SHORT REPORT

Self-collected swabs of the urinary meatus diagnose more Chlamydia trachomatis and Neisseria gonorrhoeae infections than first catch urine from men

Max A Chernesky,1 Dan Jang,1 Eder Portillo,1 Marek Smieja,1 Jodi Gilchrist,1 Ruth Ewert,2 Cindy MacRitchie3

ABSTRACT

Objectives To compare first catch urine (FCU) and self-collected urinary meatal swabs for the detection of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) using the APTIMA Combo 2 assay.

Methods A total of 511 young men from a high risk street youth clinic were studied. Group A (n=293) collected a FCU and a meatal APTIMA swab followed by Group B (n=218) who collected a FCU and two meatal samples using an APTIMA swab and a flocked swab. Order of sample collection was alternated. Individuals in Group B rated collection as easy, difficult or neither, then expressed a preference for sampling and swab type. All subjects performed meatal self-collection in the presence of a study monitor.

Results The combined CT prevalence was 7.8% and 2.7% for NG where 80% of the men were without symptoms. Meatal swabbing identified 35 cases of CT and 14 cases of NG compared to 33 and 11 for FCU. Flocked and APTIMA swabs were equally effective in detecting more cases. The majority of men found self-collection of meatal swabs and urine to be easy. Although 63% preferred urine sampling, 60% of those who preferred swabbing selected the flocked swab.

Conclusions Collection of meatal swabs could serve as an alternative to urethral swabbing and FCU for the detection of CT and NG.

INTRODUCTION

Because Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) infections are often asymptomatic in men, they are not diagnosed and treated. This allows the unsuspecting transmission to sexual partners and the risk of ascending infection to the upper genital tract. Screening men requires less invasive sampling than urethral swabbing. First catch urine (FCU) has been shown to be an effective diagnostic sample. The results of men collecting their own penile samples have been equivocal. A novel nylon-flocked swab has been developed and shown to enhance the analytical sensitivity of assays for CT and NG in mock samples and flocked swabs have been shown to be effective for the self-collection of vaginal samples. The objectives of these studies were to compare FCU and self-collected meatal-flocked swabs and Dacron APTIMA swabs in the APTIMA Combo 2 assay.

A questionnaire was used to determine ease and preference of collection.

METHODS

From August–October, 2005, a consecutive group of 511 young men (15–24 years) attending the clinic for the first time, signed consent (approved by St Joseph’s Healthcare Research Ethics Board) for collection of a FCU and self-collected meatal swabs. More than 80% were asymptomatic, 95% were white and 5% were black, Asian or Latino. Group A (n=293) collected a FCU and 1 APTIMA swab into APTIMA specimen transportation media followed by Group B (n=218) who collected a FCU, an APTIMA swab and a flocked swab (Paediatric product number 56750C501, Copan Italia, Brescia, Italy). Order of collection of each sample was alternated in both groups. Swabs were placed into APTIMA specimen transportation media. Using a rubberised penis, the study monitor demonstrated how to pull back on the penis shaft to open the meatus, to insert the tip of the swab gently and to turn the swab once before placing the swab into the transport tube, breaking the shaft at the score line and capping the tube. Without interference, the self-collection procedure was then observed by the study monitor. Specimens were transported to St. Joseph’s Healthcare Infections Research Laboratory, where they were tested with the APTIMA Combo 2 assay using a manual system. For calculation of infected status, a patient was considered positive if two samples were positive or a single positive was confirmed using APTIMA CT(ACT) or GC(AGC) assays. Technologists were blinded of any results from the other tests. Group B rated the collection of the swabs and FCU as easy, difficult or neither easy nor difficult, and were asked if they preferred one swab over another. Sensitivity and specificity were calculated as the proportions with 95% CI, comparing each of the specimen types against the reference standard of infected status described above. Swabs were compared with FCU, and with one another, using McNemar’s test. Survey preferences were calculated together with 95% CI and compared with 0.5 using the binomial test.

RESULTS

All participants completed enrolment. Refusals were not recorded but were estimated to be less
than 5%. The prevalences of CT and NG were 6.8% (20/293) and 4.4% (13/293) in Group A and 9.1% (20/218) and 0.5% (1/218) in Group B respectively. The asymptomatic rate was 80% and 92% were uncircumcised. Table 1 summarises the results of APTIMA Combo 2 testing for CT and NG. In Group A, the APTIMA meatal swab identified 18 (90%) of the CT and 13 (100%) of the NG infections compared to 17 (85%) and 11 (84.6%) respectively, from the FCU. In Group B, the flocked swab and APTIMA swab each identified 17 cases of CT (85%), and one case of NG. Collectively, the self-collected meatal swab identified 35 cases of CT and 14 cases of NG compared to 33 and 11 from FCU. Specificity for all samples was 100%.

