



# Biomarker for acute wheezing exacerbation in preschool wheeze

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## Background

Wheezing is a common problem in preschool children. Biomarkers of type 2 inflammation such as eosinophil cationic protein (ECP) and periostin appear to be associated with persistent wheezing in young children. In the present study, we investigated the utility of serum periostin and ECP for predicting acute wheezing exacerbation in preschool children with recurrent wheezing.

## Methods

Children aged 2-5 years old with recurrent wheezing  $\geq 2$  episodes per year and healthy control children were enrolled for a 6 months prospective study. All subjects were evaluated for serum periostin level, eosinophil cationic protein (ECP), and aeroallergens sensitization by skin prick test. All participants were subsequently evaluated for the episodes of wheezing exacerbations at 3 and 6 months.

## Demographic Characteristics of Study Subjects

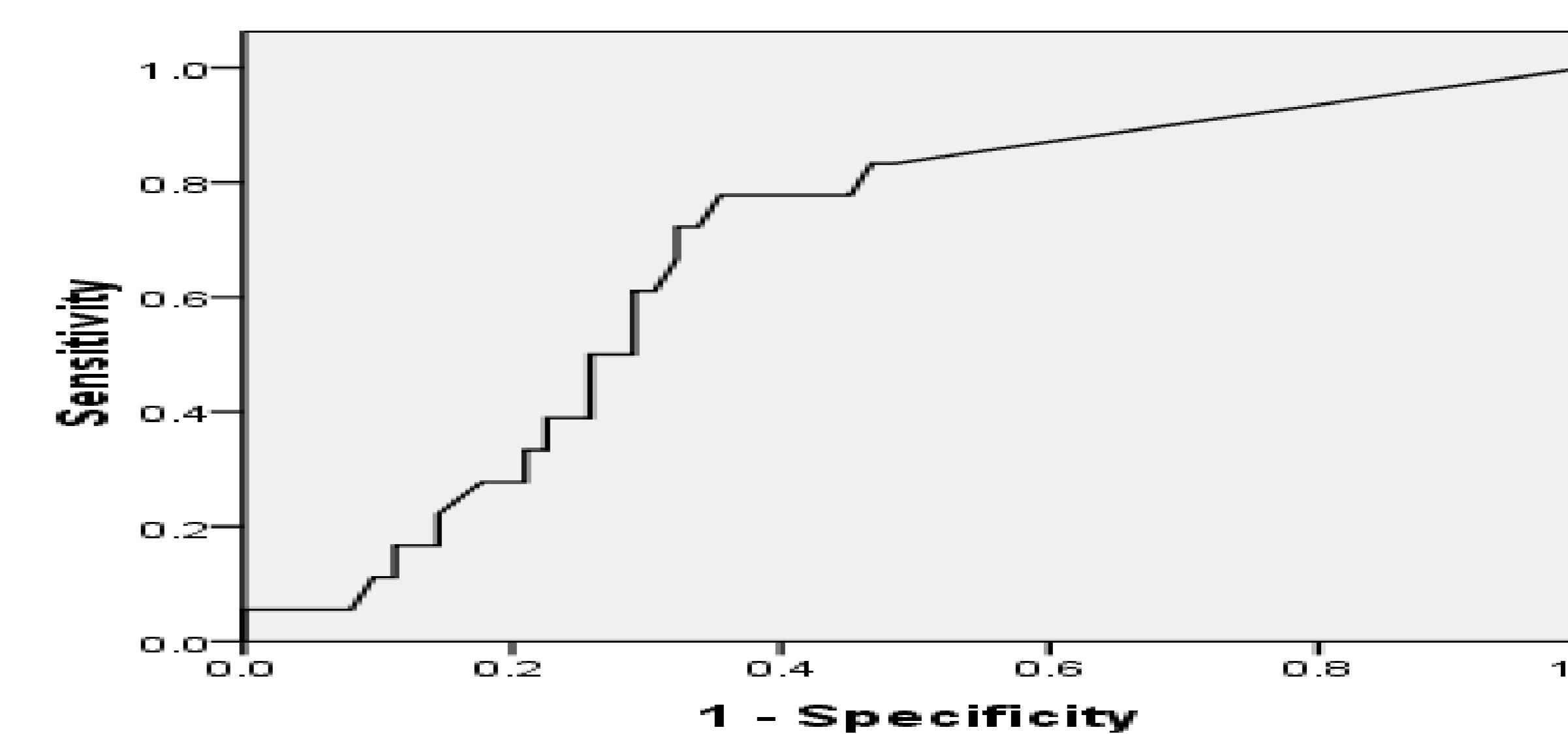
Parameter	Healthy Control N = 40	Recurrent wheezing N = 82	P value
Age: month mean(SD)	52.35 $\pm$ 11.29	52.91 $\pm$ 11.02	0.79
Gender: male n(%)	13 (32.5%)	45 (54.9%)	0.2
Weight (kg.) mean(SD)	17.17 $\pm$ 3.19	18.46 $\pm$ 5.51	0.36
Height (cm.) mean(SD)	104.77 $\pm$ 7.51	105.56 $\pm$ 8.32	0.518
Cesarean section n(%)	21 (52.5%)	43 (52.4%)	0.995
Passive smoking n(%)	9 (22.5%)	22 (14.6%)	0.719

## Biomarker

Parameter	Healthy Control N = 40	Recurrent wheezing N = 82	P value
Serum periostin (pg/ml) median(IQR)	<10pg/ml (<10pg/ml, 2116.69)	1122.32 (<10pg/ml, 6978.93)	0.006*
Serum ECP ( $\mu$ g/L) median(IQR)	3.44 (2.33, 7.71)	5.36 (2.91, 9.29)	0.232

