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Possibility of surgery treatment in pathology of respiratory organs in the patients with co-morbid chronic obstructive pulmonary disease

Key words: surgery, chronic obstructive pulmonary disease (COPD), spirometric classification GOLD, dyspnea.

Chronic obstructive pulmonary disease (COPD) is widely-spread co-morbid form of lungs pathology among the patients who need surgery treatment [3, 9]. The problem has significant meaning when surgery is merely performed on respiratory organs. Compromised lungs determine more post-operation respiratory and infectious complications just what is the main reason to reject surgery for the patients with tuberculosis, oncopathology, non-specific lung disease. So, COPD is a problem of prior urgency in the world [1, 7, 10–13]. Unpleasant prognosis and the statistics as for spreading COPD, environment, keeping the influence risk factors will determine rising surgery active. In medical-social and economic way COPD is one of the most fundamental reason for disease and death rate in the whole world and nowadays it is the only disease which death rate keeps on rising [2, 9, 11, 13]. So according to the prognosis of scientists by 2020 this pathology will move from the 12 place to the 5 and as the reason of death it will move from the 6 place to the 3rd, as for the damages in social and economic sphere will obtain the 5th place [7, 18]. On the whole, 8–22 % of adults suffer from COPD at the age of 35 and more; among men it is more often than women. Such rate in European union countries is 6 %. And as the experts of European respiratory association 9–30 % who suffer from COPD even do not suspect the disease [7, 17]. As usual, COPD is not diagnosed up to clinically stages

of disease. Only 25 % cases of disease are diagnosed in time. About 65 % of patients with the diagnosed COPD do not get appropriate therapy [10, 14]. Among the reasons of the sad statistics one may point out the low level of early diagnostics of COPD, low informing the population about the symptoms and consequences of it, neglecting their own health; not enough advertising of healthy way of life: giving up smoking, deteriorating of environment, increasing the rate of tuberculosis and AIDS, not enough care of the patients with early symptoms and traits of COPD, inefficient equipment in polyclinics for spirometric experiments [6, 7, 9, 18]. And specific problem of such patients with contaminated lungs is extra-lungs systematic effects which COPD lead to, and other following diseases (cardiovascular diseases, metabolic syndrome, dysfunction of skeleton tissue, osteoporosis, anemia, diabetes, syndrome of obstructive apnoe-hypopnoe, tuberculosis of respiratory organs, lungs cancer, depression), which deteriorate each other and influence perioperation period increasing the risk of unpleasant events which is definitely higher comparing common patients population [10, 12, 14, 19, 20]. Besides the influence of surgery and anesthetic factors during operation evokes diminishing the lung volume and functional residual capacity which lead to lowering stretching lung capacity and increasing the shunt which in turn influence negatively the COPD. Perioperation stress promotes lowering

humoral and cell immunity general and local and also violates the function of mucocellular apparatus which in turn destabilizes COPD [3, 8].

Materials and methods

In the department of thorax surgery and invasive methods of diagnostics SI «National institute of phtysiatry and pulmonology by Yanovskiy NAMS of Ukraine» 42 cases of surgery treatment of pathology of respiratory organs with COPD were analyzed. The diagnosis Chronic obstructive pulmonary disease was set definitely: age – more than 35 years old, clinic picture, obstruction of airflows were proved with postbronchodilatated spirometry (10–15min after 400 mcg salbutamol). According to spirometric classification GOLD [10] for the degree of severity of the respiratory ways passage the patients were classified as following:

– GOLD1 (slight obstruction of bronch): $VFE1 \geq 80\%$ proper – 12 (28,6 %);

– GOLD2 (moderate): $50\% \geq VFE1 < 80\%$ proper – 17 (40,5 %);

– GOLD3 (heavy): $30\% \geq VFE < 50\%$ proper – 9 (21,4 %);

– GOLD4 (very heavy): $< 30\%$ VFE1 proper – 4 (9,5 %).

Depending on the character and the area of lesion the patients were done the following surgery. The results of their varieties are in the table 1.

Most of the patients were operated on ontological pathology – 18 (42,9 %), where as tuberculosis of respiratory organs was defined in 15 (35,7 %) patients, non-specific contamination in 9 (21,4 %) cases. Men prevailed – 31 (73,8 %),

women – 11 (26,2 %). Age range was the following: 35–45 years old – 7 (16,7 %), 46–55 – 10 (23,8 %), 56–65 – 16 (38,1 %), over 65 – 9 (21,4 %). It is clear that majority of patients were of employable age – 33 (78,6 %).

