







Trichomoniasis among men presenting to a sexual health clinic in Melbourne, Australia

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ABSTRACT

Background. This study aimed to examine the positivity of urethral *Trichomonas vaginalis* in men attending an urban sexual health clinic in Melbourne, Australia. **Methods.** We conducted a retrospective analysis of men who were tested for *T. vaginalis* using nucleic acid amplification test at the Melbourne Sexual Health Centre between August 2018 and May 2021, and calculated the positivity. **Results.** Of the 893 men who were tested for *T. vaginalis*, 12 (1.3%; 95% CI 0.7–2.3) tested positive for *T. vaginalis*. The positivity of *T. vaginalis* among men who reported sexual contact with a female partner with *T. vaginalis* was significantly higher than men who were not contacts (18.6% [8/43] vs 0.5% [4/850], $P < 0.001$). **Conclusions.** The positivity of *T. vaginalis* was low at our clinic. The high positivity among contacts highlights the importance of partner notification, testing and management.

Keywords: epidemiology, males, partner notification, prevalence, screening, sexual contacts, sexually transmitted infections, sexually transmitted diseases, testing, *Trichomonas vaginalis*, trichomoniasis.

Introduction

Trichomoniasis is caused by the protozoan *Trichomonas vaginalis* (TV) and is one of the most common sexually transmitted infections (STI) globally, although the prevalence can vary with geographical location and age.^{1,2} The positivity of TV in women in Australia ranges from 0.4% to 4.8% in urban sexual health clinics,^{3–6} and up to 25% in rural Indigenous communities.⁷ Trichomoniasis is not a laboratory notifiable condition in Australia, except in Northern Territory and thus, there are limited surveillance data on trichomoniasis in Australia. The prevalence of trichomoniasis in men is estimated to be much lower, possibly due to the shorter duration of trichomoniasis in men.⁸ However, very few studies have investigated trichomoniasis in men. This study aimed to examine the positivity of trichomoniasis in men attending an urban Australian sexual health clinic to provide more up-to-date data on the epidemiology and positivity of trichomoniasis in men in urban Australia.

Materials and methods

This was a retrospective analysis of routinely collected clinical data at the Melbourne Sexual Health Centre (MSHC) between 2 August 2018 and 31 May 2021. MSHC is a public HIV/STI clinic located in the city of Melbourne, Australia. Clients are invited to complete a questionnaire via computer-assisted self-interview (CASI) if they are new to MSHC or have not completed one in the past 3 months. This questionnaire collected demographic characteristics and sexual practices for routine clinical care and management.

In this study, we included cis-gender men aged 18 years and older who were tested for TV between 2 August 2018 and 31 May 2021. Men were generally only tested for TV if they had

symptomatic urethritis and tested negative for other STIs such as chlamydia, gonorrhoea and *Mycoplasma genitalium* at a previous appointment, or if they reported sexual contact with a partner with trichomoniasis (hereafter 'TV contacts'), as per the Australian STI Guidelines.⁹ Selective testing was also performed based on an individual's risk profile. First pass urine samples or urethral swabs were collected from men for urethral trichomoniasis testing. All specimens were tested by nucleic acid amplification test (NAAT) using the Aptima Combo-2 (AC2) assay (Hologic Gen-Probe Panther system; Hologic, San Diego, CA, USA). Men who were TV contacts received presumptive treatment on the day of testing before the microbiological results were available, as per the Australian STI Guidelines.⁹ In Australia, the first-line treatment for trichomoniasis is a single dose of 2 g oral metronidazole or tinidazole.⁹

We divided the number of men who tested positive for TV by the total number of men who tested for TV to calculate the test positivity of TV. The 95% confidence intervals (CI) were calculated using the binomial exact method. Fisher's exact test was used to compare the positivity between men who were TV contacts and men who were not contacts of trichomoniasis (i.e. hereafter 'non-contacts'). All analyses were conducted in Stata (ver. 14.2; College Station, TX, USA).

