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PREDICTIVE MODEL OF INDIRECT LUNG INJURIES IN EXPERIMENTAL TRAUMA

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Introduction Trauma remains a medical and social problem, with an increased rate of lethality. "Indirect" lung injury occurs in traumatic conditions due to systemic activation of neutrophils with the release of proteases in intact tissues. In the literature, there are no data on predictive models of distant lung injuries in traumatic conditions.

Keywords trauma, indirect lung injury, predictive model

Purpose Development of a predictive model of indirect lung lesions in experimental trauma for the issuance of hypotheses regarding the pathophysiological mechanisms, prophylaxis and potential treatments of this post-traumatic complication.

Material and methods In the experimental study (19 traumatized rabbits), the proteases, antiproteases and the pulmonary morphological picture were assessed according to the Semiquantitatively Reflected Qualitative Changes Assessment Score (SRQCAS). Statistical method used - correlational analysis and multivariate linear regression.

Results Initially, to highlight potential predictors, a correlational analysis was performed between SRQCAS score values and proteases/antiproteases. Subsequently, multivariate analysis was applied. The null hypothesis was rejected (F = 7.017, p = .002). The correlation coefficient of the predicted results and the real values of $SRQCAS_{lungs}$ constituted .854, the determination coefficient being .626. The final model included the following parameters: constant (B = 9,427; 95% CI 7,341, 11,513; p <.001); α_2-$macroglobulin_0$(B = -4,053; 95% Cl -6,350, -1,757; p = .002); $ALDS_0$ (B = .002; 95% CI .000, .004; p = .075); $ALDS_{24}$ (B = -. 006; 95% CI -.010, -.002; p = .003); CGA_2 (B = .081; 95% CI .040, .122; p = .001); EA_0 (B = -. 026; 95% CI -.040, -.011; p = .002).

Table 1. Coefficients for linear regression and collinearity analysis for predictive model of indirect lung injuries in experimental trauma

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Constant	9.427	.966		9.763	.000	7.341	11.513		
α_2-$macroglobulina_0$	-4.053	1.063	-.847	-3.813	.002	-6.350	-1.757	.421	2.373
$ALDS_0$	.002	.001	.430	1.937	.075	.000	.004	.423	2.366
$ALDS_{24}$	-.006	.002	-1.353	-3.569	.003	-.010	-.002	.145	6.905
CGA_2	.081	.019	1.089	4.306	.001	.040	.122	.325	3.076
EA_0	-.026	.007	-.698	-3.840	.002	-.040	-.011	.630	1.588

α_2-macroglobulin (α_2M), Cathepsin G activity (CGA), Elastase activity (EA) and Adenilatdesaminase activity (ALDS) Constant—equation constant's value, B—B coefficients, Std.Error— standard error, t – t test, Sig. —significance threshold, VIF – variance inflation factor

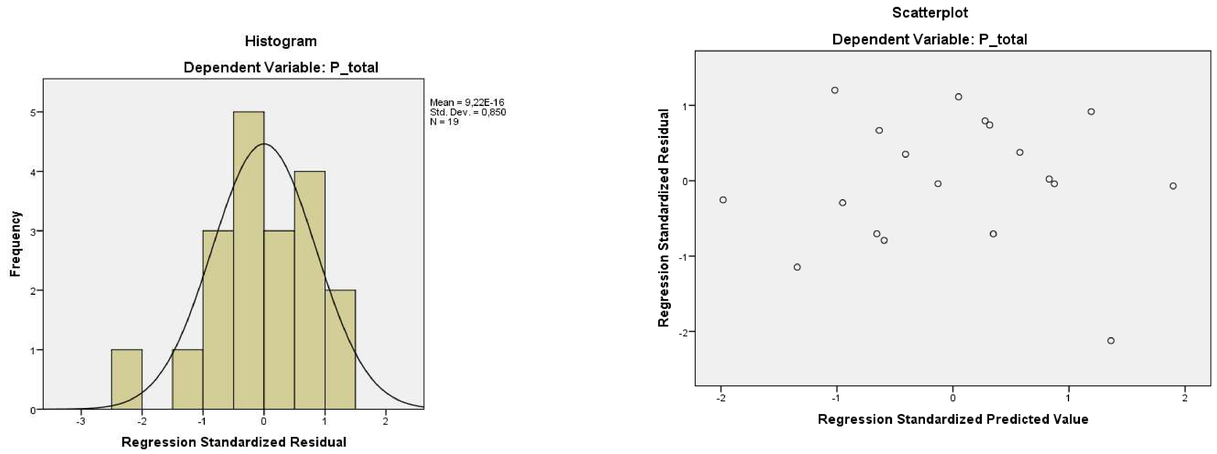

Figure 1. Residue distribution (left); scatterplot of standardized predictive values and standardized residues (right).

Conclusions In the study, a predictive model was developed for indirect lung lesions in experimental trauma, the predictors being some elements of the protease/antiprotease system. It allows the issuance of hypotheses regarding the pathophysiology, prophylaxis and treatment of this complication.