The results and discussions

The success of surgery practice depends much on complex evaluation of burden and harmful influence of COPD for every patient during preoperation stage taking into account current symptoms, heaviness of spirometric lesion, risk or exacerbation of COPD, existence and degree of co-pathology. For the materials of our clinic, primarily in surgery department COPD was diagnosed in 20 (47,6 %) patients though the complaints occurred for some period of time. The patients with earlier diagnosed COPD were treated only 16 (72,7 %) and adequate therapy was given to 12 (54,5 %).

The essential symptom of COPD is dyspnea of resistant and persistent character. For evaluating this symptom we used modified medical research council dyspnea scale [10]. The information is in table 2.

As one can see most of the patients with obstruction degree GOLD1 and GOLD2 have dyspnea less than 2 points – 22 (75,8 %) out of 29 patients; at the same time most of the patients with obstruction degree GOLD3, GOLD4 have dyspnea equal or more than 2 points – 10 (76,9 %) out of 13 patients. Evaluation of dyspnea within 2 points with obstruction degree GOLD1 and GOLD2 was due to: absence of basic treatment, and for patients with the degree of obstruction GOLD3 and GOLD4 due to non-adequate medicament treatment and exacerbation of COPD. After

The varieties of surgery for patients with surgery pathology of respiratory organs add with COPD

Table 1

Variety of surgery	Degree of obstruction			
	GOLD1 quantity (%)	GOLD2 quantity (%)	GOLD3 quantity (%)	GOLD4 quantity (%)
1	2	3	4	5
Pulmoectomy	1 (2,4 %)	3 (7,1 %)	–	–
Lobectomy	4 (9,5 %)	2 (4,8 %)	1 (2,4 %)	–
Primary thoracoplasty	–	–	1 (2,4 %)	1 (2,4 %)
Plasty of dome of the diaphragm	–	1 (2,4 %)	–	–
Typical segmental lung resection	3 (7,1 %)	2 (4,8 %)	1 (2,4 %)	–
Opened biopsy of lung	–	3 (7,1 %)	2 (4,8 %)	1 (2,4 %)
Pleuraectomy	1 (2,4 %)	2 (4,8 %)	–	–
Videothoracoscopy	Pleura biopsy	–	3 (7,1 %)	3 (7,1 %)
	Intrathoracal lymph node biopsy	2 (4,8 %)	1 (2,4 %)	–
	Biopsy of creating mediastinum	1 (2,4 %)	–	1 (2,4 %)
Transthora needle biopsy of pleura with draining pleura cavity	–	–	–	2 (4,8 %)

consulting pulmonologist and prescribing therapy in groups GOLD1 and GOLD2 it was succeeded in decreasing the dyspnea less than 2 points and for GOLD3 and GOLD4 dyspnea was stabilized in 8 (80,0 %) out of 10 patients at 2 points. More over, for the evaluation the COPD influence on everyday activity of the patient and his health we used COPD Assessment Test (CAT) [10]. CAT has 10 points which measure the health deterioration with COPD. The total is defined as the sum of points for 8 questions ranging from 0 to 40 and closely correlated with patient health. The results are in table 3.

CAT indicates expressed symptoms of COPD. As for the table, one can say that correlation between the degree of obstruction and infringement of patient health do not always exist. So that the patients can be relatively healthy or not within slight and moderate obstruction degree and also within very heavy one. As the practice reveals it depends greatly on co-morbidity of the patient.

Among the patients with surgery pathology of respiratory organs and with co-COPD who were treated in our clinic somatic pathology occurred in 34 (80,9 %) cases and most of them had two or three chronic diseases:

- arterial hypertension (AH) – 10 (23,8 %);
- ischemic heart disease (IHD) – 6 (14,3 %);
- AH and IHD – 8 (19 %);
- IHD and diabetes – 3 (7,1 %);
- AH, IHD and the syndrome of obstructive apnoe-hypopnoe of sleep – 5 (11,9 %);
- AH, IHD and thrombosis of deep vein – 2 (4,8 %).

