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New in Bronchial Asthma Surgery from The Perspective of Valvular Gastroenterology

Martynov Vladimir Leonidovich*

Doctor of Medical Sciences, Associate Professor, National Research Nizhny Novgorod State University named after N.I. Lobachevsky (UNN), Russia

***Corresponding author:**

Martynov Vladimir Leonidovich,
Associate Professor, National Research Nizhny Novgorod State University, city of Nizhny Novgorod, st. Zaprudnaya, building 3, apartment 176, Russia,
Tel: 89049188600,
E-mail: hirurgia12@mail.ru

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1. Summary

Based on the analysis of literature data, the authors distinguish the following links in the etiopathogenesis of bronchial asthma (BA), which depend on the state of the gastrointestinal tract (GIT): micro aspiration into the bronchopulmonary system of the contents of the stomach and duodenum: failure of the esophageal sphincters; pathological reflexes emanating from the gastrointestinal tract; dysbiosis; irrational diet; hernia of the esophageal opening of the diaphragm; hyperacid state of the stomach. The indicated reasons for asthma are explained by the pathological state of the valve system of the digestive tract. 52 patients with asthma underwent baugnoplasty and correction of chronic duodenal obstruction (CHD). The operation was successful for most patients. Disadvantages in the implementation of the volume of the surgical aid are indicated: inadequate correction in a number of cases of HNDP, failure to perform vagotomy with gastric hyperacidity and subsequent fundoplication. The necessity of using computed tomography and ultrasound in the diagnosis of arteriomesenteric compression of the lower horizontal part of the duodenum (as one of the forms of CPAP) has been expressed.

Bronchial asthma (BA) affects 3% of humanity. In the United States, about 4% of the population suffers from actively recurrent asthma, and another 3% have a history of it. In Russia, as in most European countries, asthma is common among 5% of the adult population and 7% of children, i.e. in the country there are about 7 million BA patients [11]. This indicates the urgency of the problem.

One of the reasons for various forms of bronchial obstruction is a pathological change in the gastrointestinal tract (GIT). Back in 1934 J. Bray [cit. 6] pointed out the connection between the pathology of the gastrointestinal tract and BA, noting the stretching of the stomach after eating with the emergence of vagal reflexes. In 1946 S. Mendelson [cit. 6] observed aspiration of gastric contents, which caused an asthma-like syndrome. A number of works of a later period have shown a clear connection between gastroesophageal reflux (GER) and AD [3, 10, 14-18]. In the last decade, it has been increasingly indicated that gallbladder often gives various bronchopulmonary complications, which are based on inconspicuous micro aspiration of gastric contents into the bronchi. Particularly dangerous is the ingestion of hydrochloric acid, pepsin, fats, bile and pancreatic enzymes into the respiratory tract, which can cause deep damage to the bronchial wall, thinning of the alveolar septa, impaired surfactant production and a significant decrease in the diffuse capacity of the lungs. Clinical manifestations of the pathology of the bronchopulmonary system in patients with gastrointestinal tract infection largely depend on the frequency of aspiration, the quantity and quality of the aspiration material. Initially asymptomatic GERD eventually necessarily leads to complications [cit. by 6]. So, L.Ch. Geller et al. [3], observing 63 patients with the initially detected gastrointestinal tract for 5-8 years, in 9 cases the development of BA and in 3 cases of chronic bronchitis with an asthmatic component was established. According to M. Puchala [17], 10% of patients have respiratory lesions. According to various authors, in patients with BA, gallbladder is detected in

40-82% of cases [3, 10, 13, 17].