Ethics approval was granted by Alfred Hospital Ethics Committee, Melbourne, Australia (341/21). Patient consent was not required for publication.

Results

There were 893 men tested for TV between August 2018 and May 2021 who were included in this study. The median age was 31 years (interquartile range 26–39 years). Of these men, 43 (4.8%) were TV contacts, 386 (43.2%) had a clinical diagnosis of non-gonococcal urethritis on the day of attendance (i.e. individuals who had urethral symptoms but were tested negative for *Neisseria gonorrhoeae*), and 466 (52.2%) were considered to be at high risk for TV (i.e. men requiring a sex worker certificate, and men experiencing ongoing symptoms after treatment of another STI). There were 12 (1.3%) men who identified as Aboriginal or

Torres Strait Islander. Of the 893 men who were tested for TV, 12 (1.3%; 95% CI: 0.7–2.3) tested positive for TV by NAAT. The test positivity of TV among TV contacts (8/43; 18.6%; 95% CI: 8.4–33.4) was significantly higher than non-contacts (4/850; 0.5%; 95% CI: 0.1–1.2) ($P < 0.001$) (Table 1). All 43 TV contacts reported sexual contact with a female with TV.

A small proportion of men (67/893; 7.5%) reported having sex with both men and women in the past 12 months, no men reported having sex with men only, and none tested positive for TV.

All 12 men who tested positive for TV were men who have sex with women only, and four presented with symptoms. Of men who tested positive for TV, none had concurrent STIs (i.e. gonorrhoea, chlamydia and syphilis). There were eight TV contacts, and they were all asymptomatic upon presentation. Of the four symptomatic men, three men had urethral discharge with the duration of symptoms ranging from 2 weeks to 3 months. One man with urethral discharge also had mild erythema of the meatus. One man reported scrotal discomfort only.

Discussion

The present study shows that the positivity of TV among men attending an urban sexual health clinic in Melbourne who were selectively tested for TV was low (1%). One-fifth of men who were TV contacts tested positive. Given only 1% of our sample were positive and men were tested because they were considered to be at higher risk of TV, it is likely that the true prevalence of infection among men in Melbourne is very low.

There have been very few studies estimating the positivity of TV in men in urban Australian cities. Bygott and Robson tested samples that sent to a pathology service in south-east Queensland, and they found that the positivity was 0.7% in 7242 men.¹⁰ However, the samples in Bygott and Robson's study were provided by several clinics, and the reason for testing was not available.¹⁰ A Dutch STI clinic in Amsterdam also reported a low positivity of TV in men (0.5%) in 2004, and the positivity of TV in heterosexual

Table 1. Test positivity of *Trichomonas vaginalis* in men by testing reasons.

Testing reasons	Total (N)	Number of positive (n)	Positivity, % (95% CI)
TV contacts	43	8	18.6% (8.4–33.4%)
Non-contacts of TV	850	4	0.5% (0.1–1.2%)
Non-gonococcal urethritis	386	1	0.3% (0.0–1.4%)
High risk	466	3	0.6% (0.1–1.9%)

Note: TV contacts were defined as men reporting sexual contact with a partner with trichomoniasis. Non-contacts of TV were defined as men who were not contacts of trichomoniasis. High risk men included men requiring a sex worker certificate, and men experiencing ongoing symptoms after treatment of another sexually transmitted infections.

TV, *Trichomonas vaginalis*; CI, confidence intervals.

men (6/526; 1.1%) was similar to our study.¹¹ A 2018 US study analysed samples collected from STI clinics in Alabama reported a positivity of 6.1% by NAAT in 12 604 men.¹² The higher positivity could be due to the large proportion of samples (72.6%) collected from African American men, who are at a higher risk of TV.¹³ The positivity of TV was 6.7% in Indigenous men living in remote Australian communities.¹⁴ This confirms previous findings that trichomoniasis disproportionately affects disadvantaged populations in high income countries. These populations may have limited access to sexual health services; and therefore, interventions such as targeted outreach programs, online STI test request, online pathology request forms in these communities may increase access to testing and treatment.^{15,16}

