A predictive tool for *Pseudomonas aeruginosa* respiratory infection in pediatric cystic fibrosis patients

Authors: Authors: Elena Roxana Smădeanu ^{1,2}, Simona Elena Moșescu², Carmen Zăpucioiu^{1,2}, Coriolan Ulmeanu^{1,2}.

¹ "Carol Davila" University of Medicine and Pharmacology

² "Grigore Alexandrescu" Emergency Children's Hospital

Background and aims: The aim of this study was to assess wheter a combination of functional, clinical and biological parameters could predict the presence of respiratory infection with *Pseudomonas aeruginosa* (*P. aeruginosa*) in pediatric cystic fibrosis (CF) patients

Methods: A 10-year retrospective study that included 31 patients with CF aged 6-18 years (able to perform spirometry) was conducted. A scoring system that included age at CF diagnosis, the presence of the F508del allele, the nutritional status at the age of two years, the mean number of annual pulmonary exacerbations (PEx), the Brasfield radiological score, the severity of the bronchiectasis assessed by computed tomography (CT) examination, the serum level of gamma-globulins and the forced expiratory volume in one second (FEV1) was proposed. Infection was confirmed with isolation of *P. aeruginosa* from respiratory samples. For each parameter points between 0 and 3 were assigned proportionally to the variations observed.

Parameter	Cut-off	Points
Brasfield radiological score	>20	0
	15-20	+1
	<15	+2
Level of gamma-globulins	<18%	0
	18-25%	+1
	>25%	+2
Number of PEx/year	<3	0
	3-5	+1
	>5	+2
FEV1	>96%	0
	<96	+1
Nutritional state at the age of 2 years	Good	0
	Defficient	+1
Homozigous for F508del	Yes	0
	No	+1
Age at diagnosis	<1 year	0
	>1 year	+1
Bronchiectasis (CT scan)	0	0
	1	+1
	2	+2
	3	+3

Results: The score comprised values between 0 and 12 points, with an average of 4.47±0.33 points. The receiver operating curve was used to assess the score's capacity to predict the presence of the *P.aeruginosa* infection. The area under the curve was 0.812 (p<0.001). For a score greater or equal to 5, this method has a sensitivity of 75% and a specificity of 80 %, thus making the score as a very good method for detecting the presence of this pathogen

Test Result Variable(s): score		
Positive if Greater Than or Equal To ^a	Sensitivity	1 - Specificity
-1,0000	1,000	1,000
,5000	1,000	,971
1,5000	1,000	,912
2,5000	1,000	,618
3,5000	,792	,471
4,5000	,750	,206
5,5000	,625	,176
6,5000	,417	,088
7,5000	,208	,000
8,5000	,167	,000
9,5000	,125	,000
10,5000	,083	,000
11,5000	,042	,000
13,0000	,000	,000

Conclusion: Using this combination of parameters can be beneficial for detection of *P. aeruginosa* infection knowing the difficulties encountred in its routine culture-based identification