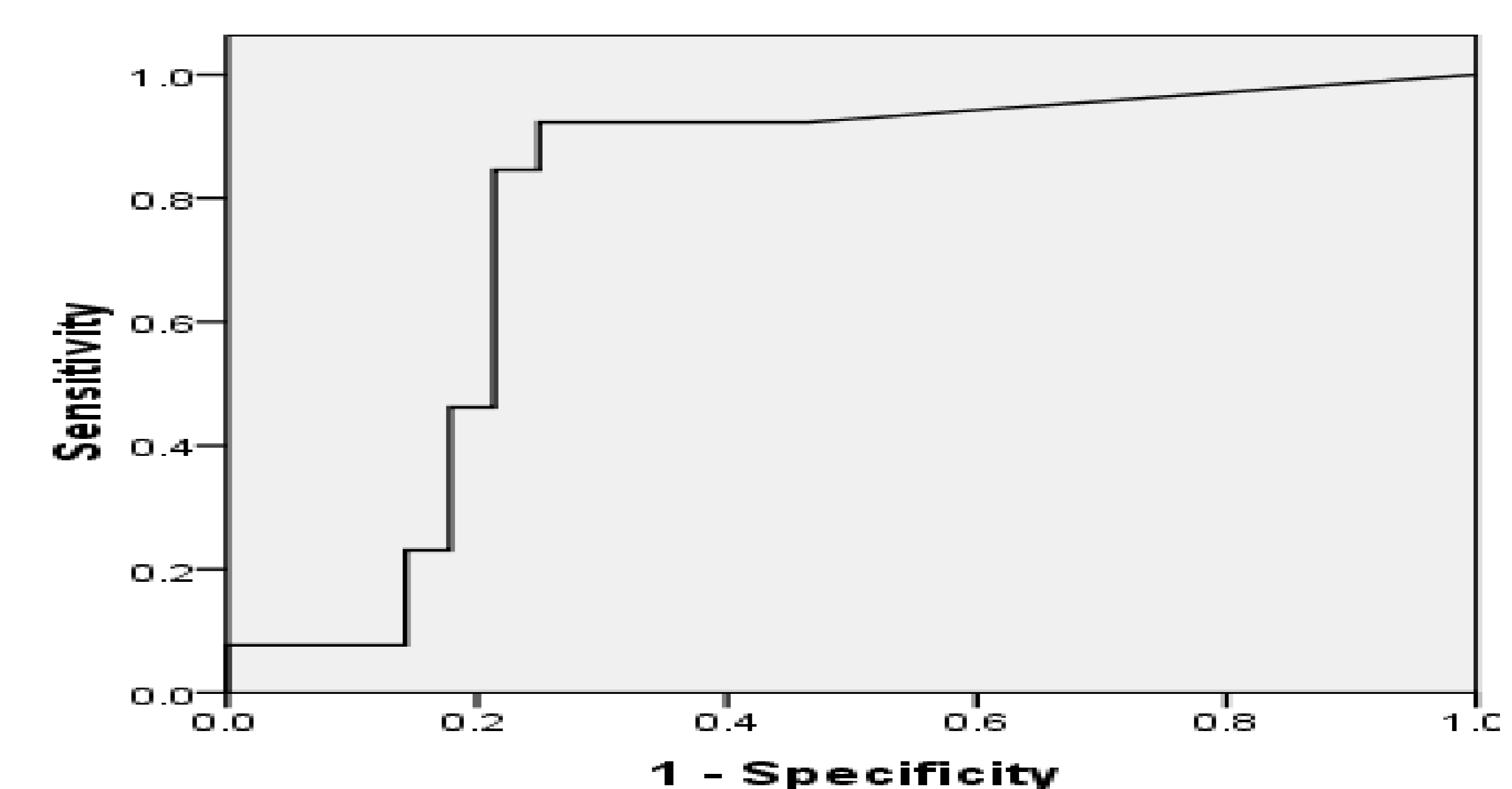
## Demographic Characteristics of Recurrent wheezing

Parameter	Atopic wheezing N = 41	Non atopic wheezing N = 41	P value
Wheeze a part form cold n(%)	34 (82.9%)	11 (26.8%)	<0.001*
Cough during playing or laughing n(%)	22 (53.7%)	2 (4.9%)	<0.001*
Pediatric asthma control test Mean $\pm$ SD	19.34 $\pm$ 5.34	24.22 $\pm$ 2.82	<0.001*
Serum periostin (pg/ml) median(IQR)	1,122.32 (<10pg/ml, 6868.42)	459.31 (<10pg/ml, 7089.43)	0.421
Serum ECP ( $\mu$ g/L) median(IQR)	6.05 (4.33, 10.7)	4.84 (2.81, 7.35)	0.088



Periostin cut off (pg/ml)	Sensitivity	Specificity	PPV	NPV	Accuracy	P value	AUC
>1200	78%	65%	38.9%	91%	68%	0.003*	0.68

Serum periostin >1200 (pg/ml) predicted wheezing exacerbation in 6 months for all subjects  
aOR 13.87; 95%CI:2.55-75.52



Periostin cut off (pg/ml)	Sensitivity	Specificity	PPV	NPV	Accuracy	P value	AUC
>1200	92%	75%	63.2%	95.5%	80.5%	<0.001*	0.78

Serum periostin >1200 (pg/ml) predicted wheezing exacerbation in 6 months for atopic wheezing group  
aOR 35.42; 95%CI:3.06-410.5

## Conclusion

Preschool children with recurrent wheezing have a greater serum periostin level than healthy control. Moreover, serum periostin level could be a predictive factor for acute wheezing exacerbation in 6 months.