The positivity among TV contacts was substantially higher than non-contacts. A US prospective study reported that the positivity of TV among male partners of women with trichomoniasis presenting to STI clinics was 72%.¹⁷ The higher positivity in the US study was presumably because the women of all male contacts were confirmed with laboratory results but the male contacts in our study were self-reported. This highlights the importance of partner notification. An online partner notification service named 'Let Them Know' was introduced in 2008 in Australia.¹⁸ Individuals who are diagnosed with an STI can contact their partners anonymously via text message or email. The number of text messages sent for TV has increased from 173 in 2011 to 629 in 2019 (a 264% increase) and 64% of the individuals with TV expressed they would like to use this online service to let their partner know.¹⁹

Historically, wet mount microscopy was used for TV diagnosis and this method is still widely used in many resource-limited settings.²⁰ Wet mount microscopy has a high specificity, but it has a poor sensitivity of 23–60% when compared with NAAT.^{10,20–22} Although NAAT is a highly sensitive diagnostic method for TV, the equipment is expensive, and it may only be limited to high-resource settings.

This study has several limitations. First, this study was conducted at an urban sexual health clinic. It is possible that individuals with symptoms and reporting sexual contact with partners with an STI are more likely to attend a sexual health service; thus, our findings may not be generalisable to the wider Australian population, particularly in locations with a higher prevalence of trichomoniasis. Second, we were unable to examine the risk factors associated with trichomoniasis in men due to the small number of cases ($n = 12$).

To conclude, the positivity of TV in men attending a sexual health clinic in Australia was low. However, one fifth of men who were TV contacts tested positive. The high positivity among male TV contacts highlights the importance of partner notification, testing and management.

