EDITORIAL

Advancing the predictive accuracy of PNTML in rectal prolapse: An ongoing quest

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Abstract

Fecal incontinence is a common symptom among patients with rectal prolapse. Pudendal nerve terminal motor latency (PNTML) testing can serve as a reference indicator for predicting the outcomes of rectal prolapse surgery, thereby assisting surgeons in formulating more appropriate surgical plans. The direct correlation between preoperative PNTML testing results and postoperative fecal incontinence in patients with rectal prolapse remains a contentious issue, necessitating further clarification. Thus, we analyze the existing publications from both clinical and statistical perspectives to comprehensively evaluate the accuracy of preoperative PNTML testing in rectal prolapse and provide some feasible statistical solutions.

Core Tip: Precise diagnostic planning would help in choosing the most appropriate surgical procedure, which would help achieve better outcomes. We will comprehensively evaluate literatures on pudendal nerve terminal motor latency from both clinical and statistical perspectives and provide viable statistical solutions.

INTRODUCTION

Rectal prolapse is a circumferential, full-thickness prolapse of the rectum through the anus. It primarily presents as a partial or complete protrusion of the rectal wall accompanied by pelvic floor dysfunction, which often leads to symptoms such as anal mucus exudation, bleeding, incontinence, and constipation, thereby affecting the quality of life of patients. Fecal incontinence is a common symptom among patients with rectal prolapse, with approximately 50% to 75% of individuals diagnosed with rectal prolapse also experiencing this condition[1].

Pudendal nerve terminal motor latency (PNTML) testing is an electrophysiological method used to evaluate the function of the pudendal nerve, which is crucial for controlling the external anal sphincter. This assessment measures the time it takes for the external anal sphincter to contract in response to stimulation of the pudendal nerve, thereby evaluating the functional status of the nerve and the anal sphincter. A prolonged PNTML, with a normal value being 2.0 ms ± 0.2 ms, is typically indicative of pudendal nerve damage and may predict the risk of postoperative fecal incontinence, providing a basis for the selection of surgical procedures[2,3]. If the pudendal nerve is not damaged preoperatively and fecal incontinence is merely a secondary symptom caused by chronic dilation of the external anal sphincter due to rectal prolapse, the patient's postoperative symptoms of fecal incontinence are likely to improve. Therefore, PNTML testing can serve as a reference indicator for assessing the pelvic nerve function in patients with fecal incontinence, and has significant clinical importance for predicting the outcomes of rectal prolapse surgery, thereby assisting surgeons in formulating more appropriate surgical plans.

Oruc and Erol[4] have published a review on the current diagnostic methods, additional treatment modalities, and controversial issues concerning the surgical techniques for rectal prolapse. It is crucial that differential diagnoses be ruled out, as this is essential for selecting a tailored surgical procedure. Precise preoperative planning would help in choosing the correct management of patients, which would facilitate better outcomes. However, the clinical value of preoperative PNTML in patients with rectal prolapse has not been explored.

The direct correlation between preoperative PNTML testing results and postoperative fecal incontinence in patients with rectal prolapse remains a contentious issue, necessitating further clarification. As a peer-reviewer for the *World Journal of Clinical Cases*, I will analyze existing literature from both clinical and statistical perspectives to comprehensively evaluate the accuracy of preoperative PNTML testing for rectal prolapse. Furthermore, I will explore the relationship between preoperative PNTML abnormalities and postoperative fecal incontinence, and identify potential improvements for future clinical research protocols.

Birnbaum *et al*[5] conducted a prospective evaluation of preoperative anorectal manometry and PNTML in 24 patients with full-thickness rectal prolapse and an average age of 59 years (range from 32 years to 76 years). PNTML testing was performed preoperatively on 12 of these patients, followed by an average postoperative follow-up of 25 months. The study findings indicate that among 3 patients with prolonged PNTML preoperatively, none returned to normal fecal continence postoperatively. No correlation was found between preoperative low resting pressure or low squeeze pressure and postoperative outcomes. Due to the limited sample size (12 preoperative PNTML assessments), the results of this study may not fully represent the true situation of the target population. Consequently, the accuracy and generalizability (external validity) of the study findings are subject to certain limitations.

Johansen *et al*[6] carried out a study involving 20 elderly patients with a mean age of 82 years (range from 68 years to 101 years) who underwent PNTML testing prior to surgery, with an average follow-up period of 26 months. The study revealed that four patients exhibited significant preoperative prolonged PNTML. However, of these patients, 3 who had severe fecal incontinence preoperatively improved to moderate fecal incontinence postoperatively. Based on these findings, the authors concluded that prolonged preoperative PNTML does not accurately predict postoperative fecal incontinence. Rectal prolapse varies in severity and classification, ranging from mild mucosal intussusception to severe full-thickness rectal prolapse. Consequently, different classifications may necessitate distinct predictive models.

In the study by Schultz *et al*[7], a cohort of 43 patients was stratified into two distinct groups according to their diagnoses: 26 patients presented with rectal prolapse, while 17 exhibited internal rectal intussusception. Each group was assessed separately with an average follow-up period of 4.5 years (range from 0.5 years to 9.5 years). The study demonstrated that even among some patients with bilaterally prolonged PNTML, postoperative symptoms of fecal incontinence improved. No correlation was found between PNTML and preoperative or postoperative fecal incontinence in either group of patients with different types of conditions. No significant correlation was identified between PNTML and fecal incontinence in the preoperative and postoperative periods across both patient groups.