So for evaluating the surgery perspectives in each case you need clinical test of patient health. And the heaviness of clinic symptoms requires to pay attention to multidimensional evaluation of COPD and not only to categorization by

the level of deterioration the respiratory function or limitation of activeness. To our mind the most practical are multiparametric indexes BODE and HODEH [4, 5, 15, 16]. They are used more often as the predictors of survival for the patients with COPD. But the indicators which are defined can be used successfully in complex evaluation of possible postoperation complications. The prognostic value of BODE index includes the necessity of calculation of body mass index so that considerable weight loss is unpleasant factor because it will be significant in dysfunction of skeleton and respiratory muscles. We have to admit the defining of BODE index has very important meaning for the patients with tuberculosis and cancer. The calculation of BODE index is performed by summing up points in table 4.

More complex in evaluating the post-operation complications is HODEH index which includes lung revelations of COPD, its extra lung effects and it is very informative for patients with co-chronic pathology. Calculation is done by summing the points in table 5.

While determining both indexes we carried out the test for exercise capacity but in another interpretation: accordingly climbing two floor, one and a half, one and a half. Evaluating the other records no difference has been noticed. As our experience proved the range of points within 0–2 determines the postoperation complications in 10–20 % patients which is not considerable for common patients. 3–4 points evoke complications among 30–40 %, the total sum more than 5 points lead to complications among more than 50 %. More than 9 points complications reach 80 % so for such patients surgery is possible for health reasons. In our research the most numerous group of patients with 3–4 points – 24 (57,2 %), then 0–2 points – 10 (23,8 %) and then less than 5 points – 8 (19 %). General effectiveness of surgery treatment was

Table 2
The evaluation of dyspnea by MMRC with different degree of obstruction in patients with surgery pathology of respiratory organs and co-COPD

Dyspnea evaluation points	Degree of obstruction			
	GOLD1 quantity (%)	GOLD2 quantity (%)	GOLD3 quantity (%)	GOLD4 quantity (%)
0	4 (9,5 %)	2 (4,8 %)	–	–
1	6 (14,3%)	10 (23,8%)	3 (7,1 %)	–
2	2 (4,8 %)	5 (11,9 %)	4 (9,5%)	2 (4,8 %)
3	–	–	2 (4,8 %)	1 (2,4 %)
4	–	–	–	1 (2,4 %)

Table 3
CAT with different degree of obstruction in patients with surgery pathology of respiratory organs and co-COPD

CAT points	Degree of obstruction			
	GOLD1 quantity (%)	GOLD2 quantity (%)	GOLD3 quantity (%)	GOLD4 quantity (%)
< 10	10 (23,8 %)	12 (28,6%)	2 (4,8 %)	1(2,4 %)
≥ 10	2 (4,8 %)	5 (11,9 %)	7 (16,7%)	3 (7,1 %)

95,3 %. The complications were 15 (35,7 %) cases. We divided all complications into 3 groups: respiratory, cardiovascular, and infectious. But this division is nominal, at some stages they mediated the appearance of each other and generated the syndrome of mutual complications so further on the complications will be regarded as an initial reason. The evidence of respiratory insufficiency we evaluated in case of oxygen therapy necessity more than one week – 6 (14,3 %) cases. As for the cardiovascular complications 5 (11,9 %) cases were defined: heart inefficiency – 3 (7,1 %), tromboembolic complications – 2 (4,7 %). Among infectious complications – 4 (9,5 %) we point out: pneumonia of operated lung – 2 (4,8 %), pneumonia of the only one lung – 1 (2,3 %), empiema of pleural cavity – 1 (2,3 %). We had 2 (4,7 %) lethal cases in our practice: 1 (2,3 %) case of respiratory inefficiency after primary extrapleural thoracoplasty (patient from the group GOLD3) and 1 (2,3 %) case of thromboembolism of lung artery branch after pulmoeotomy (patient from group GOLD2).

Conclusions

Nowadays most cases have no significant reasons for rejection in surgery treatment of respiratory organs pathology in patients with co-morbid COPD. The degree of COPD stabilization during preoperation stage should be determined basing on the evaluation symptoms by Modified Medical Research Council Dyspnea Scale and CAT. In case of finding the dyspnea by MMRC equal or more than 2 and general CAT points more or equal 10 it is advisory the pulmonologist and rehabilitator to choose adequate therapy tactics and prophylactic measures heading for providing normalization of pathologic changes and improving patient health. Aiming at determining the success of surgery it is advisory to use multiparametric indexes BODE and

HODEH which consider not only respiratory evidences of COPD but its systematic effects and co-diseases.

Carried out in time surgery treatment in surgery pathology of respiratory organs in patients with co-morbid COPD can allow to prevent decreasing of social activity and also to increase the quality of life of these patients whereas such medical aid is often the only possible way of recovery.

