urinary incontinence and pelvic organ prolapse should evaluate a patient's signs and symptoms in order to develop a differential diagnosis, determine need for additional testing, and decide possible treatment options. A thorough history and physical exam is necessary for initial evaluation and subsequent testing should be based on clinical suspicion and treatment goals.

Further tests should be considered if surgical intervention is planned, conservative therapies are not effective, or there is suspicion for pelvic pathology such as stone, cancer, or fistula. In addition, further testing is valuable if there is a prior history of pelvic surgery or radiation, recurrent UTI, neurologic disease, voiding dysfunction, significant prolapse, pain, or hematuria [1].

C. Lee, M.D. (✉) • S. Vasavada, M.D.
Center for Female Urology and Reconstructive Pelvic Surgery, Glickman Urological and Kidney Institute, Cleveland Clinic, Q-10-1 Urology, 9500 Euclid Avenue, Cleveland, OH 44195, USA
e-mail: Vasavas@ccf.org

Important in the assessment of both urinary incontinence and pelvic organ prolapse is an assessment of the impact of the pelvic floor disorder on the patient. Several questionnaires have been developed to assess the severity of the disease, the degree of bother from the disease, and the effect of the disease on quality of life.

History

Urinary symptoms should be evaluated in all patients with urinary incontinence and pelvic organ prolapse. Storage symptoms are symptoms that occur with bladder filling. They include urinary urgency, daytime and nighttime frequency, nocturnal enuresis, and urinary incontinence.

A patient with urinary incontinence should be questioned about the duration of her symptoms and whether the leakage appears to be per urethra or per vagina. The severity of incontinence can be estimated by asking the patient about the frequency of incontinent episodes and pad usage. A micturition diary, which will be described below, is useful to determine the severity of incontinence.

The physician should attempt to determine the precipitating factors of incontinence in order to characterize the incontinence. Stress urinary incontinence (SUI) is an involuntary loss of urine during physical activity; urgency incontinence is leakage of urine associated with urinary urgency; mixed incontinence is a combination of both stress and urgency incontinence. When a patient

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complains of mixed incontinence, the physician should ask which type of incontinence occurred first and which is more bothersome to the patient.

During questioning regarding urinary incontinence, patients may complain of continuous incontinence or insensate incontinence when the patient is unaware of urinary leakage. Patients may also complain of postural urinary incontinence, which occurs when the patient loses urine when changing positions. The exact mechanism of postural incontinence is unknown and will require further evaluation [2]. Bladder sensation during filling should also be assessed. Bladder sensation can be increased, reduced, or absent.

Both urinary incontinence and pelvic organ prolapse can be associated with urinary obstruction. Therefore, voiding symptoms, such as hesitancy, slow stream, straining to urinate, position-dependent micturition, and inability to pass urine, should be assessed. Patients with prolapse may also complain of a need to reduce the prolapse in order to void.

Other urinary symptoms such as dysuria, gross hematuria, and a history of urinary tract infections are important to ascertain during a history for pelvic floor dysfunction. These symptoms signify a need for additional tests to rule out pelvic pathology.

Defecatory symptoms should be evaluated. A patient should be asked whether vaginal or perineal splinting is required to evacuate her bowels. Constipation is relatively common in the community. A meta-analysis showed the prevalence of chronic idiopathic constipation in North America is about 14 % [3]. It is more common in the elderly and in women and can be exacerbated by anticholinergics used to treat OAB symptoms. A history of fecal incontinence should also be elicited.

Patients with prolapse can present with a variety of symptoms. The most common and specific symptom of prolapse is the sensation or visualization of a vaginal bulge [4–9]. Several studies have shown that visualization or sensation of a vaginal bulge correlates with the degree of pelvic organ prolapse [5–7, 9]. Women with pelvic organ prolapse are more likely to complain of pain and pressure in the lower abdomen, pelvis, and genital region [10]. While low back pain is common in the community, this has been evaluated and thought to not likely be caused by pelvic organ prolapse [11].

Sexual symptoms should be assessed as part of the routing pelvic floor evaluation. Issues including dyspareunia, disorders of vaginal lubrication, and coital incontinence should be further evaluated. As such, coital incontinence can occur during penetration or orgasm yet the pathology of incontinence during sexual activity is likely multifactoral. SUI is common in patients with leakage during penetration and urgency incontinence tends to be more common in patients with incontinence describing leakage during orgasm [12].