The effect of the contents of the stomach and duodenum (12 sc) on the spastic reaction of the bronchi was also studied experimentally [13]. Thus, patients with (a) esophagitis, (b) AD, (c) esophagitis and AD were injected with a 0.1N HC1 solution through a catheter into the esophagus. Only in patients of the third group (a combination of esophagitis and asthma) there was a significant decrease in the peak expiratory flow rate and a significant increase in bronchial resistance; functional impairments in other groups were minimal. After the introduction of saline into the esophagus, reactions were not observed in any group. No changes in the parameters of lung function were observed after the infusion of HCl in patients of the third group after a three-day course of atropine administration. It has been suggested that moderate bronchial obstruction in patients with asthma combined with severe inflammation of the esophagus is due to the presence of HC1 in the esophageal cavity, and the positive effect of atropine in bronchoconstriction indicates the involvement of the parasympathetic nervous system. In dogs with esophagitis, esophageal HCl perfusion caused bronchospasm [13]. After vagotomy, acid had no effect.

The presence of micro aspiration is most convincing when detecting gastric contents by methods for determining lipids in alveolar macrophages. This method is sensitive (83%) and specific (94%). All aspiration complications of the gastrointestinal tract more often develop at night when the patient is asleep in a horizontal position, especially after taking sleeping pills, alcohol, drugs [7]. Therefore, patients with asthma who do not have clinical manifestations of reflux esophagitis, but with nocturnal attacks of bronchospasm, are recommended to have a compulsory examination for gastrointestinal fluid. The very same treatment of the bronchospastic reaction with drugs that relieve the tone of smooth muscles, causes a decrease in the tone of the esophageal sphincter, which increases the possibility of manifestation of gastrointestinal tract infection and its severity, which, in turn, aggravates the course of AD [12]. Treatment of dysfunctions of the esophagus in the presence of gallbladder not only significantly reduces complaints associated with gallbladder, but also reduces the severity of BA manifestations at the same time, in 75% of patients, the intake of anti-asthma drugs is reduced by more than half. Without targeted treatment of gallbladder, the number of anti-asthma drugs taken decreased only in 42% of patients [14]. Many consider antacid therapy mandatory [13].

ZhPD is the most frequent and characteristic symptom of cardia insufficiency due to hernia of the esophageal opening of the diaphragm. According to a number of authors, reflux esophagitis is observed in 14-90% of all patients with hernia of the esophageal opening of the diaphragm. Such patients have a very high risk of developing AD [8, 9].

In almost 90% of cases, dysbacteriosis is detected in BA patients [11]. In this regard, enterosorption can have a positive effect [2], the main mechanisms of which are detoxification of cellular contents, release from toxic or potentially dangerous substances of exo and endogenous nature due to their binding and neutralization in the gastrointestinal tract, sorption of food allergens, histamine and other biologically active substances, bacterial antigens, normalization of intestinal microflora, immunocorrective effect (sorption of circulating immune complexes, effect on intestinal lymphoid tissue, blocking immunoglobulin E) [1].

Improvement of the condition of BA patients can be achieved with the help of unloading dietary therapy (EAD), the mechanisms of action of which, through positive changes in the immunocompetent system, are apparently associated with the suppression of allergic inflammation, the exclusion of food allergic products with the subsequent passage of macromolecular food residues through the liver and the lymphatic system of the gastrointestinal tract into the general bloodstream [4]. Elimination of products of infectious sensitization originating from the gastrointestinal tract, by hemosorption, plasmapheresis, is accompanied by stimulation of the adrenal cortex with the release of glucocorticoids into the blood, as well as inhibition of the immune-pathological component of AD pathogenesis [11].

Summarizing the above, during BA the following pathological links can be distinguished, depending on the state of the gastrointestinal tract: • micro aspiration into the bronchopulmonary system of stomach contents and 12 p.c.; • incompetence of the esophageal sphincters, leading to gallbladder and micro aspiration; • pathological reflexes emanating from the gastrointestinal tract, going along the afferent nerve pathways to the central nervous system, and from there along the centrifugal pathways to the bronchopulmonary system, followed by bronchospasm; • dysbiosis of the gastrointestinal tract, leading to autointoxication and microbial allergies, immunological shifts; • food allergy; • irrational diet; • hernia of the esophageal opening of the diaphragm; • hyperacid state of the stomach as an organ of production and finding of a pathological agent (hydrochloric acid) in the pathogenesis of AD.

