

Aspects of the neurogenic bladder in children

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ABSTRACT

This PhD dissertation is based on studies performed in the Institute of Clinical Medicine and Department of Urology, Århus University Hospital, Skejby section, Denmark.

Close follow-up of the neurogenic bladder remain an important aspect in the management of the child with congenital spinal malformation. More than 90% of children with myelodysplasia are at risk of developing neurogenic bladder dysfunction during childhood and subsequently at risk of developing impaired upper urinary tract and renal function. In this PhD dissertation we follow-up on 60 newborns with congenital spinal malformations. We compare two different methods for evaluation of bladder dysfunction: NFU and CMG and we investigate whether CMG is affected by bowel emptying. Finally we have developed and tested new MRI methods employed to assess renal function beside the urinary tract morphology.

In study I we report that quantifiable urodynamic parameters obtained by NFU do not correlate with UUTP. Furthermore we find that most NFU parameters are correlated to CMG parameters, suggesting that NFU parameters are applicable in the evaluation of the neurogenic bladder. CMG were not sufficient in the evaluation since nearly one third of the infants in our study revealed important information at NFU not seen in CMG.

In study II we show that in two consecutive CMGs (before and after bowel movement) detrusor pressure at cystometric capacity increased. We also find that bladder overactivity and detrusor pressure at cystometric capacity decreases.

In study III we describe the outcome in a cohort of 60 adolescents managed at our department since infancy. Besides describing events (e.g. febrile UTI) and surgical intervention performed in the follow-up period, we find that with close follow-up and intervention at fixed intervals, it is possible to reduce the risk of renal damage. Only two patients experienced moderate renal impairment. Total faecal and urinary continence was found in 81% and 62% respectively.

In study IV we examine the reproducibility of contrast enhanced MR renography in three consecutive investigations in ten healthy adolescent volunteers. We found that the method is susceptible to different states of hydration but with good reproducibility at a standardized fluid intake.

In study V we investigate the association between isotope-based GFR values and MRI GFR values and have been able to generate GFR values with MRI which were associated with GFR obtained by Cr-EDTA clearance. Unfortunately the investigation was terminated prematurely since the use of Gadolinium based contrast agents became contraindicated in patients with renal impairment.

In conclusion the examinations showed that future follow-up in