One of the most effective adjuncts to the clinical office visit is the use of a fluid or voiding diary. This diary allows the clinician to assess the timing and amount of fluid intake as well as consumption of caffeinated and other bladder stimulant type beverages. Furthermore, the log can be used as an objective measure of a patient's level of frequency and urgency and allows the physician to estimate one's functional capacity. From the voiding diary the physician can calculate daytime and nighttime frequency, number of incontinence episodes, number of urgency episodes, pad usage, total urine volume, maximum voided volume, and nighttime urine volume. It is a good quantitative measure of patients' urinary frequency and incontinence episodes and can be used to track treatment. Perhaps it is most useful for patients who present with nocturnal symptoms as it allows the physician to determine if the patient has nocturnal polyuria—a medical cause of nocturia.

In addition, a good gynecologic history is necessary in pelvic floor disorders and will include obstetric and menstrual history including menopausal status. The medication list should be evaluated for hormone replacements, diuretics, and medications that can affect the urinary tract. Prior medical history should be evaluated for history of trauma, congenital abnormalities, pelvic radiation, neurological diseases, and prior history of treatment for incontinence and pelvic organ prolapse. A history of diabetes mellitus or diabetes insipidus may account for an increase in urine volume leading to urinary incontinence.

Diabetes mellitus may also cause an acontractile bladder and overflow incontinence. Prior surgical history should include prior hysterectomy, pelvic surgery, and past surgical treatment for incontinence or prolapse.

Questionnaires

Diagnostic questionnaires are administered as a tool to determine if a patient has a disease. Furthermore, it can provide a baseline measurement or assessment of symptoms prior to a planned intervention. Currently, two validated questionnaires designed for the diagnosis of OAB are used commonly: the overactive bladder awareness tool (OAB-V8) and the overactive bladder symptom score (OAB-SS). OAB-V8 is an 8-item patient administered questionnaire to identify men and women with bothersome OAB symptoms that may benefit from treatment [13]. This questionnaire is designed ideally for a primary care setting. The OAB-SS is a 7-item patient administered symptom score for men and women [14]. It has 4 items related to urgency and urge incontinence, and two questions related to nighttime and daytime frequency, and one general question regarding "bladder control." The OAB-SS does not address bother or quality of life issues but is designed to grade the severity of urgency using an urgency subscale.

The questionnaire for urinary incontinence diagnosis (QUID) is a 6-item questionnaire to diagnose and differentiate between SUI, UUI, and MUI in women [15]. It has a stress and urge subscale. Patients with a stress subscale greater than or equal to 4 are more likely to have a diagnosis of stress incontinence, and those with an urge subscale greater or equal to 4 are more likely to have a diagnosis of urgency incontinence. Those with both evidence of stress and urge have mixed incontinence.

Urinary incontinence and pelvic organ prolapse do not cause significant morbidity or mortality in a majority of patients suffering from these conditions. The main effect of incontinence and prolapse is on a patient's quality of life. Therefore, it is important to evaluate the effects of UI and pelvic organ prolapse on a patient's quality of life at initial presentation and throughout a patient's treatment course.

Many of quality of life questionnaires have validated short forms with fewer questions to make them easier to use in a clinical setting. The short forms may also be beneficial in a research situation where patients are given numerous questionnaires. While there are a multitude of questionnaires available for use, several more common ones are highlighted below.

The Bristol Female Lower Urinary Tract Symptoms Questionnaire (BFLUTS) measures the severity and bother of urinary incontinence and lower urinary tract symptoms in women [16]. It also evaluates the effects of lower urinary tract symptoms on quality of life. It consists of 33 questions with 4 domains. The domains are incontinence severity, associated lower urinary tract symptoms, quality of life, and sexual function. The BFLUTS-SF is a scored form of the BFLUTS with 19 items and 5 domains. BFLUTS-IS measures urinary incontinence symptoms, BFLUTS-VS measures voiding symptoms, BFLUTS-FS measures urinary storage symptoms, and the BFLUTS-sex and BFLUTS-QoL measure sexual symptoms and quality of life symptoms related to lower urinary tract symptoms [17].

The urinary distress inventory (UDI) and incontinence impact questionnaire (IIQ) are paired measures that evaluate the bother and psychosocial impact of urinary incontinence in women. The UDI evaluates bother from urinary incontinence. It has 19 questions with 3 subscales: irritative symptoms, obstructive/discomfort, and stress symptoms [18–20]. The IIQ measures the psychosocial impact of urinary incontinence. It has 30 items with 4 subscales: physical activity, travel, social relationships, and emotional health [18–20]. The UDI-6 and IIQ-7 are short forms of the UDI and IIQ [21, 22].

