DYSFUNCTIONAL ELIMINATION SYNDROME IN CHILDREN

Essay
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List of abbreviations

BC	:	Bladder Compliance
CKD	:	Chronic Kidney Disease
DES	:	Dysfunctional Elimination Syndrome
DMSA	:	Dimercaptosuccinic acid
DUI	:	Daytime Urinary Incontinence
EAS	:	External Anal Sphincter
EMG	:	Electromyogram
EUS	:	External Uretheral Sphincter
FDR	:	Fecal Dislodging in Rectum
GFR	:	Glomerular Filtration Rate
IAS	:	Internal Anal Sphincter
ICS	:	International Continence Society
IPG	:	Implanted Pulse Generator
IU	:	Idiopathic Urethritis
KUB	:	Kidney, Ureter and bladder plain X-ray
LUTS	:	Lower Urinary Tract Symptoms
MRI	:	Magnetic Resonant Image
NNBSD	:	Non Neuropathic Bladder Sphincter Dysfunction
OAB	:	Over Active Bladder
PEG	:	Poly Ethylene Glycol
PVR	:	Post Void Residual volume
SCr	:	Serum Creatinine
SN	:	Sacral nerve Neuromodulation

UG	:	Uro Gynecological clinic
US	:	Ultra Sound
UTI	:	Urinary Tract Infection
VCUG	:	Voiding Cysto Urethro Gram
VUR	:	Vasico Ureteric Reflux
VUD	:	Video Uro Dynamic

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Introduction

The association of constipation with urologic pathologic processes has been described in the literature since the 1950s, but it was only over the past decade that clinicians have paid more attention to this relationship and recognized its existence with the term dysfunctional elimination syndrome (DES). This term is used to reflect the broad spectrum of functional disturbances that may affect the urinary tract, including that of functional bowel disturbances ***(Bower et al, 2005).***

The close proximity of the rectum to the posterior wall of the bladder makes it possible that any gross distention of the rectum by impacted feces can result in mechanical compression of the bladder and bladder neck, leading to urinary obstruction ***(O'Regan et al, 1997)***. In addition, it has been observed that large fecal impaction may induce significant detrusor instability and other bladder dysfunctions, which in turn will result in the urge syndrome, UTI, and reflux ***(O'Regan et al, 1997).***

The impacted stool in the rectum compresses the bladder, reduces its functional capacity, and provokes earlier sensation to void. In addition, chronic pelvic floor spasm prevents complete relaxation during voiding, and will attribute to post voiding residuals ***(Sarel et al, 2008).***

Gatti et al identified a population of children evaluated in an emergency department who presented with urinary retention caused by constipation. These observations lend further evidence of the significant impact that a dysfunctional bowel can inflict upon the urinary tract.***(Gatti et al.2001)***

Others have found an association between renal dilatation and bladder residual and constipation in a prospective study of children with functional constipation who were age matched with a control population of healthy children without constipation ***(Dohil et al, 1994).***

The dysfunctional elimination syndrome (DES) is rare in adulthood. The OAB symptoms of DES, such as urgency, frequency, recurrent UTI and incomplete emptying, are more prevalent in childhood and more often present in adulthood ***(Bower et al, 2005).***

Clinical assessment involves a history and physical examination, along with noninvasive uroflowmetry and residual urine quantification by bladder ultrasound scan. Abdominal radiographs (KUBs) may also be used to visually evaluate the amount of stool in the rectum and colon ***(Heidi A. Allen et al 2007)***

Diagnosis often is based on subjective findings alone, including the parent's and/or child's report of the nature and frequency of stooling. Various methods have been developed to assess constipation objectively, including whole gut transit time, mean daily stool weight, daily KUBs, and digital examination of the rectum. These measures are generally not preferred because they are either time consuming or invasive. Radiographs have been used to visually assess constipation and have been valued because they are an inexpensive and quick method to obtain objective data. ***(Van den Bosch et al 2006).***

Management of constipation in children with DES is imperative because this often confers an improvement in related conditions, including urinary tract infections (UTIs) and daytime incontinence. Children presenting with urinary incontinence, frequency, or urgency are generally recommended to begin conservative treatment, including the use of bladder diaries, timed voiding, and laxatives ***(Heidi A. Allen et al, 2007).***

