

Application of Anorectal Dynamics in the Treatment of Colon Disease Packing

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Abstract. Anorectal manometry technology has been widely used in clinical diagnosis and research. Through the anorectal manometry can help people be able to timely understand, quantify and assess the anal canal, rectum homemade bowel function, and abnormal defecation anal, rectal diseases in-depth study provides pathophysiology basis. And guide clinical treatment, and anorectal manometry biofeedback can also be used to guide the judge anorectal disease surgery is a safe, simple, non-invasive and objective detection technology.

Introduction

Anorectal manometry is used by manometry method to understand, quantify and assess the anal canal, rectum homemade bowel function and provide for the study based on the pathophysiology of some anal canal, rectum disease and bowel disorders. This detection technique is considered to be a relatively non-invasive, objective, and very safe, simple detection method. As early as 100 years before there have been a method of pressure measurement, pressure measurement method 30 years ago, it is used to diagnose anorectal disease [1]. In 1972, when people began to study the pathophysiology of rectal surgical diseases and diagnosis of certain diseases use of anorectal manometry method. Anorectal pressure measurement is a lot of information of a non-invasive screening method, the measurement obtained. This information can anorectal pathophysiology have a comprehensive understanding of the whole. Last few years, through the tireless efforts of people, anorectal manometry method, and various methods derived therefrom have been widely used in various fields digestive intestinal surgery and internal medicine. A large number of experimental data shows that this is a very important research tool, it plays an irreplaceable role in the diagnosis of disease. For a long time he is also one of the important means of diagnostic study of gastrointestinal motility disorders. Anorectal manometry study examination method of diagnosis of digestive power, domestic the study is already underway, and has made some achievements. But because all the different research institutions using the instrument manufacturer, differences exist instrument caused measurement errors. Another point is the subject of examination in patients with the degree of difference in vastly different physical state, even when detecting differences in the surrounding environment will affect the accuracy of the results. Luo Jinyan applications such as three cavity three bladder manometry and balloon-style two-chamber perfusion manometry 100 healthy volunteers anal manometry, and continuous motion mode tracings of the anal canal, the establishment of a healthy tube, rectal pressure parameters and tube motion mode [2]. After 2 hours of observation, found that slow wave, spontaneous relaxation wave, ultraslow wave, irregular wave and spasmodic contraction wave, five kinds of waveforms. The most common is the slow wave, the subjects were appeared, is a law that appears flat waveform, frequency 10-20/min, amplitude 1.5-5.6mmHg. Spontaneously relaxation wave is seen in slow-wave based on pressure

suddenly dropped, then rose slowly, usually accompanied by rectal pressure. Wave slow wave is a law appear, the frequency 0.6-1.9 times / min, amplitude 25-33mmHg. Irregular wave pressure changes no rules to follow, but the volatility, lower volatility is not. Spasmodic contraction emerges in slow-wave based on the peak wave amplitude 3.0-12mmHg.

Main Outcome Measures of Anorectal Manometry

Anorectal manometry is the main test indicators anal resting pressure, anal sphincter length, systolic anal canal, anorectal inhibitory reflex, rectal sensory threshold, rectal compliance and so on.

Anal Resting Pressure. Anal resting pressure is mainly formed of the internal anal sphincter, about 85%, while the external anal sphincter maintained by only 15%. Studies have shown that when the internal anal sphincter function completely inhibited, anal canal pressure may drop 84.6%. Anal resting pressure has not arbitrary, can be influenced by many factors, such as age, race, gender, posture and so on.

Systolic Anal. That is a subject with a systolic blood pressure of the anal canal as large a force as long as possible adhere to the anal contraction 15s than the measured pressure in the anal canal, with randomness, which comes mainly from the anal sphincter (striated) systolic pressure. Research has shown that the maximum pressure of the rectum and anal canal is much lower than the maximum systolic blood pressure, which is generated by the external sphincter [3]. The anal squeeze the maximum systolic pressure is used to define the maximum defecate anywhere within the anal canal pressure and atmospheric pressure difference. Water perfused manometry, for example, by observing the maximum pressure in the anal canal with 1:03 times the initial defecation mean obtained was regarded as the biggest squeeze systolic pressure, while anal squeeze maximum sustained systolic pressure is used to describe any of the anal canal pressure points three times greater than the 15s sustained contraction of the mean atmospheric pressure difference.

Anal Sphincter. Anal sphincter length (HPZ) resting state, the maximum length of the sphincter anal sphincter resting pressure than the pressure inside the rectal area above the level of 5mmHg determined.

