Acta Derm Venereol 2015; 95: 343–344

SHORT COMMUNICATION

Trichomonas vaginalis Infections are Rare Among Young Patients Attending an STI Clinic in Sweden

Helena Pellrud[1], Daniel Golparian[2], Christian Steczkó Nilsson[1], My Falk[1], Hans Fredlund[2] and Magnus Unemo[2]*

*[1]STD Clinic, Department of Dermatovenereology, Örebro University Hospital, Örebro, and [2]WHO Collaborating Centre for Gonorrhoea and other Sexually Transmitted Infections, Swedish Reference Laboratory for Pathogenic Neisseria, Department of Laboratory Medicine, Clinical Microbiology, Örebro University Hospital, Örebro, Sweden. *E-mail: magnus.unemo@orebroll.se*

Accepted Aug 19, 2014; Epub ahead of print Aug 19

Trichomonas vaginalis infections represent the most common curable non-viral sexually transmitted infection (STI) worldwide. In 2008, 276 million incident cases of *T. vaginalis* infections were estimated by the WHO among adults (36–45 years of age) globally (1). Trichomoniasis may cause vulvar irritation with purulent or frothy white-to-yellow malodorous discharge, dysuria, pelvic pain and itching in women, and urethral discharge, dysuria and testicular pain in men. The infection may be asymptomatic in 50% of infected women and 70–80% of infected men (2–4). *T. vaginalis* infections have been associated with pelvic inflammatory disease, adverse outcomes of pregnancy (low birth weight and premature birth) and increased risk of HIV transmission and acquisition (2–6).

For diagnosis of trichomoniasis, microscopic examination of a wet-mount preparation of vaginal secretions is the most frequently used method internationally. If appropriately performed by an experienced microscopist, the specificity can be high; however, the sensitivity is suboptimal, i.e. in comparison with nucleic acid amplification tests (NAATs) 44–68% in women and even lower in men (2, 7–9). In-house culture or, e.g. the commercial InPouch TV culture system (BioMed Diagnostics, White City, USA), have a higher sensitivity; however, this method requires 5–7 days for completion and is rarely used in many settings (2, 7, 8). Several in-house NAATs that offer improved sensitivity for detection of *T. vaginalis* have been developed (2). Recently, the first NAAT for diagnosis of trichomoniasis was approved by the United States Food and Drug Administration (FDA), i.e. the APTIMA *T. vaginalis* assay (Hologic, San Diego, USA). This NAAT has superior sensitivity compared with traditional diagnostic methods (2, 8–11) and the clinical sensitivity and specificity have been stated to be >95% and 98%, respectively (12). Using this NAAT, studies from the USA have shown prevalences of *T. vaginalis* in STI populations of 10–12% and in the general population of 3% (6, 10–14). In Sweden, mainly wet-mount microscopy solely is used for detection of *T. vaginalis* and the prevalence of trichomoniasis has never been evaluated with a highly sensitive and specific NAAT.

The aim of this study was to investigate the prevalence of *T. vaginalis* infections among patients attending an STI clinic in Sweden using the APTIMA *T. vaginalis* assay.

MATERIALS AND METHODS

All consecutive patients ($n = 1{,}121$) attending the STI clinic at the Örebro University Hospital, Örebro, Sweden from May 2012 to January 2013 were enrolled in the study after giving their written consent. The patients attended the STI clinic due to complaints indicating an STI, sexual contact tracing, or being concerned about infection having had unprotected sex. Specimens were collected from all patients in the APTIMA sampling medium (Hologic) and were subsequently tested with the APTIMA *T. vaginalis* assay (Hologic) on the PANTHER platform (Hologic), in accordance with the instructions from the manufacturer. All women also underwent gynaecological examination, when vaginal specimens were collected for wet-mount microscopy. The study protocol was approved by the ethics committee of Uppsala University, Sweden (Dnr 2012/249).

RESULTS

During the study period, urine specimens from 501 males and 460 females, and vaginal swabs from additional 160 females were collected. The mean age of the females and males was 28 years (median age 26 years; range 15–62 years) and 32 years (median age 30 years; range 18–77 years), respectively. The age distribution of the patients is shown in Fig. 1.

Only one specimen positive in the APTIMA *T. vaginalis* assay was identified, and the prevalence of *T. vaginalis* infection was, accordingly, 0.09% (0.16% among the females and 0% among the males) in this young STI population in Sweden. The positive patient was a 38-year-old Swedish Caucasian female with

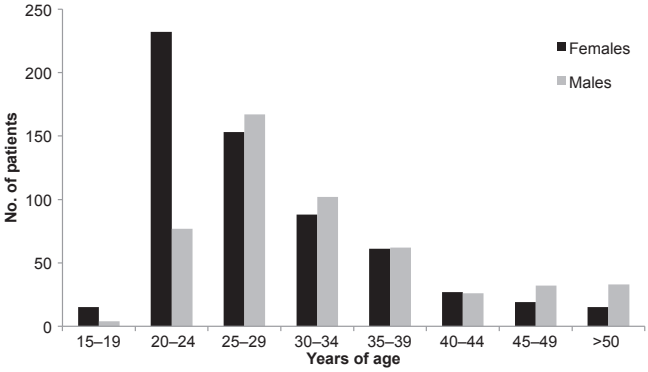

Fig. 1. Age distribution of females and males attending a Swedish sexually transmitted infections (STI) clinic and tested for *Trichomonas vaginalis* in the present study.

 doi: 10.2340/00015555-1946
 ISSN 0001-5555

only 2 sexual contacts in the previous 6 months (both in Sweden). She had symptomatic trichomoniasis and was also positive in the wet-mount microscopy. No additional positive female was found by wet-mount microscopy. For comparison, the prevalence of bacterial vaginosis and *Chlamydia trachomatis* infection of the investigated females was 10% and 6.6%, respectively.

