

Quick-Wee: a novel non-invasive urine collection method

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Received 30 April 2016

Revised 26 July 2016

Accepted 4 August 2016

Published Online First

26 August 2016

ABSTRACT

Background Clean catch urine (CCU) collection in precontinent children is often time-consuming, with associated collection failure. We hypothesise that stimulating cutaneous reflexes hastens voiding for CCU.

Methods 40 children aged 1–24 months in the ED. Standard CCU was augmented with gentle suprapubic cutaneous stimulation using saline-soaked gauze (Quick-Wee method).

Results 12/40 (30%) children voided within 5 min for successful CCU. Parental and clinician satisfaction was high.

Conclusions Quick-Wee appears to be a simple method to speed CCU in young children.

INTRODUCTION

Urinary tract infections (UTIs) are common in young children, clinical signs vary and if unrecognised further complications can occur.

Collecting uncontaminated urine from precontinent children is challenging. Non-invasive methods (perineal bag, clean catch) are convenient but time-consuming, with high contamination¹ and collection failure.^{2,3} Invasive methods (catheter, suprapubic aspiration) reduce contamination¹ and are potentially faster, but require expertise and cause pain and distress.

Clean catch urine (CCU) collection involves waiting to catch midstream urine if a nappy-free child voids spontaneously. CCU is commonly used and recommended by UK guidelines for young children with suspected UTI.⁴ American guidelines however suggest CCU can be used for screening, but not definitive diagnosis before initiating treatment.⁵

CCU can be time-consuming, with average time waiting for CCU of 1 hour in a previously published study.³ Based on preliminary data from a current study, median time to void is 25 min but only 12% void within 5 min.² Improved non-invasive collection would have major benefits, and is recommended for future research.⁵ Previously investigated techniques include a vibrating bladder-stimulator in young children (not effective)³ and bladder/lumbar stimulation in neonates (effective, but neonatal age-group only).^{6,7}

Anecdotally many children void during routine perigenital cleaning before urine collection attempts. We hypothesise this stimulates newborn cutaneous voiding reflexes, triggering involuntary parasympathetic detrusor contraction via exteroceptive somatobladder mechanisms.⁸ These reflexes are observed when animals stimulate voiding by licking their newborn's perigenital skin.⁹

This study trials a new pragmatic technique to elicit voiding reflexes for CCU within 5 min in young children.

METHODS

Design: Prospective feasibility study using gentle cutaneous stimulation with saline-soaked gauze (Quick-Wee method) to trigger voiding. The hospital Ethics Committee approved the study (ref.35083A).

Setting: ED, Royal Children's Hospital Melbourne.

Sample size: Convenience sample of 40 patients to assess proof of concept and feasibility, and determine sample size for a potential randomised controlled trial (RCT).

Participants: Precontinent children (aged 1–24 months) where treating clinicians required urine collection. Children were excluded if they had urogenital or neurological abnormalities affecting voiding, or required alternate urine collection methods. Demographics, comorbidities and CCU indication were recorded.

Procedure: Verbal and written study information was provided, before parents provided verbal consent. Trained clinicians performed 10 s standardised perigenital cleaning with room-temperature sterile water-soaked gauze, then additionally rubbed the suprapubic area with saline-soaked gauze held by disposable plastic forceps in continuous circular motions (see figure 1), for up to 5 min.

To determine if temperature influenced voiding success or adverse effects, for 20 children room-temperature saline-soaked gauze was used, and for 20 cold saline (2.8°C refrigeration).

Primary outcome was voiding within 5 min. Secondary outcomes were a parent or clinician successfully catching urine if children voided, and parent and clinician satisfaction (5-point Likert scale).

RESULTS

Forty patients participated in the study: no families declined participation. CCU indications included fever of unknown origin (42.5%), vomiting (17.5%), unsettled baby (17.5%), specifically suspected UTI (15%), failure to thrive (5%), other (2.5%). Four patients had minor renal abnormalities (three antenatally diagnosed hydronephrosis, one duplex kidney), one had previous UTI.

Twelve children (30%) had successful voids within 5 minutes (see table 1). Mean age of patients who voided was 3.7 months, all were <12 months, 10 <6 months of age. Urine was successfully caught in a specimen jar on all occasions. More



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To cite: Kaufman J, Tosif S, Fitzpatrick P, et al. *Emerg Med J* 2017;**34**:63–64.



Figure 1 Quick-Wee method.

