

THE ROLE OF URINARY ATP IN THE DIAGNOSIS, TREATMENT, AND FOLLOW-UP OF CHILDREN WITH OVERACTIVE BLADDER

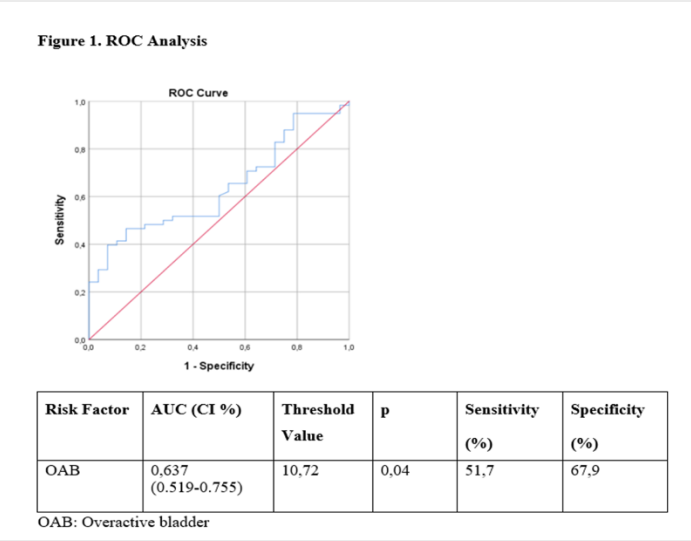
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Background

Recent studies suggest a link between biomarkers and OAB. DOA is associated with increased urothelial and cholinergic ATP release. This study investigated urinary ATP as a diagnostic and follow-up biomarker in children with OAB—previously explored only in adults and neurogenic bladder cases.



Methods

Study Groups: 58 children with OAB
28 healthy controls

Sample Collection & Processing:
Two midstream urine samples (pre-treatment & 1 month post-therapy)
Centrifuged & stored at -80°C

Analysis:
ATP levels measured by ELISA
Group comparisons, pre/post-treatment analyses
Correlations with LUS parameters

Results

OAB group: 29/58 (50%) male; median age 7 years
Controls: median age 10 years
Median urinary ATP:
OAB: 12.15 (2.48–170.62) ng/mg Cr
Controls: 9.92 (3.09–29.95) ng/mg Cr → **p=0.04**
No significant ATP change pre-/post-treatment (p=0.84)
No correlation with LUS parameters

Table 1. Comparison of Urinary ATP in the OAB Group at Initial Presentation and After Treatment

| | Initial (n=30) | After Treatment (n=30) | P value |
|------------------|---------------------|------------------------|---------|
| ATP (ng/mg cre) | 25,44 (2,48-170,62) | 18,05 (3,51-96,28) | 0,84 |
| Median (min-max) | | | |

Table 2. Correlation analysis of parameters

| | ATP | VDSS | VD Min. Volume | VD Max. Volume | Frequency | Urine Volume | Qmax | PVR |
|----------------|-------|--------|----------------|----------------|-----------|--------------|--------|-------|
| ATP | 1 | 0,035 | -,021 | -,221 | ,172 | -,039 | -,008 | -,129 |
| VDSS | 0,035 | 1 | -,268 | -,032 | ,202 | -,317* | ,01 | -,108 |
| VD Min. Volume | -,021 | -,268 | 1 | ,553** | -,512** | ,259 | ,187 | ,317 |
| VD Max. Volume | -,221 | -,032 | ,553** | 1 | -,275 | ,337* | ,168 | ,140 |
| Frequency | ,172 | ,202 | -,512** | -,275 | 1 | -,139 | -,139 | -,106 |
| Urine Volume | -,039 | -,317* | ,259 | ,337* | -,139 | 1 | ,551** | ,255 |
| Qmax | -,008 | ,01 | ,187 | ,168 | -,139 | ,551** | 1 | ,256 |
| PVR | -,129 | -,108 | ,317 | ,140 | -,106 | ,255 | ,256 | 1 |

(Spearman Correlation Analyses *p<0.05, **p<0.01)
Qmax: Maximum Urine Flow Rate in Uroflowmetry, PVR: Post-voiding residual volume, VDSS: Voiding Dysfunction Symptom Score, VD: Voiding Diary

Implications

This is the first prospective study to show elevated urinary ATP in children with OAB, suggesting its potential as a diagnostic biomarker. Larger studies across symptom severities and with urodynamic evaluation are needed to clarify its role, especially for treatment monitoring.