Anorectal Inhibitory Reflex (RAIR). Anorectal manometry in the solid state, using a syringe to 10ml/s rate in order to locate the tip of the catheter balloon rectal injection of air (10ml, 20ml, 30ml, 40ml), with the expansion of the balloon may cause reflex anal sphincter relaxation, if anal relaxation rate (anal relaxation pressure/anal resting pressure 100%) greater than 20% or more, that means RAIR be drawn RAIR not only the volume of the balloon, but also to the balloon the pace of expansion related to the same capacity when injected with a slow speed, anal pressure drop was gentle shape and the decline is significantly lower. Anorectal manometry in high-definition 3D images, rectum and anal canal refrain from transmitting in the upper anal canal in the most obvious, the maximum residual pressure occurs in the anal canal adjacent thereto.

Rectal Sensory Thresholds. Anorectal manometry in the solid state, the above using a syringe to 10ml s rate intermittently positioned to inject air in the balloon rectal catheter tip, until the subject appears subjective discomfort (intolerant) stop. Every time gas injection needs to be maintained for 1 minute interval of 2 minutes. May in turn be obtained initial feeling threshold, it is intended initial threshold, it intended to urge threshold, the maximum tolerated threshold [4]. For there anorectal disease patients may feel about their capacity to stimulate divided into four: 0: no feeling, level 1: a transient feeling, Level 2: persistent feeling, Level 3: Maximum tolerated feeling and in order to determine rectal sensation

Rectal Compliance. Compliance value that is inside the rectum with a balloon and the steady state volume of rectal pressure relationship is expressed, which may reflect the rectum and rectal volume expansion. The higher the compliance of the balloon intestine indicates the resistance is smaller, and vice versa.

Measurement Methods

Measurement Object. constipation, fecal incontinence in patients with anorectal disease.

Measuring Instruments: manometry catheter (a small balloon catheter (Marquat); anorectal manometry water perfusion catheter (Zinetics); solid state 4-dimensional anorectal manometry catheter; vector volume water perfusion catheter (Zinetics)), Polygraf, perfusion system, computer, anorectal manometry analysis software.

Subsidiary Materials. lubricants, 4×4 gauze, gloves, 60 or 100ml empty needles, therapy, three-way valve (g), bedpan.

Preoperative Preparation. ① detailed history, including symptoms (constipation, urinary or fecal incontinence, perineal pain or abdominal pain), allergies, treatment history (anal surgery), pelvic trauma history. ② sign the consent form. ③ severe constipation patients, preoperative cleansing enema, other patients do not need special treatment. ④ front air urine and feces. ⑤ without anesthesia. ⑥ detailed description of the whole process of inspection to the patient to obtain cooperation and relieve discomfort. ⑦ before surgery by the use of manual correction machine.

Manometry Catheter Placement. ① the left side of my eyes patient supine. The left hip at home a bedpan. ② The manometry catheter inserted through the anus Lubricate. Different different catheter placement. Small balloon anorectal manometry catheter balloon over the end (the external anal sphincter balloon) into the anal canal just prevail (Fig. 1). Perfusion catheters should be inserted into the anus or solid 6cm. ③ before detecting a break of 2 to 10 minutes, in order to adapt to the patient catheter. ④ rectal or anal canal pressure to do a baseline for testing.

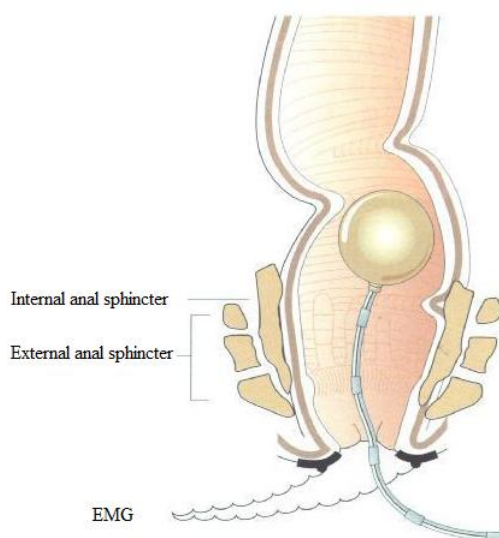


Figure 1. Manometry catheter placement

Detection process needs attention: super slow wave and slow wave of spontaneous contraction or relaxation exists, mark the patient movement, posture or errors resulting conversation. Resting anal sphincter pressure measurement can check in at the beginning or at the front end of the most relaxed patients.

