

IN MANY BOYS WITH POSTERIOR URETHRAL VALVES OBLIGATE PRODUCTION OF HYPO-OSMOLAR URINE IS HIGHLY ASSOCIATED WITH SUBSEQUENT LOWER URINARY TRACT DYSFUNCTION

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Aim of the study: Renal tubular dysfunction (RTD) causing obligate production of hypo-osmolar urine in boys with posterior urethral valves (PUV) has been well described. (Normal random urine osmolality is 500-850mOsmol/Kg). It is unknown how common and clinically significant this is. We hypothesize that this feedback loop is present in many PUV boys who suffer deterioration of their lower urinary tract (LUT): RTD results in hypo-osmolar urine, obligate polyuria, and bladder stretch-injury. Back-pressure worsens RTD, exacerbating this feedback loop. Renal dysplasia and acquired renal scarring that coexists in these boys exacerbates and confounds this.

We tested this by comparing the concentrating ability (random clinic urine osmolality) of PUV boys who had no deterioration in LUT to those who required intervention, examining the confounding effect of intrinsic renal impairment by performing a sub-group analysis comparing those with plasma creatinine $\leq 80\mu\text{mol/l}$ in each group.

Methods: A retrospective review of our PUV research database was performed for the following data: date of birth, intervention (e.g. Clean Intermittent Catheterisation (CIC), urinary diversion, bladder augmentation), highest recorded random clinic urine osmolality (>1 yr) with concurrent plasma creatinine. Data given as median (interquartile range), analyzed by Mann-Whitney u-test, $p < 0.05$ taken as significant.

Main results: Of 125 PUV boys, 76 had urine osmolality results, 36 required intervention, whereas 40 had normal LUT (non-intervention). Ages were similar, intervention 7.7(4.6-10.9)yrs vs. non-intervention 6.8 (4.0-8.7)yrs, $p=0.18$. Urine was significantly hypo-osmolar for intervention vs. non-intervention groups, 393(277-523)mOsmol/Kg vs. 635(440-807)mOsmol/Kg, $p < 0.0001$. Sub-group analysis comparing those with creatinine $\leq 80\mu\text{mol/l}$ was respectively 323(230-500)mOsmol/Kg ($n=15$) vs. 663(481-810)mOsmol/Kg ($n=36$), $p < 0.0001$.

Conclusion: This study confirms that RTD (demonstrated by hypo-osmolar urine) is highly associated in many PUV boys with progression of LUT dysfunction requiring intervention. Even boys with normal creatinine have a bigger risk of LUT deterioration if they have a RTD and produce hypo-osmolar urine.