



# Does the introduction of clean intermittent catheterization and antimuscarinic therapy in the newborn period preserve renal function in children with spina bifida?

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## BACKGROUND

Spina bifida aperta is an anomaly occurring one every 2000 newborn annually in Ireland.

Despite publications suggesting the early introduction of clean intermittent catheterisation (CIC) and antimuscarinic therapy reduces the incidence of renal damage<sup>1</sup>, a recent survey and consensus statement<sup>2</sup>, showed no agreement on when these interventions should be introduced.

From 2015 we changed from intervention as deemed clinically indicated to intervention in all from birth. This has given us the opportunity to compare early with late intervention.

## OBJECTIVE

To assess if the routine early introduction of CIC and antimuscarinic therapy was associated with a reduction in renal parenchymal damage in this cohort.

## METHODS

We reviewed data on all patients with open myelomeningocele attending the Spina Bifida Clinic. Two groups were identified;

- Group 1: Patients were started on CIC and antimuscarinic therapy after routinely after birth
- Group 2: Patients in whom CIC and antimuscarinic therapy was not introduced until after their first birthday.

eGFR calculated with the Schwartz formula ( $36 \times \text{Height (cm)} / \text{Creatinine } (\mu\text{mol/l})$ ).

Renal damage was assessed using DMSA scan and divided into 4 groups;

## METHODS (cont)

- Normal, no parenchymal defects, differential function between 45% and 55%.
- Mild, some focal scarring, differential function not below 40% unilaterally.
- Moderate, significant parenchymal defects with a fall in differential function to between 20 and 40% unilaterally.
- Severe, major parenchymal damage, unilateral uptake <20% of total.

Vesico-ureteric reflux (VUR) was assessed during video-urodynamic assessment.

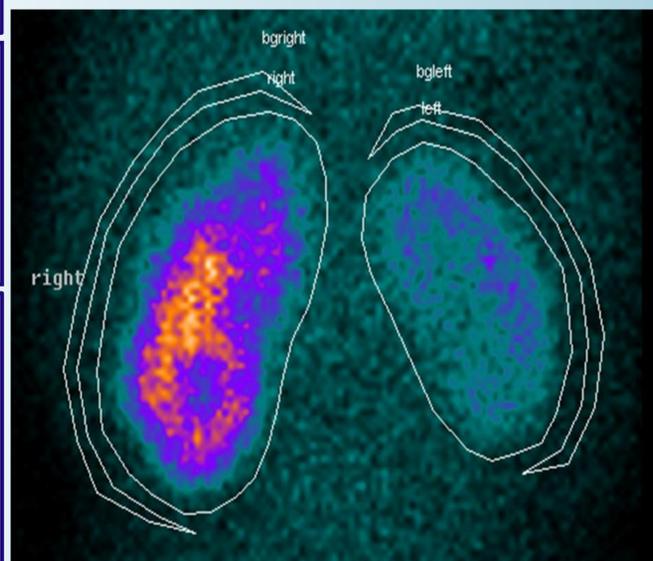


Figure 1 (above). DMSA scan from a patient in Group 2 with moderate renal damage. Relative function right 73%, left 27%.

Figure 2. (right). Unilateral, high grade, VUR in a patient from group 2.

## CONTACT INFORMATION

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	eGFR		DMSA				VUR		
	>/=90	<90	Normal	Mild	Moderate	Severe	None	Unilateral	Bilateral
Group 1 (39)	39	0	36	1	1	1	31	5	3
Group 2 (63)	63	2	52	8	4	1	57	6	2

Table 1. Results for eGFR, DMSA scan and imaging for VUR between groups

## RESULTS

- 104 patients were identified, 39 in Group 1 and 65 in Group 2.
- The mean age of introduction of CIC and antimuscarinic therapy was 0 in Group 1 and 42 months in Group 2.
- All children in Group 1 had a normal eGFR whilst 2 (3%) of children in Group 2 had a reduced eGFR (p=ns).
- DMSA scans showed renal parenchymal damage in 3 (6%) of children in Group 1 compared with 13 (20%) of those in Group 2 (p=ns).
- VUR (unilateral or bilateral) was present in 8 (21%) of children in Group 1 and 8 (12%) of children in Group 2 (p=ns).



## DISCUSSION

Whilst there was more renal damage on DMSA in group 2, there was less reflux on cystography in this group. These differences did not reach statistical significance. We have not shown that the current practice of early institution of CIC and antimuscarinic therapy has a renal protective effect in our cohort of patients. In part this may be due to the small cohort. However, numerous other factors influence outcome. For instance, it is naïve to assume regular CIC and antimuscarinic therapy provides a safe bladder in all. Infants on normal feed volumes have a urine output of ~4 ml/kg/hour. Thus urine production is more than twice the capacity of 7 ml/kg if 4 hourly CIC is performed. Leak pressure is vital. Indeed, antimuscarinic therapy might be detrimental in some if it abolishes synergistic detrusor contractions with voiding.

## CONCLUSIONS

In patients treated with CIC and antimuscarinic therapy from birth;

- There was reduced parenchymal scarring
- There was more vesico-ureteric reflux
- The differences between groups were NOT significant
- Other factors influence outcome in addition to CIC and antimuscarinic therapy so individualisation of treatment based on urodynamic parameters is optimal

## REFERENCES

1. Dik P et al Early start to therapy preserves kidney function in spina bifida patients. Eur Urol. 2006 May;49(5):908-13. Epub 2006 Jan 19.
2. Lee B et al British Association of Paediatric Urologists consensus statement on the management of the neuropathic bladder. J Pediatr Urol. 2016 Apr;12(2):76-87. doi: 10.1016/j.jpuro.2016.01.002. Epub 2016 Jan 29.