Considering that at this stage in the development of medicine, AD is incurable, any new data on the etiopathogenesis and treatment of AD should be given close attention. Nevertheless, the overwhelming majority of specialists continue to be skeptical about such important pathogen etic mechanisms of AD. Meanwhile, its final recognition could allow a new look at the etiology and pathogenesis of respiratory pathology, and the impact on these links would be an impetus for the development of new methods of treating AD.

In our opinion, the indicated causes of AD, caused by the gastrointestinal tract pathology, can be explained by the pathological state of the valve system of the digestive tract [5]. If the valve system breaks down, the principle of "one-way road" of chyme movement along the gastrointestinal tract is violated.

We will trace the pathophysiological and path anatomical changes in case of disturbances in the functioning of the valve system in the gastrointestinal tract. According to L.G. Peretz (1955), in 1 ml of the small intestine contents there are up to 5 thousand microbes, and in 1 ml of the contents of the large intestine there are about 30-40 billion of them. The differentiation of the functions of the small and large parts of the intestine is due to the formation in the ileocecal region of this obturator, which ensures the isolation of the small intestine from reflux of colonic contents. Isolation of the gut by the race is necessary due to the sharp difference in the chemical composition, physiological state and bacterial spectrum of its contents and the large intestine.

The importance of the ileocecal region in the motor activity of the intestine has also been determined, its high sensitivity to the chemistry of the chyme and the reflex effect of the ileocecal apparatus on the motility of the gastrointestinal tract in general. The specified section of the intestine performs the function of an "internal analyzer" coordinating such an important function of the intestine as a portioned rhythmic conduction of chyme from the small intestine to the large intestine, which is necessary for the completeness of bacterial processes in the right half of the large intestine. In case of insufficiency of the ileocecal locking apparatus, constant reflux of the colon contents into the small intestine disrupts not only its function, but also its structure. As a result of insufficiency of the ileocecal obturator, billions of microbes are thrown from the large intestine into the small intestine, colonization of the small intestine with allochthonous (foreign) microorganisms occurs, which leads to the appearance of putrefactive and fermentative processes in the small intestine. Waste products - indole, phenol, cresol, skatole, pyrocatechol, carbolic acid, hydrogen sulfide, mercaptan, methane, ethane, etc. - infect the mucous membrane of the small intestine and, being absorbed into the blood, cause the phenomena of autointoxication. These metabolites cannot be sufficiently detoxified by the body, especially in liver disease.

Invasive, toxic, and often necrotic factors of microorganisms contribute to dystrophic and necrotic changes in the mucous membrane, which further leads to the destruction of the intestinal wall. In this case, the barrier role of the intestinal wall is violated. The intestine becomes an entrance gate for infection, as evidenced by nonspecific bacteremia in patients with intestinal dysbiosis and the formation of foci of endogenous infection. Chronic enteritis develops, called reflux enteritis. As a result of the chronicity of the process, local and regional lymphoid tissue suffers, as a result of which a deficiency of immunoglobulins A and M develops. The body becomes less protected against microbial aggression. With microbial colonization of the small intestine in the proximal gastrointestinal tract, premature deconjugation of bile acids occurs. The resulting free bile acids have a damaging effect on the mucous membrane, enhancing morphological changes in the small intestine. In this case, the absorption of bile acids in the ileum is impaired. Normally, up to 90% of all bile acids are absorbed in the indicated section of the intestine, and the rest pass into the large intestine, from where they are excreted with feces. In conditions of reflux enteritis, a significant part of them is not absorbed in the small intestine, which is the cause of the development of colitis and a risk factor for the development of a tumor. In the presence of dysbacteriosis of the small and large intestine, enzymes are not inactivated, and the remains of food protein molecules formed in the more proximally located parts of the gastrointestinal tract (stomach, liver, pancreas, tic intestine), causing inflammation of the mucous membrane of the underlying parts as well. So, on the basis of insufficiency of the Bauhinia valve (NBZ), enterocolitis develops.