In research led by Glasgow *et al*[8], an investigation involving a total of 106 patients was undertaken. Within this cohort, 45 individuals were subjected to preoperative assessments, which included anorectal manometry and PNTML. The average follow-up period was 44 months. The study findings indicated that patients with a maximum squeeze pressure greater than 60 mmHg experienced significantly improved outcomes. Pudendal nerve dysfunction and mean resting pressure were not predictive of postoperative fecal incontinence.

Currently, based on the existing literature, there is a lack of high level data from evidence-based medicine to support the clinical predictive value of PNTML testing in rectal prolapse.

INSUFFICIENT SAMPLE SIZE

In statistics, the magnitude of the sample size plays a pivotal role in the reliability of clinical case analysis outcomes. A small sample size can lead to false-positive results due to chance, even with highly specific tests, causing unnecessary concern and further medical intervention. Moreover, if there is bias in patient selection, the generalizability of the results will be questioned[9]. The aforementioned studies were limited by a small sample size (Table 1). To more accurately assess the reliability of test results, it is recommended that in future research the sample size should be expanded and large-scale, multicenter, prospective studies conducted to enhance the reliability and external validity of the research conclusions. Concurrently, more rigorous statistical methods should be employed to conduct an in-depth analysis of existing data, thereby enhancing the validity of the study outcomes.

INDIVIDUAL DIFFERENCES IN AGE

As demonstrated in Table 1, there is a wide range of patient ages, necessitating consideration of the impact of age variability on data outcomes. Studies by Lefaucheur *et al*[10] have shown that PNTML values are influenced by age, suggesting the need to account for age-related factors and to establish age-stratified reference values during assessment. When designing future research and constructing statistical models, the potential influence of age span on study outcomes should be taken into account, with age incorporated as a significant covariate within the model. Subsequent studies should further analyze the trend of PNTML values in relation to age, to determine whether there is a linear or nonlinear relationship. When applying research findings to clinical practice, the specific needs and responses of patients across different age groups should be considered, thereby enabling the provision of personalized healthcare for patients of varying ages.

DIFFERENT SURGICAL INTERVENTIONS

Surgical intervention is a conventional approach for the treatment of rectal prolapse, yet the selection of surgical methods remains a contentious issue[11,12]. The choice of surgical technique may influence the development of fecal incontinence and the predictive outcomes of the PNTML model.

DIAGNOSTIC CRITERIA

Utilizing internationally recognized and standardized criteria for the diagnosis of fecal incontinence ensures the consistency of assessment outcomes.

STAGES OF RECTAL PROLAPSE

To effectively mitigate the impact of rectal prolapse classification on statistical outcomes and enhance the quality and credibility of research, it is essential to adopt a unified international classification system for rectal prolapse[11]. By refining the inclusion and exclusion criteria and conducting subgroup analyses based on specific stages of the disease, the predictive value of PNTML for patients in different stages can be assessed. This approach ensures the homogeneity of the study and helps determine which rectal prolapse patients are suitable for PNTML testing, as well as identifying potential limitations or situations where it may not be applicable.

CONCLUSION

PNTML testing plays a significant role in the preoperative assessment of rectal prolapse, yet its specific clinical utility may require further validation through additional scientific research. Future studies should involve multicenter, large-scale, prospective designs. Integrating knowledge from experts in various fields and enhancing interdisciplinary collab-

Table 1 Results of preoperative pudendal nerve terminal motor latency follow-up

Patients	Age (years)	Months	Surgical procedures	Stage	PNTML	Diagnostic criteria	Ref.
24	59 (32-76)	25	Low anterior resection and retrorectal sacral fixation	Full thickness	Preoperative PNTML in 3 patients was related to postoperative incontinence	Grade 2: Uncontrollable liquid stool; grade 3: Uncontrollable solid stool	[5]
20	82 (68-101)	26	Perineal rectosigmoidectomy and coloanal anastomosis	Full thickness	NS	19-23 score: Severe incontinence; 24 score: Total incontinence	[6]
43	53 (18-84)	54	Rectopexy	--	NS	Grade 1: Incontinence of gas only; grade 2: Incontinence of feces ≤ 1/week; grade 3: Incontinence of feces > 1/week	[7]
106	68.4 (30-90)	44	Perineal proctectomy	Full thickness	NS	Grade 2: Uncontrollable liquid stool; grade 3: Uncontrollable solid stool	[8]

PNTML: Pudendal nerve terminal motor latency; NS: Non-significant.

oration will improve the accuracy and practicality of the model. Ultimately, by synthesizing these approaches and through ongoing research, the controversies surrounding the predictive efficacy of PNTML in rectal prolapse can be progressively addressed, providing the clinic with more precise prognostic tools. With advancements in medical technology and deepening research, PNTML testing is anticipated to play an increasingly vital role in the personalized treatment of rectal prolapse.

FOOTNOTES

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