

ELECTRICAL ACTIVITY OF THE INTESTINE AFTER RESECTION FOR ULCERATIVE COLITIS AS THE CRITERIA OF THE NUTRITIONAL STATUS AND TACTICS OF THE NUTRITION SUPPORT

Kostyuchenko LN¹, Lychkova AE¹, Smirnov OA¹, Kostyuchenko MV², Puzikov A.M.¹

¹Moscow's Clinical Research Center of Health Department, Moscow, Russia

²Pirogov Russian National Research Medical University, Moscow, Russia

Abstract

The control of the metabolic system after of surgical treatment of ulcerative colitis remains the most difficult task. Severity of intestinal insufficiency accompanied by not only the traditional characteristics, but also correlated with changes in the electrical activity of the intestine. Electromyography is non-invasive rapid method that can be used for an indicative dynamic control of intestine digestion recoverability. The study of the electrical activity of the remaining colon in the postoperative period is advisable to use as an option to select the tactics of the nutrition support.

Keywords: ulcerative colitis, postoperative metabolism control, nutrition support, electromyography.

Introduction. Among surgeons, there are some differences in the definition of the indications for surgical treatment of ulcerative colitis (UC) and to the tactics of a relatively rapid recovery of nutritional status after surgery. In most cases, the indications for surgical treatment consider: a) acute fulminant form with failure of conservative treatment for 2-4 weeks; b) the disease with nonacute, recurrent, progressive course with failure of conservative treatment for at least 6 months; c) chronic form of Yak with periodic exacerbations, progressive course in the presence of irreversible changes in the colon; d) (presence of severe, life-threatening complications at any stage of the disease - perforation of the bowel, intestinal bleeding, abscesses in pericolon tissue, bowel narrowing, malignancy [3,5]. However, the control of the metabolic system under different variants of surgical treatment of ulcerative colitis remains the most difficult and actively disputed task [4].

Most adequate is dynamic monitoring using parameters known as alimentary-volemic diagnosis (AVD) [2]. However, it is usually carried out one every 10-12 days. A more simple and rapid method can serve an indicative assessment of the restoration of electrical activity that can be recorded every 2-3 days [1].

The aim - to study the electrical activity of the remaining colon in the postoperative period as a criterion for rapid dynamic control over the restoration of its function and as a parameter to justify the choice of tactics of the nutrition support.

Material and methods. The study included 34 patients with ulcerative colitis at the age of 15 to 69 years (mean age $35,5 \pm 10,4$ years). According to the type of surgical intervention were observed two groups of patients with palliative and radical surgery, respectively. Electrical activity of the descending colon and sigmoid colon was recorded with the help of hardware and software M-Conan has a margin of error of $\pm 5\%$. We assessed the frequency and amplitude of slow waves and spikes (action potentials of smooth muscle) with subsequent computer processing of the results. Nutritional status was verified by alimentary-volemic diagnosis [2] (the structure is shown in Table 1), and compared with the functional recovery of limiting the absorption of the body according to the peripheral portable electromyography (EMG). Thus, the efficiency of applied nutrition programs evaluated as correction for an AVD, and EMG. Dynamics were observed in patients during the first 10 days after surgery.

Results and its discussion. Analysis of the data showed that patients with palliative intervention have the heaviest nutritive disorders (Table 1). There were water-electrolytic disturbances (usually, disgidroticescoy disorders of 1-2 stages), deficiencies of circulatory protein, hemoglobin, expressed energy deficiency, liver-kidney dysfunction and intestinal failure of 2-3 stages. Severity of intestinal insufficiency accompanied by not only the traditional characteristics, but also correlated with changes in the electrical activity of the intestine (at nutritional risk score 3-4 frequency-amplitude characteristics of the electrical rhythm of the slow waves of descending part of the colon were $10,4 \pm 0,5$ / min and $0,11 \pm 0,03$ mV; spike potentials were observed in all the observed patients, their frequency was $3,6 \pm 0,7$, the amplitude - $0,025 \pm 0,004$ mV). Electric parameters of colon it was somewhat better if nutritional risk score is 2. This made it possible to non-invasively control the indirect protein-energy imbalance often enough - 1 time in 2-3days and correct parenteral-ental destination correspondly.

When performing *radical* operations recovery of nutritional status took place more gradually and steadily. Electrical activity at the same time expressed the following parameters: frequency and amplitude of EMG slow waves of descending part of the colon patients were $9.9 \pm 0,8$ / min and $0,14 \pm 0,07$ mV, accordingly; spikes rate was $1,4 \pm 0,3$, the amplitude - $0,08 \pm 0,001$ mV. The electromyogram of sigmoid colon of patients with UC brings the following changes of the studied parameters: frequency-amplitude characteristics of slow waves were $10,0 \pm 0,4$ / min and $0,10 \pm 0,008$ mV. Spike potentials were observed in all patients. Their frequency varied from 1,1 to $4,1 \pm 0,4$, the amplitude - $0,03 \pm 0,004$ mV. Nutritional characteristics in this group of patients were also

slightly better than that in patients with a stoma. Nutritional dynamics on the 6th day was somewhat improved: deficiencies of protein are decreased, as well as calculated energy deficit. There were a positive trend in body composition both in water and electrolyte parameters and content of protein and energy components, liver function going better (level of ACT / ALT, albumin, and fibrinogen), a renal function (creatinine clearance by), intestine (for citrulline, short-chain fatty acids coprofiltrates) noted a marked tendency to normalize. These nutritive characteristics correlated with the electrical parameters of the intestine, which at 6 th day almost normalized in the stump of the body, despite the big dimensions of the former.

Conclusions. Regardless of the type of surgery interventions at UC observed unidirectional changes in the electrical activity of the gastrointestinal tract, they were confidently related with the severity of the syndrome of intestinal insufficiency, which determined the nutritional deficiency. Electromyography is non-invasive rapid method that can be used for an indicative dynamic control of intestine digestion recoverability.

Table 1

The estimation of the parameters of nutritional status and the state of the intestinal stump, EMG in 2nd day after surgery.

Operation 's type	Parameters of the electrical activity of the intestinal stump			Nutritional status				Treatment program
	Impulses per min	Frequency, /min	Spikes activity (Amplitude)	Dishydria	Plastic components deficiency	Energo-deficity	Functional reserve of digestive organs: liver, kidneys, intestines	
palliative intervention on the autonomic nervous system	-	-	-	-	-	-	-	Diet: up to 600-700 ccal Table #5 Siping Diazon or Impact to 300.0 / day Parenteral Oliklinomel 700 or Nutrifleks 70 / 180 - 625 \ day
palliative intervention (Ileostomy, colostomy) localised above damage place	10,4 ± 0,5 / min	3,6 ± 0,7	0,025 ± 0,004 mV	+++	+++	++	low	Enteral: Diazon to 1000.0

radical surgery - removal of a diseased portion or the entire colon	9.9 ± 0,8 / min	1,4 ± 0,3	0,08 ± 0,001 mV	+	++	++	Mediun and high	
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