In addition to the toxic effect on the intestine, the waste products of bacteria have a similar effect on the liver, gallbladder, stomach, and pancreas. As a result of inflammation of the wall of the small intestine, lymphatic vessels and lymph nodes located in the retroperitoneal space and about 12 p.c., a spastic process develops around the last and initial parts of the small intestine. These parts of the intestine are located mesoperitoneally and do not have a mesentery, therefore, they are inactive and often undergo an adhesive process. Fibrous tissues formed as a result of the adhesion process and enlarged lymph nodes squeeze from the outside the end section of 12 sc, which makes it difficult for its contents to exit the intestine, increasing the cavity pressure. Hypertension at 12 sc. makes it difficult for the secretions of the organs flowing into it (gallbladder, pancreas, stomach, liver) to escape, which leads to their infection and the occurrence of chronic inflammation.

In addition to these processes, the output of content from 12 bp. often complicated by compression of its lower-horizontal part by the upper mesenteric vessels. This is how a chronic violation of duodenal patency is formed with relaxation of the pyloric and cardiac esophageal sphomas, which, in turn, can cause duodeno-gastro-esophagial-lingual reflux with subsequent microaspiration of the contents. This is the path of development of the pathology of the organs of the digestive system on the basis of dysfunction of the valves of the gastrointestinal tract, which is a huge zone for the occurrence of pathological reflexes that go to the central nervous system and from there to the smooth muscles of the bronchi with subsequent bronchospasm.

Attention should be paid to the already proven fact that bile reflux from 12 p.c. into the stomach causes hypersecretion of hydrochloric acid, if deep atrophy of the gastric mucosa has not yet occurred (chronic duodenal obstruction (CHNDP) is the reason for this).

The indicated etiopathogenetic influence of dysfunction of the valve system allows supporting the opinion of some authors that AD is a complication of gastrointestinal tract pathology.

We have experience in the treatment of 700 patients in whom NBZ was proved during irrigoscopy. All these patients underwent baug-

inoplasty, in 165 cases it was supplemented with correction of the CPAP. Among these patients, there were 52 patients suffering from BA from 5 to 35 years old, at the age from 13 to 57 years. ChNDP was found in 46 of them. Analyzed were complaints of gastroenterocolitic nature in 202 patients suffering from asthma (including those operated on). They complained of pain (63%) and heaviness in the abdomen (61%), nausea (49%), belching with air (61%), regurgitation of food (45%), heartburn and bitterness in the mouth (74%), diarrhea and loose stools (43%), intolerance to milk and other food (41%), bad breath (52%), bloating and rumbling in the abdomen (62%). 48% of patients underwent various operations on the abdominal organs.

In the group operated on, the leading form of AD was allergic (71%), non-allergic form was noted in 5%, mixed - in 24% of patients. Moderate BA was noted in 63.1%, mild - in 21.1%, severe - in 15.8% of patients. The association of asthma attacks with food allergens was noted by 52.6%, with house dust - 47.4%, plant pollen - 26.3%, drugs - 21.1% of patients. The provocation of physical activity was noted by 52.6% of patients, cold air - 50%, psychoemotional overstrain - 31.6%. In 84.2% of cases, nocturnal attacks of suffocation predominated. Extrapulmonary allergic manifestations were also observed in the group of operated patients: urticaria or angioedema was noted in the anamnesis in 78.9%, allergic rhinitis - in 47.7%, seasonal conjunctivitis - in 21.1%, atopic dermatitis - in 15.8 %.

