Urodynamic Evaluation of Continent Cutaneous Urinary Stoma

Thesis

Submitted for Fulfillment of
MD Degree in Urology

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2014

تقييم ديناميكية التبول فى تحويل مجرى البول بفتحة تحكمية على الجلد

دراسة توطئة للحصول على
درجة الدكتوراه فى جراحة المسالك البولية

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Acknowledgement

First of All Thanks To ALLAH

I wish to express my deep appreciation and gratitude to **Prof. Dr. Shereen Ibrahim Ragy,** *Professor of Urology, Faculty of Medicine, Ain Shams University, for his academic supervision, guidance, constant encouragement and valuable advice, which was essential for the completion of this study.*

My sincere gratitude to **Prof. Dr. Hassan Seid Shaker,** *Professor of Urology, Faculty of Medicine, Ain Shams University, for his unforgettable help, continuous inspiration, generosity in giving his time, effort and advice and his continuous assistance during the course of this research*

I'm greatly indebted to **Dr. Mohamed Yassin** *Lecturer of Urology, Faculty of Medicine, Ain Shams University for his kind help, guidance and follow up throughout the whole work.*

Last but by no means least, I would like to express my endless gratitude to my dear patients and their parents without whose help and cooperation this work would have never been accomplished. May Allah grant them good health.

Rehab Helmy.


قَالُوا سُبْحَانَكَ
لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ
صدق الله العظيم
سورة البقرة الآية (٣٢)
(مدنية)

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LIST OF ABBREVIATIONS

Abbrev.	Meaning
ACE	Angiotensin Converting Enzyme
Cr.	Creatinine
CCD	Continent cutaneous diversion
CIC	Clean intermittent catheterization
CT scan	Computed tomography scan
CUD	Continent Urinary diversion
FPL	Functional Pressure Length
GFR	Glomerular filteration rate
HCO_3	Bicarbonate
K	Potassium
MACE	Malone Antegrade continent enema
Na	Sodium
QoL	Quality of life
SIPMT	Simplified Indiana Pouch with multiple taeniamyotomies
SIU	Societe Internationale d'urologie
TAP	Transverse ascending pouch
TDP	Transverse descending pouch
UCB	Urothelial carcinoma of the bladder
UTI	Urinary tract infection

Introduction

Although the procedures for continent urinary diversion & urinary tract re-construction have been described for more than 140 years, only in last three decades a concentrated effort have been made to evaluate the outcome of these procedures ***(Hautmann, 2007).***

Urinary diversion is indicated when the bladder can no longer safely function as a reservoir for urine storage or voiding ***(Webster et al., 2003).***

The goal of any form of urinary diversion is to deliver the urine to outside with a minimum interference of life style with a maximum protection of the urinary tract ***(Mahbub et al., 2008).***

Orthotopic continent urinary diversion designed from detubularised ileum has gained wide spread acceptance among urologists and the patients, however this needs proper patient selection and the urethra should be normal ***(Mahbub et al., 2008).***

When the access of a normal bladder, augmented bladder, or continent reservoir for intermittent catheterization may not be possible through the urethra. Creating an abdominal stoma is necessary ***(Hinman, 2009).***

Many techniques & procedures have been described over years however few of them could survive to withstand the test of time, especially when the outlet control mechanism is not physiological ***(Abol-Enein et al., 2004).***

When the appendix is available, submucosal implantation of the appendix provides continence and furnishes a catheterizable stoma *(Mitrofanoff principle)*. The ureter may also be used as a conduit between the skin and the bladder when one of the renal units is nonfunctional or by performing trans-ureteroureterostomy. Alternative approach when the appendix is not available is an opened ileal segment closed transversely *(Yang-Monti technique)*. In patient with a large flaccid bladder a portion of the bladder may be constructed into a continent vesicostomy tube ***(Hinman, 2009).***

Patients with a continent catheterizable stoma have a one-way valve mechanism fashioned at the insertion site that leads into the urinary storage system. The limb allows for catheterization through a small stoma on the abdominal wall, enabling the system to empty; however, this limb remains continent during the storage phase between catheterizations. Mechanisms for continence of the efferent limb include a flap valve, nipple valve, pressure equilibration, or combinations of thereof ***(Joseph A Costa, 2008).***

The incidence of incontinence after continent catheterizable reservoirs is difficult to determine due to a lack of standard terminology, the use of non-validated

questionnaires and retrospective evaluation. In a review by Rowland et al. an overall incontinence rate of 3.2% was found ***(Rowland et al., 1996)***.