References

- Kissinger P. *Trichomonas vaginalis*: a review of epidemiologic, clinical and treatment issues. *BMC Infect Dis* 2015; 15: 307. doi:10.1186/s12879-015-1055-0
- Rowley J, Vander Hoorn S, Korenromp E, Low N, Unemo M, Abu-Raddad LJ, et al. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. *Bull World Health Organ* 2019; 97(8): 548–62p. doi:10.2471/BLT.18.228486
- Uddin RNN, Ryder N, McNulty AM, Wray L, Donovan B. *Trichomonas vaginalis* infection among women in a low prevalence setting. *Sex Health* 2011; 8(1): 65–8. doi:10.1071/SH09147
- Lusk MJ, Naing Z, Rayner B, Rismanto N, McIver CJ, Cumming RG, et al. *Trichomonas vaginalis*: underdiagnosis in urban Australia could facilitate re-emergence. *Sex Transm Infect* 2010; 86(3): 227–30. doi:10.1136/sti.2009.039362
- Tilley DM, Dubedat SM, Lowe P, Templeton DJ. Genital *Trichomonas vaginalis* is rare among female attendees at a Sydney metropolitan sexual health clinic. *Aust N Z J Public Health* 2016; 40(1): 95–6. doi:10.1111/1753-6405.12475
- Marrone J, Fairley CK, Saville M, Bradshaw C, Bowden FJ, Horvath LB, et al. Temporal associations with declining *Trichomonas vaginalis* diagnosis rates among women in the state of Victoria, Australia, 1947 to 2005. *Sex Transm Dis* 2008; 35(6): 572–6. doi:10.1097/OLQ.0b013e3181666aa3
- Bowden FJ, Paterson BA, Mein J, Savage J, Fairley CK, Garland SM, et al. Estimating the prevalence of *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and human papillomavirus infection in indigenous women in northern Australia. *Sex Trans Inf* 1999; 75(6): 431–34. doi:10.1136/sti.75.6.431
- Petrin D, Delgaty K, Bhatt R, Garber G. Clinical and microbiological aspects of *Trichomonas vaginalis*. *Clin Microbiol Rev* 1998; 11(2): 300–17. doi:10.1128/CMR.11.2.300
- Australian Sexual Health Alliance. Trichomoniasis. Australian Sexual Health Alliance; 2018. Available at <http://www.sti.guidelines.org.au/sexually-transmissible-infections/trichomoniasis>
- Bygott JM, Robson JM. The rarity of *Trichomonas vaginalis* in urban Australia. *Sex Transm Inf* 2013; 89(6): 509–13. doi:10.1136/sextrans-2012-050826
- van der Veer C, van Rooijen MS, Himschoot M, de Vries HJC, Bruisten SM. *Trichomonas vaginalis* and *Mycoplasma genitalium*: age-specific prevalence and disease burden in men attending a sexually transmitted infections clinic in Amsterdam, the Netherlands. *Sexually Transmitted Infections* 2016; 92(1): 83–5. doi:10.1136/sextrans-2015-052118
- Schwebke J, Merriweather A, Massingale S, Scisney M, Hill C, Getman D. Screening for *Trichomonas vaginalis* in a large high-risk population: prevalence among men and women determined by nucleic acid amplification testing. *Sex Transm Dis* 2018; 45(5): e23–4. doi:10.1097/OLQ.0000000000000757
- Patel EU, Gaydos CA, Packman ZR, Quinn TC, Tobian AAR. Prevalence and correlates of *Trichomonas vaginalis* infection among men and women in the United States. *Clin Infect Dis* 2018; 67(2): 211–7. doi:10.1093/cid/ciy079
- Guy R, Ward J, Wand H, Rumbold A, Garton L, Hengel B, et al. Coinfection with *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Trichomonas vaginalis*: a cross-sectional analysis of positivity and risk factors in remote Australian Aboriginal communities. *Sex Transm Infect* 2015; 91(3): 201–6. doi:10.1136/sextrans-2014-051535
- Causier LM, Guy RJ, Tabrizi SN, Whitley DM, Speers DJ, Ward J, et al. Molecular test for chlamydia and gonorrhoea used at point of care in remote primary healthcare settings: a diagnostic test evaluation. *Sex Transm Inf* 2018; 94(5): 340–5. doi:10.1136/sextrans-2017-053443
- Groos A, Peardon-Freeman S, McFarlane K, Braithwaite S, Gajjar D, Murch P, et al. Free online chlamydia and gonorrhoea urine test request in Queensland, Australia: convenience of home sample collection versus pathology collection centre attendance for faster results. *Sexual Health* 2021; 18(3): 254–9. doi:10.1071/SH21029

- 17 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(1): 13–22. doi:10.1086/511144
- 18 Bilardi JE, Fairley CK, Hopkins CA, Hocking JS, Sze JK, Chen MY. Let Them Know: evaluation of an online partner notification service for chlamydia that offers e-mail and SMS messaging. *Sex Transm Dis* 2010; 37(9): 563–5. doi:10.1097/OLQ.0b013e3181d707f1
- 19 Htaik K, Fairley CK, Bilardi JE, Chow EPF, Ong JJ, Chen MY. Evaluation of the online partner messaging service for sexually transmitted infections let them know. *Sex Transm Dis* 2022; 49(1): 12–4. doi:10.1097/OLQ.0000000000001505
- 20 Van Der Pol B, Kraft CS. Clinical and Laboratory Testing for *Trichomonas vaginalis* infection. *J Clin Microbiol* 2016; 54(1): 7–12. doi:10.1128/JCM.02025-15
- 21 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(2): 188.e1–7. doi:10.1016/j.ajog.2008.10.005
- 22 Wiese W, Patel SR, Patel SC, Ohl CA, Estrada CA. A meta-analysis of the Papanicolaou smear and wet mount for the diagnosis of vaginal trichomoniasis. *Am J Med* 2000; 108(4): 301–8. doi:10.1016/S0002-9343(99)00466-0

Data availability. All data relevant to the study are included in the article.

Conflicts of interest. CKF is the Editor-in-Chief of Sexual Health and EPFC is a Joint Editor of Sexual Health, but they were blinded from the peer review process for this paper. All other authors declared no conflicts of interest.

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