Of 218 men in Group B, 92% (95% CI 88% to 95%) expressed no difficulty collecting either an FCU or meatal swab and 63% preferred FCU over meatal swab (95% CI 56 to 69; p<0.001 for comparison with a proportion of 0.5). Amongst those who preferred swabbing, 60% preferred the flocked swab (95% CI 50 to 70; p=0.07 for comparison).

**DISCUSSION**

APTIMA and flocked meatal swabs identified a few more cases of CT and NG than FCU, which may have been due to differences in analyte load in urine and meatal swab samples, or inconsistencies of urine submissions even though instructions were given to collect the first catch of 20 ml. When asked about ease and preference of collection of FCU and swabbing, the majority of men found collecting each sample to be easy but preferred collecting FCU. Using a novel-flocked swab, which was originally designed for nasal swabbing of paediatric patients, those who preferred swabbing, stated that the flocked swab was more desirable. The strengths of our study are (a) a large number of participants who alternated the order of samples, which were tested in a blinded fashion; (b) monitoring the self-meatal collection. A weakness was a lack of self-collection of the FCU. Our observations are in agreement with several previous reports. Lamba et al² compared physician-collected meatal swabs to urethral swabs in 208 men and showed them to be equal in sensitivity in a ligase chain reaction assay; 19 of 25 men (76%) had a strong preference for the meatal technique. Elawad et al (unpublished data, 2005) reported 90% meatal swab sensitivity compared to 100% for urethral sampling, and showed that 95 of 100 men considered meatal sampling to cause the least discomfort. Agreda et al (unpublished data, 2010) compared self-collected meatal swabs to urine collection at home for 602 men recruited through the internet. Although they did not record preferences they used nylon-flocked swabs for meatal sampling and reported sensitivities for CT, NG and *Trichomonas vaginalis* that were higher than for FCU.

Several authors have reported less success for self-collected penile swabs compared to urine testing. Pittaras et al³ studied 210 men using the AMPLICOR assay for CT. They reported diagnostic sensitivities for physician-collected penile skin swabs (78.7%) and intraurethral swabs (89.4%), compared to FCU (89.4%). Moncada et al⁴ compared swabbing of the glans surface to urine testing and meatal swabbing. In the glans to urine comparison, the two sample types were equal in sensitivity (96.5% vs 95.5%) for NG by APTIMA testing but strikingly different for CT (59.4% for glans vs 98.8% for urine). The same study compared meatal swabs to urine for NG and CT and showed higher sensitivities for urine testing. A similar study by Raherison et al⁵ confirmed a low level of positives with glans sampling using flocked swabs for CT.

Regardless of the swab type in the present study, swabbing the meatus always identified more cases of CT-infected and NG-infected men than FCU and may in part, be due to monitored collection of the meatal swabs, requiring opening of the urinary meatus sufficiently to insert the swab tip. Unobserved self-sampling may account for lower values for meatal swabbing in previous studies³⁵ as men may be reluctant to swab the meatus. Notwithstanding a reluctance to recommend meatal self-sampling as a routine to screen asymptomatic men for CT and NG because of uncertainty of adequate collection, this study suggests that the meatal sample when properly collected can yield positive results. This observation may not be easily translated into practice. Further studies are needed comparing FCU, self-collected and physician-collected meatal swabs to urethral swabbing to determine whether a meatal swab can be recommended as a routine sample for the diagnosis of CT and NG infections in men.

### Table 1 Sensitivity of urinary meatal swabs and first catch urine (FCU) for the diagnosis of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) (Group A, n=293; Group B, n=218)

<table>
<thead>
<tr>
<th>Infection</th>
<th>Swab</th>
<th>Group</th>
<th>%Sensitivity (CI)</th>
<th>%Sensitivity (CI)</th>
<th>%Sensitivity (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APTIMA</td>
<td>Flocked</td>
<td>FCU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>18/20</td>
<td>ND</td>
<td>17/20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>90.0 (69.9 to 97.2)</td>
<td>85.0 (64.0 to 94.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>17/20</td>
<td>ND</td>
<td>16/20</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>85.0 (64.0 to 94.8)</td>
<td>80.0 (58.4 to 91.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NG</td>
<td>13/13</td>
<td>ND</td>
<td>11/13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>100 (77.2 to 100)</td>
<td>84.6 (57.8 to 95.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>100 (20.7 to 100)</td>
<td>0 (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key messages**

- Meatal self swabbing is acceptable
- Flocked and dacron swabs were equally effective
- Flocked swabs were preferred. Supervised meatal self-swabbing diagnosed more cases of CT than FCU

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### Contributors

MC and DJ were involved with the design of the study. EP, JG, RE and CM were involved with patient recruitment. EP, JG and DJ were responsible for laboratory testing and data collection. MS analysed the data. All authors reviewed the manuscript.

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### Competing interests

None.

### Ethics approval

Ethics approval was provided by St. Joseph’s Healthcare Research Ethics Board.

### Provenance and peer review

Not commissioned; externally peer reviewed.

### REFERENCES


**Clinical**


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