THE COMPARISON OF BLADDER CATHETERIZATION AND SUPRAPUBIC ASPIRATION METHODS FOR SUSPECTED URINARY TRACT INFECTION IN INFANTS

Yavascan Onder, Aksu Nejat, Alparslan Caner, Eiacik Kayi, Kanik Ali, Saritas Serdar, Elmas Cengizhan, Mutlubas Ozsan Fatma , Kasap Demir Belde , Anil Murat, Bal Alkan.
Izmir Tepecik Teaching and Research Hospital, Department of Pediatric Nephrology, Izmir, TURKEY

Introduction

Urinary tract infection (UTI) is a common clinical problem in infants and young children, but high index of suspicion is required for the diagnosis of UTI as clinical presentation during infancy is usually non-specific. The choice of urine collection for diagnosing UTI in young children is important. Suprapubic aspiration (SPA) obtained urine (SPAU) culture is believed to be the gold standard in diagnosing UTI because bladder urine should be sterile. Therefore catheter obtained urine (COU) culture is an alternative more readily acceptable to parents. However, there is a chance of contamination or introducing perineal microorganisms resulting in iatrogenic UTI, especially in uncircumcised boys (8).

We aimed to confirm catheter-based UTI suspicions with a SPA-obtained urine sample before initiating any antimicrobial treatment in a department of pediatric nephrology. Urine culture results were then obtained with both collection methods in the same infants, thereby allowing us to compare the results of these 2 methods.

Material and Method

We conducted a prospective cross-sectional study involving non-toilet-trained infants who are younger than 24 months and had been admitted to out patient pediatric nephrology clinics between June 2012 and September 2013.

Urine cultures were obtained with nonspecific symptoms for UTI such as fever, irritability, lethargy, failure to thrive, vomiting and unusual odor of the urine. Urine was first obtained with catheterization. Urine was sent for urinalysis and for culture. Any empiric antibiotic therapy was not started. If urine culture is positive a second specimen obtained with SPA for confirmation. All patients have two urine analysis and two culture (first obtained with catheter and second with SPA) results.

The following definitions were used according to American Academy of Pediatrics guidelines. Positive urine analysis:

- ≥10 WBC/microL, nitrit (+), presence of bacteria on direct microscopic examination, or both;
- Positive urine culture for COU: ≥10^3 colony forming unit (CFU)/ml (1 species only).
- Positive urine culture for SPAU: any number Gram-negative bacilli (1 species only).

Results obtained from SPAU were considered to be the gold standard for comparison with COU

Results

104 patients with suspected UTI have been seen at the outpatient clinic. 83 infants (69 boys and 14 girls) diagnosed with UTI according to COU-cultures were included in the study (Figure 1). All COU-culture results were positive. However, COU urinalysis was only positive in 27 (32.5%) infants (Table 1). The most common uropathogens were Enterobacter spp., (37.3%) of positive COU-culture results. The most common uropathogens were Escherichia coli (66.6%) of positive SPA-culture results. COU-culture contamination rate was detected 71.1% (Figure 1).

Figure 1. Study design and number of patients according to COU and SPAU results.

