ACUTE EXACERBATION OF COPD: FACTORS PREDICTING RE-HOSPITALIZATION

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THE AIM OF THE STUDY was to develop the prognostic model for prediction of re-hospitalisation due to acute exacerbations of COPD (AE COPD).

MATERIAL AND METHODS.

Retrospective analysis was done for the case-records of patients (pts) hospitalized due to AE COPD during three years at the Pulmonology department in the City clinical hospital #6 (Dnipro, Ukraine).

✓ The anthropometric parameters,
✓ medical history,
✓ physical examination data,
✓ complaints,
✓ chest x-ray results,
✓ ECG data,
✓ blood analyses,
✓ post-bronchodilator spirometry tests were evaluated.

The procedure basing on a probabilistic *Bayes method* and *sequential analysis of Vald* was used in order to predict the integrated effect of the parameters on the probability of re-hospitalization due to AE COPD.

The study has been approved by institutional ethics committee

RESULTS

2189 case records were analyzed.

162 case-records with confirmed **severe AE COPD** were included into the analysis.
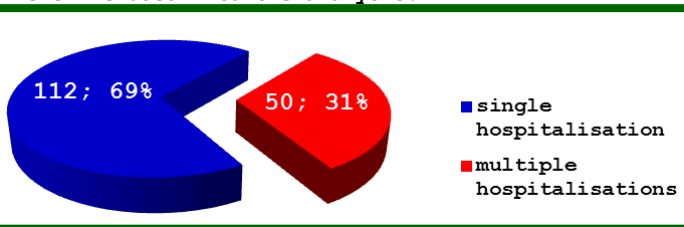
Figure 1. Proportion of pts with single and multiple hospitalizations due to severe AE COPD

Prognostic criteria	Gradation	OR [95 % CI]	χ^2
BMI < 19	yes	7,20 [1,63-31,87]	8,66
	no	0,14 [0,04-0,61]	
Respiratory rate > 20	yes	27,82 [3,58-215,90]	20,04
	no	0,04 [0,00-0,27]	
CRP > 13 мг/л	yes	6,58 [1,96-22,09]	11,09
	no	0,15 [0,05-0,49]	
Total protein > 80 г/л	yes	5,63 [1,15-28,88]	5,15
	no	0,18 [0,03-0,91]	
FEV$_1$ < 45 % predicted	yes	4,17 [1,40-12,38]	7,37
	no	0,24 [0,08-0,71]	
FVC < 80 % predicted	yes	6,38 [1,41-28,92]	7,19
	no	0,16 [0,03-0,71]	
FEV$_1$/FVC < 45 % predicted	yes	4,55 [1,65-12,53]	9,58
	no	0,22 [0,08-0,61]	

Table 1. Critical values of quantitative features that increase the risk of re-hospitalization due to AE COPD

Prognostic criteria	Gradation	Diagnostic coefficient	Ij	I
BMI < 19	yes	8	0,70	0,79
	no	-1	0,09	
Smoking	yes	2	0,32	1,77
	no	-9	1,45	
Any comorbidity	yes	2	0,81	1,08
	no	-6	0,27	
IHD	yes	3	0,43	0,71
	no	-2	0,28	
Diabetes mellitus	yes	8	0,52	0,59
	no	-1	0,07	
Respiratory rate > 20	yes	4	3,05	4,16
	no	-11	1,11	
Eosinophily	yes	11	0,53	0,53
	no	0	0,00	
CRP > 13 mg/l	yes	7	1,00	1,29
	no	-2	0,29	
Total protein > 80 g/l	yes	7	0,63	0,72
	no	-1	0,09	
FEV$_1$ < 45 % predicted	yes	3	0,50	1,17
	no	-4	0,67	
FVC < 80 % predicted	yes	2	0,32	1,29
	no	-6	0,97	
FEV$_1$/FVC < 45 % predicted	yes	4	0,66	1,09
	no	-2	0,33	

Table 2. Diagnostic criteria of increased risk of hospitalization due to AE COPD

The obtained data allowed us to identify **FIVE MAJOR** and **EIGHT ADDITIONAL CRITERIA** of hospital re-admission due to AE COPD.

THE MAJOR CRITERIA INCLUDED:
* BMI < 19,
* diabetes mellitus,
* blood eosinophilia > 5 %,
* serum C-reactive protein > 13 mg/l,
* total protein > 80 g/l.

THE ADDITIONAL CRITERIA INCLUDED:
* active smoking,
* a presence of any comorbidity,
* respiratory rate > 20 per minute,
* the presence of dyspnea,
* involving of additional muscles in breathing;
* FEV1/FVC < 45% predicted,
* FEV1 < 45% predicted,
* FVC < 80% predicted.

CONCLUSIONS:

✓ The presence of at least **two major** or **one major** and **three additional criteria** make the probability of **re-hospitalization** due to AE COPD significant.
✓ The proposed model could be helpful for the practitioners in quick and easy prediction of repeated AE COPD and in the case of high-risk of re-hospitalizations it may be the background for the more aggressive medical intervention.