Anorectal Physiological Assessment in Obstructive Defecation

Thesis

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Tropical Medicine

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Abstract

Background: Functional disorders of the anus and rectum affect 10-20% of the population.Tests of anorectal function can provide useful information regarding the pathophysiology of the disorders that affect continence and defecation

Aim: anorectal physiological assessment of patients with functional obstructive defecation using anorectal manometry, balloon expulsion test and surface EMG and compare their results with normal controls.

Subjects and methods: 20 patients that fulfilling Rome III criteria of functional constipation underwent anorectal physiological testing using anorectal manometry, balloon expulsion test and surface EMG in addition to 10 healthy individuals as a normal controls.

Results: Mean resting pressure in patients and normal controls was 81 and 60 mmHg respectively. The anal canal pressure during straining in patients showed paradoxical increase in relation to the resting pressure in 17 patients (85%) and 3patients (15%) showed decrease by less than 20% of the resting pressure, however in normal controls decreased by more than 20%. Recto anal inhibitory reflex was present in both groups. There was marked hyposensation in 12 patients(60%),4 patients (20%) showed mild anorectal hyposensation, and 4 patients (20%) showed normal rectal sensory thresholds, However in control group there was mild rectal hyposensation in 5 volunteers (50%). All constipated patients failed to expel a 50 cc water inflated balloon within 2 minute and 100% of normal controls succeeded to expel the balloon in less than one minute. Surface EMG showed paradoxical increase in average MUAP base line in 17 patients (85%) and remaining 3 patients (15%) showed mild decrease

in average MUAP base line, however in normal controls it showed decrease in average MUAP base line.

Conclusion: Anorectal physiological testing using anorectal manometry is very helpful in diagnosis of functional obstructive defecation among constipated patients. Balloon expulsion test is a good screening test for identification of functional constipation.

Key word: Anorectal manometry in functional constipation.

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List of Abbreviations

ACD	Anal canal Diameter
ACL	Anal canal length
ACP	Anal canal pressure during straining
CMAP	Compound muscle action potential
DV	Dynamic velocity of stool
EMG	Electromyography
ERS	External anal sphicter
IAS	Intenal anal sphicter
IRP	intra rectal pressure
MRP	Maximum resting pressure
MSP	Maximum Squeeze pressure
MUAP	Motor unit action potential
OD	Obstructive defecation
PEG	Poly ethylene glycol
PNTML	Pudendal Nerve terminal motor latency
PPC	paradoxical puberectalis contraction
RAIR	Recto anal inhibitory reflex

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Introduction

Obstructive defecation (OD) is a broad term of the pathophysiologic condition describing the inability to evacuate contents from the rectum **(Geibel; 2006).**

This disorder is commonly known by numerous terms, including paradoxical puborectalis contraction (PPC), outlet obstruction, anismus, pelvic floor dyssynergia, nonrelaxing puborectalis syndrome, spastic pelvic floor syndrome, and dyschezia. It may result from functional, metabolic, mechanical, and anatomical derangements involving a rectoanal evacuatory mechanism. Dyssynergia, or uncoordination of the pelvic floor muscles, leads to paradoxical external anal sphincter and puborectalis Contraction with no relaxation during defecation **(Rao et al; 1998).**

OD may result from rectoanal intussusception, pelvic organ prolapse, rectocele, sigmoidocele, enterocele, solitary rectal ulcer syndrome, PPC and descending perineum syndrome. Other rare causes include rectal hyposensitivity (blunted rectum), idiopathic megarectum, hereditary internal sphincter myopathy and nutcracker anus **(D'Hoore; 2003).**

The Rome foundation has defined the presence of obstructive defecation in the Rome III criteria for functional anorectal disorders as follow:

Diagnostic criteria for functional defecation disorders include those for functional constipation, namely two or more of 6 symptoms present for the last 3 month with an onset more than 6 month in the past; the symptoms are straining, lumpy or hard stools, sensation of incomplete evacuation, sensation of anorectal obstruction/blockage, or manual maneuvers to facilitate defecation on more than 1/4 of bowel movements, or less than 3 bowel movements per week**.**

To meet criteria for functional defecation disorders, the patient must also undergo objective diagnostic testing and demonstrate at least two of three abnormalities: impaired evacuation of the rectum (balloon expulsion test), inappropriate contraction or less than 20% relaxation of the pelvic floor muscles, and inadequate propulsive forces during defecation (anorectal manometry and EMG)**(Bharucha et al; 2006).**

Anorectal manometry provides a comprehensive assessment of anal pressures, rectoanal reflexes, rectal pressures, sensation and compliance.A paradoxical increment in anal pressure on straining efforts is a distinctive feature of dyssynergic defecation. An increment in muscle motor activity on straining may be demonstrated by means of EMG either by intra-anal electrodes or by electrodes taped to the perianal skin **(Scarlett et al; 2005).**

Aim of the work

This study aims to analyze results of anorectal manometry, rectal sensations assessment, surface EMG and balloon expulsion testing in patients with symptoms of functional obstructive defecation and to compare them with normal controls.

Review of literature

Chapter 1

Functional Anatomy and Physiology

Pelvic Floor

The pelvic floor is a dome-shaped muscular sheet ***(Hjartardottir et al; 1997)*** that predominantly contains striated muscle and has midline defects enclosing the bladder, the uterus, and the rectum. These defects are closed by connective tissue anterior to the urethra, anterior to the rectum (i.e. the perineal body), and posterior to the rectum (i.e. the postanal plate). Together with the viscera (i.e. the bladder and anorectum), the pelvic floor is responsible for storing and evacuating urine and stool. The levator ani and the coccygeus muscle comprise the two muscular components of the pelvic floor or pelvic diaphragm. The muscles that constitute the levator ani complex are the puborectalis, the pubococcygeus, and the ileococcygeus. These muscles originate at different levels of the pubic bone, the arcus tendinous fascia pelvis (condensation of the obturator internus muscle fascia), and the ischial spine. These muscles are inserted at the level of the rectum, the anococcygeal raphe (levator plate), and the coccyx. It is unclear whether the puborectalis should be regarded as a component of the levator ani complex or the external anal sphincter. Based on developmental evidence, innervation, and histological studies, the puborectalis appears distinct from the majority of the levator ani ***(Cook et al; 2002).***

On the other hand, the puborectalis and external sphincter complex are innervated by separate nerves originating from S2–4, suggesting phylogenetic differences between these two muscles ***(Percy et al; 1981).***