Treatment for constipation in the past has included enemas, fecal disimpaction and a variety of oral agents such as mineral oil, milk of magnesia and sorbitol ***(Brad et al 2003).***

Use of polyethylene glycol 3350 for treatment of constipation in children with dysfunctional elimination. the beneficial effect of treating constipation for improvement of urinary continence and urodynamic parameters. Furthermore, this effect was seen with a single agent. It remains possible that other agents for constipation may be better for resolution of bowel and bladder symptoms in children with dysfunctional elimination, and further studies comparing different treatments ***(Brad et al, 2003).***

Sacral nerve neuromodulation (SN) with the InterStim device (Medtronic, Minneapolis, MN) has been successfully applied to children with medically refractory dysfunction elimination syndrome (DES) ***(Roth et al, 2008).***

DES is a constellation of chronic urinary symptoms that can be especially frustrating to the child, parents, and medical caregivers owing to the frequent evaluations and numerous medical therapies ***(Roth et al 2008).***

Aim of The Work

Our work targets to study DES in children, regarding the definition, diagnosis, relationship with urinary tract infection and vesicoureteric reflux and importance of its management to improve the prognosis.

Anatomy of male urethral sphincter

Bladder Neck and Prostatic Urethra: Figure 1shows multiple views of 3-D reconstruction of the male sphincteric complex. The sphincteric complex is a continuous structure that surrounds the bladder neck, prostate, and membranous and proximal bulbar urethra. It is obvious that the sphincteric complex is not circumferential, with varying degrees of separation on the dorsal aspect. The trigonal musculature extends into the bladder neck only on the dorsal aspect of the prostate. The levator ani musculature surrounds the lower aspect of the urinary sphincter except on the dorsal aspect, where the rectourethralis muscle is located ***(Selcuk Yucel et al., 2004).***

The urinary bladder trigone :

The trigonal musculature extended caudally halfway to the verumontanum. The trigone narrowed below the ureteral orifices, then broadened and thickened dorsally to the bladder and prostate. The outer longitudinal muscle layer of the ventral bladder wall continued at the bladder neck over the ventral circular muscle fibers of the prostate to the level of the verumontanum. Dorsally the outer longitudinal layer of the detrusor attenuates beneath the trigone before reaching the prostate The 3-D reconstructions illustrate the circular muscular layer of the detrusor covering the ventral side of the bladder neck meatus.***(Selcuk Yucel et al., 2004).***

The muscular structure of the male external urethral sphincter :

At the level of the bladder neck, smooth muscle fibres are of oblique and longitudinal orientation, and longitudinal fibres run parallel to the longitudinal smooth fibres of the prostatic urethra (Fig. 1B,I).

Three-dimensional reconstructed images showed that the external urethral sphincter continued from the prostatic base to the membranous urethra in the form of a crescent shape above the seminal colliculus and a horseshoe shape below the seminal colliculus (Fig. 1E,H), and covering the membranous urethra evenly at all sides (Fig. 1I). The striated muscle fibres of the external sphincter were arranged in a circular pattern in the membranous urethra (Fig. 1H,I), and were intermingled with the smooth muscle fibres in the posterior and lateral part of the sphincter (Fig. 2B– D). The relationship between the prostate, sphincteric complex and urethra did not change as a function of gestational age ***(I. Karam et al., 2005).***

The innervation of the male urethra

At the level of the bladder neck, the nerve fibres run under the pelvic fascia on either side of the rectovesical pouch, lateral and cranial to the rectum and the seminal vesicles, and penetrate into the bladder neck at 5 o’clock and at 7 o’clock positions (Figs 3A and 4A,B).

The autonomic nerves, originating from the inferior hypogastric plexus, run beneath the fascia of the levator ani muscle along the lateral surface of the rectum (Fig. 3A,D), around the anterolateral aspects of the seminal vesicles and over the inferolateral aspect of the prostate (Fig. 3A,B) ***(Fritsch et al., 2004).***

At this level there are myelinated and unmyelinated nerve fibres on the posterior face of the bladder neck (Fig. 3C). A section of the unmyelinated fibres follow the ejaculatory ducts of the cranial prostate to reach the prostate and the prostatic urethra (Fig. 3C). Myelinated nerves follow the same course as the autonomic nerves and end in striated muscle fibres of the prostatic capsule (Figs 4C,D and 8C)***(Fritsch, 1989).***