The Kings Health questionnaire is a 21-item questionnaire that evaluates the impact of urinary incontinence on a woman's quality of life. It has 8 domains which evaluates perception of severity of incontinence and the effect of urinary incontinence on general health, role, physical interactions,

social interactions, personal relationships, emotions, and sleep [23].

The overactive bladder symptoms and health-related quality of life questionnaire (OAB-Q) is an OAB-specific measure that evaluates bother and impact of OAB in men and women [24, 25]. This survey, which is validated for use in continent and incontinent patients, has 33 questions with 2 parts. The first part evaluates symptom bother. The second part has 4 domains that evaluate the impact of OAB in areas of coping, concern, sleep, and social interaction. The OAB-Q SF is a 19 question short form of the OAB-Q with questions related to symptom bother and health-related quality of life [26].

The short form of the International Consultation on Incontinence Modular Questionnaire (ICIQ-SF) is a 4-question measure that evaluates symptom severity and bother from lower urinary tract symptoms in men and women [27]. The York Incontinence Perception Scale (YIPS) is an 8-item questionnaire that evaluates the psychosocial effects of incontinence in women [28].

Single question global measures can be used as a quick tool to evaluate a patient's experience with urinary symptoms. A patient is asked to sum all the effects of a symptom to answer one question. These measures don't allow a physician to determine specifics about a patient's bother or quality of life, but gives a general impression how a symptom affects the patient. The Patient Perception of Bladder Condition (PPBC) is a single-item global index to evaluate the impression of urinary problems in men and women with OAB. It is validated for use in both continent and incontinent patients with OAB [25, 29]. The Patient Global Impression of Severity is a single question global index validated to evaluate the severity of SUI [30].

Two commonly used questionnaires for the evaluation of health-related quality of life in patients with pelvic organ prolapse is the Pelvic Floor Distress Inventory (PFDI) and the Pelvic Floor Impact Questionnaire (PFIQ) [31]. The PFDI is a 61-item measure with 3 domains. The first domain is the UDI. It contains the aforementioned UDI and 9 questions related to lower urinary tract symptoms in women with pelvic organ prolapse. Similar to the UDI, it has 3 sections: obstructive, irritative/discomfort, and stress. The second domain, the POPDI, has questions related to pelvic organ prolapse. It is divided into 3 sections: general, anterior, and posterior. The CRADI (Colorectal and Anal Distress Inventory) is the last section. This portion helps evaluate lower bowel function and is divided into 4 sections: obstructive, incontinence, pain/irritation, and rectal prolapse.

The PFIQ evaluates health-related quality of life and the affect prolapse symptoms have on a patient's daily activities relationships and emotion. It is based off of the IIQ and like the PFDI is separated into 3 scales with 31 questions each: the IIQ, the colorectal impact questionnaire (CRAIQ), and the pelvic organ prolapse impact questionnaire (POPIQ). Each scale assesses 4 areas of quality of life: travel, social, emotions, and physical activity. Though intended to be administered in entirety, each domain in the PFDI and PFIQ is scored separately. The PFDI-12 and PFIQ-7 are short forms of the PFDI and PFIQ [32].

Quality of life and bother from defecatory symptoms can be evaluated by the CRAIQ and CRADI, which are domains of the PFDI and PFIQ that address lower GI symptoms. The Fecal Incontinence Quality of Life Scale is a 29-item measure that evaluates the affect of fecal incontinence on men and women. It has 4 domains: lifestyle, coping/behavior, depression/self-perception, and embarrassment [33].

The Female Sexual Function Index (FSFI), the BFLUTS-sex, and the PISQ are three measures used to evaluate sexual function in women. The FSFI is a 19-item questionnaire with 6 domains: desire, arousal, lubrication, orgasm, satisfaction, and pain [34]. Though it can be administered to all women regardless of their sexual activity, the questionnaire is more appropriate for sexually active women.

The BFLUTS-sex is part of the BFLUTS that assesses sexual function in patients with lower urinary tract symptoms. The PISQ is a 31-item questionnaire designed to evaluate sexual function in sexually active heterosexual women with urinary incontinence or pelvic organ prolapse [35]. It has 3 domains: behavioral/emotive, physical,