Table 1 Results

	Room-temperature group	Cold-temperature group	All children
Number	20	20	40
Male	12/20 (60%)	18/20 (90%)	30/40 (75%)
Age in months, mean (range)	7.5 (2–15)	5.7 (1–16)	6.6 (1–16)
Voided urine (%) (95% CI)	5/20 (25%) (9% to 49%)	7/20 (35%) (15% to 59%)	12/40 (30%) (17% to 47%)
Successful catch	5/20 (25%)	7/20 (35%)	12/40 (30%)

voids occurred using cold-soaked gauze, but 95% CIs overlapped.

Satisfaction with Quick-Wee was high. Thirty-five of 40 parents (87.5%, 95% CI 73% to 96%) and 36/40 clinicians (90%, 95% CI 76% to 97%) were satisfied or very satisfied (Likert score 4 or 5). No adverse events occurred and no respondents were unsatisfied with the intervention.

DISCUSSION

This simple method has a promising 5 min voiding rate of 30%. The yield appears higher in younger infants which may be expected given the hypothesis of stimulating newborn cutaneous voiding reflexes, which likely diminish with age.

Although comparison is limited by possible confounders, a study from the same ED found a much lower voiding rate of 12% within 5 min with standard CCU in 218 children 2–48 months of age (mean 11.4 months, median 10 months, boys 61%).²

A limitation of this study is the small sample size and a lack of a contemporaneous comparison group; however, our aim for

this exploratory study was to demonstrate proof of concept and the feasibility of this novel method performed by a single clinician. Other reported methods to facilitate voiding in infants require three staff to perform,^{6,7} and may not be practical in older or heavier infants. There may be an important age effect related to the maturity of the reflex arch which could be explored in a larger study.

Obtaining urine from precontinent children remains challenging. Expediting CCU could reduce painful invasive collection methods and improve satisfaction with CCU. With such a simple intervention, even a modest improvement would be of clinical benefit.

The Quick-Wee method of saline-soaked gauze suprapubic stimulation appears promising to speed CCU in young children. Further studies are required to evaluate its efficacy in the ED.

Acknowledgements The authors thank the families and clinical staff participating in this trial.

Contributors JK was responsible for identifying the research question. All authors contributed to the study design and development of the protocol. JK was responsible for drafting this paper and finalising the manuscript. All authors provided comments on the drafts and approved the final version.

Funding This study was funded in part by the Shepherd Foundation, Melbourne, Australia. JK has been part funded by an Avant Doctor In Training Research Scholarship and Royal Australasian College of Physicians Basser Research Entry Scholarship. FEB is supported in part by a National Health and Medical Research Council Centre of Excellence Research Grant for paediatric emergency medicine (GNT 1058560) and a Royal Children's Hospital Foundation Grant, Melbourne Australia. The Royal Children's Hospital Melbourne receives infrastructure support from the Victorian Government's Infrastructure Support Program, Melbourne, Australia.

Competing interests None declared.

Ethics approval Royal Children's Hospital Human Research Ethics Committee.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Tosif S, Baker A, Oakley E, *et al*. Contamination rates of different urine collection methods for the diagnosis of urinary tract infections in young children: an observational cohort study. *J Paediatr Child Health* 2012;48:659–64.
- 2 Kaufman J, Tosif S, Fitzpatrick P, *et al*. Urine clean catch in the paediatric emergency department: success, time to void and contamination rates. *Canadian Pediatric Society Annual Conference*; Charlottetown, 2016.
- 3 Davies P, Greenwood R, Bengier J. Randomised trial of a vibrating bladder stimulator—the time to pee study. *Arch Dis Child* 2008;93:423–4.
- 4 *Urinary tract infection in children: diagnosis, treatment and long-term management*. London, UK: National Institute for Health and Clinical Excellence, 2007. <http://www.nice.org.uk/nicemedia/live/11819/36032/36032.pdf>
- 5 Roberts KB. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics* 2011;128:595–610.
- 6 Herreros Fernández ML, González Merino N, Tagarro García A, *et al*. A new technique for fast and safe collection of urine in newborns. *Arch Dis Child* 2013;98:27–9.
- 7 Altuntas N, Tayfur AC, Kocak M, *et al*. Midstream clean-catch urine collection in newborns: a randomized controlled study. *Eur J Pediatr* 2015;174:577–82.
- 8 Fowler CJ, Griffiths D, de Groat WC. The neural control of micturition. *Nat Rev Neurosci* 2008;9:453–66.
- 9 Wu HY, de Groat WC. Maternal separation uncouples reflex from spontaneous voiding in rat pups. *J Urol* 2006;175Pt 1:1148–51.