DISCUSSION

The present study is the first assessment of the prevalence of *T. vaginalis* infection in the patients attending a regional STI clinic in Sweden using a highly sensitive and specific NAAT, i.e. the FDA-approved APTIMA *T. vaginalis* assay (Hologic; 2, 5, 8–11). Although *T. vaginalis* infections are common in many settings internationally (1, 2, 6, 10–14), they appear to be rare among young patients attending an STI clinic in Sweden. *T. vaginalis* infections have previously been highly associated with higher age of females (peaking at between 40 and 50 years of age) as well as with ethnicity, i.e. black race (2, 6, 10–14). In particular, this difference in age distribution is relevant to informing STI control programmes and appropriate targeting of screening efforts. In the present study, only 9% of the females were more than 40 years of age and ethnicity was not adequately recorded. Notably, the only *T. vaginalis* positive specimen in the present study was from one of the few slightly older females (38 years of age). Thus, the limitations of this study were the low number of women $\geq$40 years and the lack of appropriate recording of ethnicity. Additional studies are crucial to address those issues and provide evidence-based data regarding the prevalence of *T. vaginalis* infections in the population of Sweden as well as in many other countries.

ACKNOWLEDGEMENTS

The study was supported by grants from the Örebro County Council Research Committee and the Foundation for Medical Research at Örebro University Hospital, Sweden. APTIMA *T. vaginalis* tests were provided by Hologic, San Diego, CA, USA.

The authors declare no conflicts of interest.

REFERENCES

1. World Health Organization. Global incidence and prevalence of selected curable sexually transmitted infections – 2008. Geneva: World Health Organization; 2012. [accessed: May 5, 2014] Available from: http://www.who.int/reproductivehealth/publications/rtis/2008_STI_estimates.pdf.
2. Adu-Sarkodie Y, Unemo M, Van Der Pol B. Trichomoniasis. In: Laboratory diagnosis of sexually transmitted infections, including human immunodeficiency virus. Geneva: World Health Organization (WHO), 2013.
3. Seña AC, Miller WC, Hobbs MM, Schwebke JR, Leone PA, Swygard H, et al. Trichomonas vaginalis infection in male sexual partners: implications for diagnosis, treatment, and prevention. Clin Infect Dis 2007; 44: 13–22.
4. Piperaki ET, Theodora M, Mendris M, Barbitsa L, Pitiriga V, Antsaklis A, et al. Prevalence of Trichomonas vaginalis infection in women attending a major gynaecological hospital in Greece: a cross-sectional study. J Clin Pathol 2010; 63: 249–253.
5. Schwebke JR, Hobbs MM, Taylor SN, Sena AC, Catania MG, Weinbaum BS, et al. Molecular testing for Trichomonas vaginalis in women: results from a prospective U.S. clinical trial. J Clin Microbiol 2011; 49: 4106–4111.
6. Sena AC, Bachmann LH, Hobbs MM. Persistent and recurrent Trichomonas vaginalis infections: epidemiology, treatment and management considerations. Expert Rev Anti Infect Ther 2014; 12: 673–685.
7. Patil MJ, Nagamoti JM, Metgud SC. Diagnosis of Trichomonas vaginalis from vaginal specimens by wet mount microscopy, In Pouch TV Culture System, and PCR. J Glob Infect Dis 2012; 4: 22–25.
8. Nye MB, Schwebke JR, Body BA. Comparison of APTIMA Trichomonas vaginalis transcription-mediated amplification to wet mount microscopy, culture, and polymerase chain reaction for diagnosis of trichomoniasis in men and women. Am J Obstet Gynecol 2009; 200: 188.e1–7.
9. Huppert JS, Mortensen JE, Reed JL, Kahn JA, Rich KD, Miller WC, et al. Rapid antigen testing compares favorably with transcription-mediated amplification assay for the detection of Trichomonas vaginalis in young women. Clin Infect Dis 2007; 45: 194–198.
10. Gaydos CA, Barnes MR, Quinn N, Jett-Goheen M, Hsieh YH. Trichomonas vaginalis infection in men who submit self-collected penile swabs after internet recruitment. Sex Transm Infect 2013; 89: 504–508.
11. Gaydos CA, Hsieh YH, Barnes M, Quinn N, Agreda P, Jett-Goheen M, et al. Trichomonas vaginalis infection in women who submit self-obtained vaginal samples after internet recruitment. Sex Transm Dis 2011; 38: 828–832.
12. Chapin K, Andrea S. APTIMA® Trichomonas vaginalis, a transcription-mediated amplification assay for detection of Trichomonas vaginalis in urogenital specimens. Expert Rev Mol Diagn 2011; 11: 679–688.
13. Ginocchio CC, Chapin K, Smith JS, Aslanzadeh J, Snook J, Hill CS, Gaydos CA. Prevalence of Trichomonas vaginalis and coinfection with Chlamydia trachomatis and Neisseria gonorrhoeae in the United States as determined by the Aptima Trichomonas vaginalis nucleic acid amplification assay. J Clin Microbiol 2012; 50: 2601–2608.
14. Schwebke JR, Hobbs MM, Taylor SN, Sena AC, Catania MG, Weinbaum BS, et al. Molecular testing for Trichomonas vaginalis in women: results from a prospective U.S. clinical trial. J Clin Microbiol 2011; 49: 4106–4111.