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BODE index calculation				
Indicators	Points			
	0	1	2	3
Body mass index	> 21	< 21	–	–
Obstruction	> 65	50–64	36–49	< 35
Dyspnea	0–1	2	3	4
Exercise capacity	> 350	250–349	150–249	< 149

HODEH index calculation				
Indicators	Points			
	0	1	2	3
Нипохемия	> 90	< 90	–	–
Obstruction	> 65	50–64	36–49	< 35
Dyspnea	0–1	2	3	4
Exercise capacity	> 350	250–349	150–249	< 149
Нипертензия легочная	< 30	30–39	40–49	> 50

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ВОЗМОЖНОСТИ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ПАТОЛОГИИ ОРГАНОВ ДЫХАНИЯ У БОЛЬНЫХ С КОМОРБИДНЫМ ХРОНИЧЕСКИМ ОБСТРУКТИВНЫМ ЗАБОЛЕВАНИЕМ ЛЕГКИХ

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Резюме

Цель: проанализировать на основе собственного опыта возможность хирургического лечения патологии органов дыхания у больных с коморбидным хроническим обструктивным заболеванием легких (ХОЗЛ).

Материалы и методы. Проведен ретроспективный анализ 42 случаев хирургического лечения. Все больные были распределены согласно спирометрической классификации GOLD: GOLD1 – 12 (28,6 %); GOLD2 – 17 (40,5 %); GOLD3 – 9 (21,4 %); GOLD 4 – 4 (9,5 %) пациентов. В статье в виде таблицы представлены разновидности оперативных вмешательств в каждой группе отдельно. По поводу онкологической патологии прооперировано 18 (42,9 %) больных, туберкулеза органов дыхания – 15 (35,7 %), неспецифического поражения – 9 (21,4 %).

Результаты и их обсуждение. Степень стабилизации ХОЗЛ определяли на основе оценки симптомов одышки по мМДР и ТОХ. При обнаружении одышки по мМДР > 2 и общего счета ТОХ > 10

совместно с пульмонологом и реабилитологом была выбрана новая адекватная терапевтическая тактика. С целью определения достоверности осложненной использовали мультипараметрические индексы BODE и HODEH, учитывающие респираторные проявления ХОЗЛ, его системные эффекты и сопутствующие заболевания. Эффективность хирургического лечения составила 95,3 %. Осложнения наблюдались у 15 (35,7 %) пациентов.

Выводы. Собственный опыт показывает, что в большинстве случаев не имеет существенных причин для отказа в хирургическом лечении больных с коморбидным ХОЗЛ.

Ключевые слова: хирургическое лечение, хроническое обструктивное заболевание легких, спирометрическая классификация GOLD, одышка.

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POSSIBILITY OF SURGICAL TREATMENT OF PATHOLOGY OF THE RESPIRATORY SYSTEM IN PATIENTS WITH COMORBIDITY CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Summary

Purpose. Analyzed on the basis of their own experience possible surgical treatment of respiratory pathology in patients with comorbidity COPD.

Materials and methods. A retrospective analysis of 42 cases of surgical treatment was conducted. All the patients were divided according to the spirometric classification GOLD: GOLD1 – 12 (28.6 %); GOLD2 – 17 (40.5 %); GOLD3 – 9 (21.4 %); GOLD 4 – 4 (9.5 %) patients. In an article in the form of a table represented variety of surgical interventions in each group separately. Regarding oncologic pathology operated 18 (42.9 %) patients, pulmonary tuberculosis – 15 (35.7 %), non-specific lesion – 9 (21.4 %).

Results and discussion. The degree of stabilization of COPD was determined based on the symptoms of dyspnea on mMDR and TOX. Upon detection of dyspnea mMDR > 2 and the total bill TOX > 10 together with the pulmonologist and was chosen as the new rehabilitator adequate therapeutic strategy. In order to determine the reliability of complications used multiparametric BODE index and HODEH, taking into account the respiratory manifestations of COPD, its systemic effects and comorbidities. The effectiveness of surgical treatment was 95.3 %. Complications have been observed in 15 (35.7 %) patients.

Conclusion. Own experience shows that in most cases there are no significant reasons for the refusal of surgical treatment of patients with comorbidity COPD.

Key words: surgery, chronic obstructive pulmonary disease (COPD), spirometric classification GOLD, dyspnea.

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