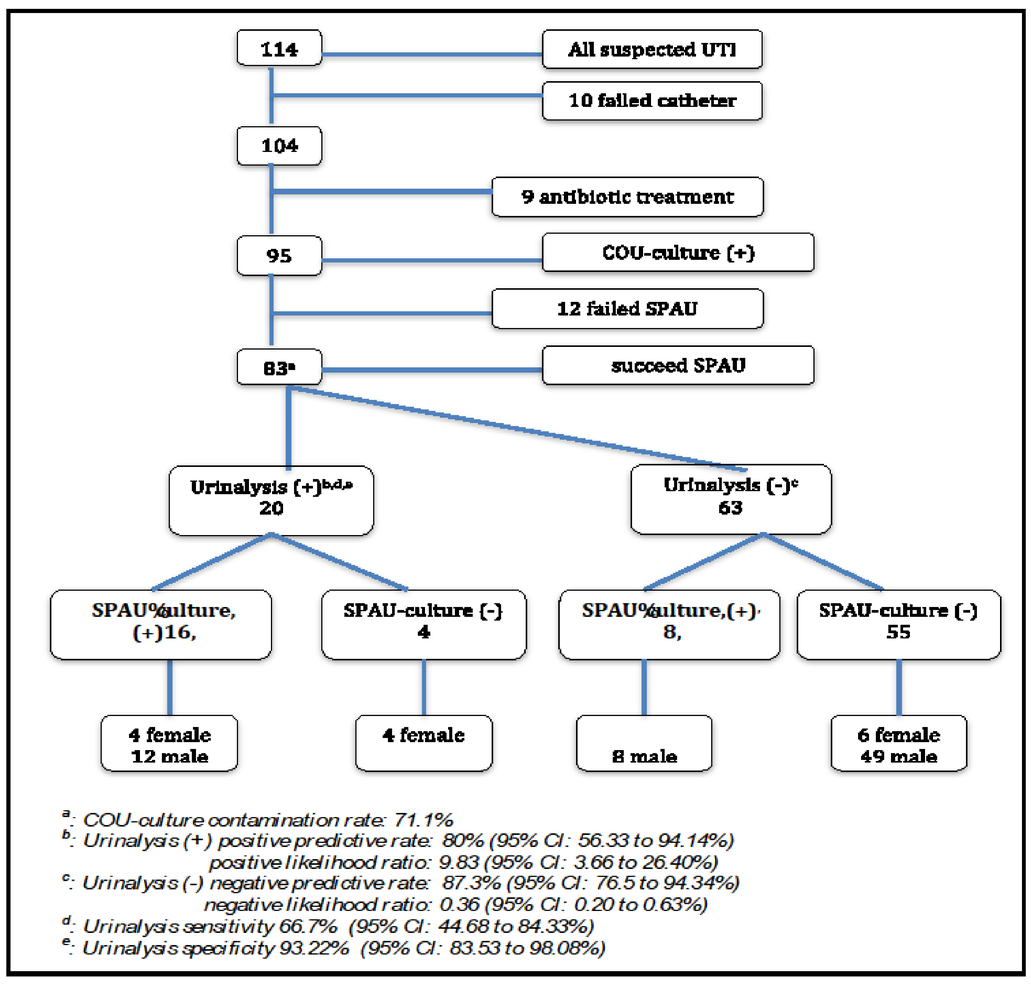

Table 1. Catheter-obtained specimen culture results related and urinalysis to SPAU specimen results.

	COU				SPA				Contamination	
Microorganism	**n**	**%**	**U (+)**	**%**	**n**	**%**	**U (+)**	**%**	**n/n**	**%**
Enterococcus spp	31	37.3	12	44.4	1	4.2	1	5	**30/31**	**96.7**
E. coli	22	26.5	11	40.8	16	66.6	12	60	**6/22**	**27.3**
Klebsiella spp	19	22.8	3	11.1	6	25	6	30	**13/19**	**68.4**
Serratia spp	2	2.4	0		1	4.2	1	5	**1/2**	**50**
Enterobacter spp	4	4.8	1	3.7	0		0		**4/4**	**100**
Proteus spp	3	3.6	0		0		0		**3/3**	**100**
Stafilococcus spp	1	1.3	0		0		0		**1/1**	**100**
Citrobacter spp	1	1.3	0		0		0		**1/1**	**100**
Total	**83**	**100**	**27**	**100**	**24**		**20**	**100**	**59/83**	**71.1**

COU: Catheter obtained urine, SPA: Suprapubic aspiration, U: Urinalysis

In conclusion, for the firm diagnosis of UTI in infants, it is best to obtain SPA for culture when there are no contraindications, as it can unambiguously diagnose and exclude UTI in these patients. We concluded that COU-cultures might not be useful for diagnosing UTI if done incorrectly, contrary to previous recommendations, and should always be followed up with SPAU-culture in young children to confirm the diagnosis.

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