When studying the function of external respiration, a predominant violation of the patency of the bronchi of large and medium caliber was recorded: the average indicators of MOC25 and MOC50 were, respectively, 44.8 ± 6.2 and 46.2 ± 7.6% of the required value, while MOS75, which characterizes the patency of small armor ¬khov, - 61.2 ± 9.6%. Esophagogastroduodenoscopy noted signs of gastritis, duodenitis, esophagitis in all patients, and the signs of CPD were: duodeno-gastric reflux (69%), dehiscence of the cardia (59%) and pylorus (73%). Step-by-step manometry using the open catheter method revealed isolated duodenal hypertension in 28.9%, duodenal hypertension with "discharge" into the stomach - in 44.7%, duodenal hypertension with "discharge" into the stomach and into the esophagus - in 10.5%, hypertension in stomach with normotension - in 12 p.c. in 7.9%, the norm of 12 p.c. and the stomach - in 7.9% of cases. Average pressure in the lumen 12 p.c. amounted to 192.4 ± 31.2 mm of water. Art. (norm - 80-130 mm of water column), in the lumen of the stomach - 110.6 ± 22.7 mm of water. Art. (norm - 60-80 mm of water column). The data obtained indicate the presence of HNDP. To concretize the causes of CNDP, probe fluoroscopy 12 sc was carried out. without hypotension: antiperistalsis in the horseshoe 12 sc. noted in 60.5% of studies, duodenogastric reflux - in 55.3%, antiperistalsis in the jejunum - in 47.4%, ejunoduodenal reflux - in 39%, expansion of 12 sc. - in 28.9%, slowing down of emptying 12 p.c. - in 21.1%, high duodeno-jejunal transition in 87%, contrast stop in the middle third of the lower-horizontal part of 12 bp. (place of arteriomesenteric compression 12 PC) - in 65% of cases.

Violation of the microbial landscape of the small intestine was detected in 33 patients (80.8% of the examined): I degree - in 3 people, II degree - in 19, III degree - in 9, IV degree - 2 people. The most pronounced changes related to anaerobic microflora: complete absence or deficiency of bifidumbacteria - in 26 patients, lactobacilli - in 17, excessive growth of E. coli - in 16, other opportunistic flora (Proteus, Klebsiella, Candida) - in 12 patients.

The reaction of urine to indican was positive in 63% of patients. The level of average blood serum molecules was increased in 76% of patients, on average it turned out to be 46% higher than normal values and amounted to 0.35 ± 0.01 at a norm of 0.24. An increase in lipid peroxidation in intensity was detected in 50%, in terms of the light sum of radiation - in 70%. Total cholesterol did not exceed the norm in all cases. Triglycerides were increased in 28% of cases, and the atherogenic coefficient - in 52%. These data indicate the presence of a syndrome of endogenous intoxication in the examined patients with BA and NBD, and it is more pronounced in them than in patients with NBD who do not suffer from BA.

All 52 patients with asthma underwent plasty of the ileocecal obturator according to the methods developed in the clinic: 46 - with simultaneous correction of CNDP (34 - dissection of the Treitz ligament (PCT), 12 - duodeno-jejunostomy). The operation was successful in most patients. Thus, asthma attacks did not recur after surgery in 12 patients, in 40 patients the clinical picture became less pronounced; 18 patients stopped taking hormones, and another 20 began to reduce their intake.

A retrospective analysis of the volume of surgical aid for BA patients revealed the most significant drawback - inadequate correction of CPAP in some cases.

Currently, we attach great importance to computed tomography (CT) and ultrasound in the diagnosis of arteriomesenteric compression of 12 sc. as one of the forms of KhNDP. We found that the distance between the aorta and the superior mesenteric artery at the level of the lower horizontal part is 12 bp. less than 2.0 cm requires duodenojejunostomy, and not PCT, which is proven by stopping the contrast at the indicated place (compression!) when performing duodenoscopy with a probe without hypotension.

In the overwhelming majority of cases, the development of AD depends on the state of the gastrointestinal tract. The most important links in the pathology of the gastrointestinal tract, contributing to the development of AD, are HNDP and NBZ. Adequate surgical correction of CNDP and NBZ makes it possible to improve the condition of patients with BA, which is a promising direction in the treatment of this category of patients.

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