Pressure Method. Maximum Autonomy SBP. Told patients forced anal contraction (screen stool Action) 10 to 20 seconds. Under normal circumstances the external anal sphincter contraction and should be continued for at least 3 to 5 seconds, such as less than 3 seconds, was an exception. 30 seconds and then repeat inspections. Note that the inspection process to move the patient's legs, raise the hips and pelvis to rotate due to errors.

Defecation Pressure. Told to do by pushing the patient / contraction of the bowel stimulant action at this time, external anal sphincter relaxation, repeat the inspection 1-2 times 30 seconds. Many

laboratory found that if patients feel embarrassed, will lead to defecation difficult to detect the external anal sphincter relaxation, so that the detection is not necessary.

Resting Pressure. Patient completely relaxed from 20 to 30 seconds when the measured pressure.

Sphincter pressure changes

Cough. For observation of external sphincter reflex contraction due increased abdominal pressure caused, so that patients do 1-2 times a cough at intervals of 20 seconds or more.

Anorectal Inhibitory Reflex (RAIR). The reflector is also known as the rectal sphincter reflex, usually induced by the rectal filling. Checks can be measured in the rectum causing rectal sphincter relaxation of the minimum capacity. Press each additional 10ml gradient into the rectal balloon injecting gas or water at room temperature. Within 3 to 5 seconds should end note, then suck out the gas or water. As such method is repeated injection increments 10ml to appear RAIR. Experimental normal order 10ml, 20ml, 30ml, 40ml, 50ml, should be sufficient to lead to 50ml RAIR [5]. But the giant rectum patients may require larger capacity. After each filling rectal balloon, whether or RAIR or whether patients feel, it should be recorded. Rectal filling 50ml under normal circumstances, the internal anal sphincter will relax (pressure drop 10 ~ 15mmHg).

Capacity Rectal Sensory Thresholds. Detection of patients with rectal stretch initial feeling capacity and maximum tolerated capacity (both are different). Within five seconds, it is injected into the rectal balloon 10ml water at room temperature, after 20 seconds to ask whether patients feel, and sensory properties. Successive increase in rectal balloon volume, two water injection interval of 20 seconds. Patients capacity to stimulate the feeling is divided into 4: 0 = no sense, level 1 = initial feeling, level 2 = persistent feeling, level 3 = maximum tolerated feel.

Manometry Report. Detection catheter with a balloon at the top of perfusion manometry catheter, 7cm at the bottom of the balloon has four radial pressure channel (each opening in the same plane was 90° angle). Detecting when the catheter is inserted into the anal manometry passage 6cm, stretch out each 1cm, were detected in resting systolic pressure and the maximum pressure can be used to check the balloon rectal catheter tip feeling capacity. As shown in Table 1.

Table 1 Manometry Report

	Resting	Normal	Contraction	Normal	Total
HPZ length (cm)	1	2.5~3.5	3		4
HPZ mean pressure	37.1	40~70	75.2		90.5
HPZ maximum pressure	70.6		149.8	30~110	163.6
Anus to the maximum pressure zone length (cm)	1		1		1

Conclusion

Anorectal manometry may provide objective indicators of the condition and operation before operation, after the evaluation of anorectal sphincter function. Anal fissure patients before surgery for anal manometry, resting pressure was significantly elevated in patients with internal sphincterotomy, can achieve better results. For patients with fecal incontinence sphincter repair or angioplasty, before surgery, after surgery to do anal manometry, anal canal pressure can rise and postoperative recovery of a high pressure zone to provide an objective basis for clinical treatment.

References

- [1] Dan Dongguang preliminary research on anorectal manometry clinical significance [J] Chinese Community Doctors, 2005, 4 (7): 66-67.
- [2] MacDonagh RP, Forster DMC, Thoms DG. Urinary continence in spinal injury patients following complete sacral posterior rhisotomy [J].1990; 66(6):618-22.
- [3] Zhangyi Xia, Liuzheng Yan, Hepatology. Chronic constipation and anorectal manometry changes in plasma VIP and SP [J]. Chinese Journal of Digestion, 2001, (6): 76.
- [4] Huangnai Jian: China anorectal science [M]. Shandong Science and Technology Press, 1996.642
- [5] Zhou Wangwei. Anorectal pressure measurement and analysis of common anorectal disease [J]. Guangxi Traditional Chinese Medical University, 2004, (7): 10-13.