This rate varied among the different continence mechanisms of patients with intussuscepted nipples 5.8%, with tunneled appendix 3% and with stapled plicate ileocecal valves 0.6% was incontinent. Other reported incontinence rates in larger series range from 6.7% (Florida pouch) and 28% (Indiana pouch) ***(Holmes et al., 2002)***.

In a recent large series Abol-Enein et al. reported a 94.6% day- and nighttime continence. Patients catheterized at four to five hourly intervals during the day and one to two times at night ***(Abol-Enein et al., 2004)***.

Thus further evaluation is needed to determine the cause of incontinence. Potential reasons being uninhibited reservoir contractions, a low compliance high-pressure reservoir, an incompetent continence mechanism. In this setting Urodynamic and cystoscopy can be helpful to determine the underlying cause, which then needs to be treated, respectively ***(Fiona et al., 2006).***

Aim of the work

To evaluate continent catheterizable stomas urodynamically as regards factors that affects continence or cause incontinence. This will help future modification to improve.

Surgical Anatomy Of Intestinal Segment Used For Urinary Diversion

For more than a century the gastrointestinal tract has been employed in numerous creative and sophisticated procedures to correct abnormalities of the genitourinary tract. Different procedures incorporating stomach, jejunum, ileum, different parts of the colon and a combination of the above bowel segments have been used in diverting, reconstructing and remodeling different portions of the urinary tract. A thorough knowledge of the surgical anatomy of these structures is necessary in order to properly isolate, mobilize and fashion them according to the requirements of the reconstructive procedures being performed ***(Ramon, 2005).***

This chapter reviews the anatomy of the gastrointestinal tract and provides an overview of the anatomical considerations in the use of bowel segments in urinary reconstructive surgery.

Small bowel:

The small bowel is about 6.7 m long; (4.5-9 m). Its largest diameter is in the duodenum; the lumen becomes smaller in the more distal portions, reaching its smallest diameter in the ileum, approximately 30 cm. from the ileocecal valve. About two fifths of the small bowel is jejunum, whereas the distal three fifths is ileum. There is no definite demarcation between the two; however, each possesses several unique properties ***(Dahl and McDougal, 2010).***

The ileum, being more distal in location, has a smaller diameter. It has multiple arterial arcades, and the vessels in the arcades are smaller than those in the jejunum. The ileal mesentery is also thicker than the jejunal mesentery. In contrast, the jejunal diameter is larger, the arterial arcades are usually single, and the vessels composing them are larger in diameter. The arcades anastomose one with another and give off straight vessels, which enter the bowel and form an anastomotic network within the bowel wall (Fig. 1) ***(Dahl and McDougal, 2010)***.

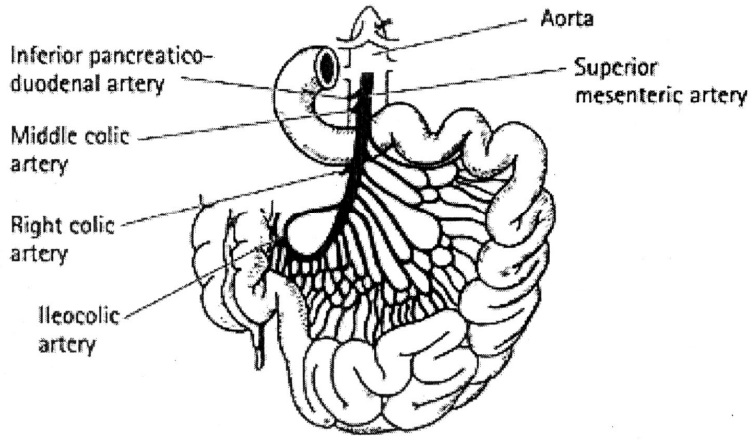

Figure (1): *Arteries to the small bowel* ***(Ramon, 2005).***

In spite of the rich collateral blood supply provided by the arterial arcades, occlusion of a major branch of the superior mesenteric artery will lead to bowel death if not quickly corrected. However, straight vessels can be cleaned from the small bowel up to distance of 15 cm without necrosis of such a