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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи.** Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html. В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректуре авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საყურადღებო!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე, დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემავსებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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FIRST-VOID URINE VERSUS URETHRAL SWAB FOR MOLECULAR DETECTION OF SEXUALLY TRANSMITTED INFECTIONS IN MEN WITH MULTIPLE SEXUAL PARTNERS

Shishniashvili D.S.^{1,2}, Bedinashvili Z.J.^{1,3}, Tsomaia K.B.^{1,3}, Svanadze L.M.^{1,3}, Chkhikvishvili N.M.², Durglishvili G.A.^{1,2}

¹Faculty of Medicine, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia.

²National Center of Dermatology and Venereology, Tbilisi, Georgia.

³Aleksandre Natishvili Institute of Morphology, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia.

Abstract.

Background: Sexually transmitted infections remain a major clinical and global public health burden. Nucleic acid amplification tests are recommended for the molecular detection of urogenital sexually transmitted infections. Although physician-collected urethral swabs have traditionally been used for STI testing in men, swab collection is invasive and may cause substantial discomfort. First-void urine is a promising non-invasive alternative that can support molecular STI testing and screening in men.

Aim of study: To compare first-void urine with physician-collected urethral swab specimens for PCR-based detection of sexually transmitted infections in men with multiple sexual partners.

Material and methods: A prospective paired specimen-comparison study included 148 men aged 22-49 years. Urethral swabs were collected first by a physician, followed by the collection of the initial 20-30 mL of first-void urine. PCR testing targeted *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, and *Trichomonas vaginalis*. Paired results were analyzed using exact McNemar tests and Cohen's kappa.

Results: At least one STI pathogen was detected in 128 of 148 men (86.5%). First-void urine detected at least one pathogen in 128 participants, whereas the urethral swab detected at least one pathogen in 100 participants. All 28 participant-level discordant results were first-void urine-positive/urethral swab-negative ($p < 0.001$). First-void urine yielded higher detection for *C. trachomatis* (43 vs 38; $p = 0.063$), *N. gonorrhoeae* (55 vs 45; $p = 0.002$), and *M. genitalium* (75 vs 62; $p = 0.0002$). *T. vaginalis* detection was identical in both specimens (27 vs 27).

Conclusions: First-void urine demonstrated equal or higher molecular detection yield than urethral swab for all four STI pathogens studied, supporting its use as a practical specimen for molecular STI testing in men with multiple sexual partners.

Key words. First-void urine, urethral swab, sexually transmitted infections, PCR, multiple sexual partners.

Introduction.

Sexually transmitted infections (STIs) remain a serious and complex clinical problem, as well as a global public health concern. According to the World Health Organization (WHO), more than 374 million new curable cases of STIs are reported annually worldwide, primarily caused by *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis* [1].

Despite the high global prevalence of STIs and their associated

complications, including infertility, ectopic pregnancy, preterm delivery, fetal and neonatal mortality, endometritis, pelvic inflammatory disease, and cervical neoplasia [2,3], which constitute a significant public health burden, STIs are still underrepresented in scientific research. The lack of research significantly hinders efforts to minimize and eliminate the harm caused by these problems [4].

From a clinical perspective, dermatovenereologists frequently encounter male patients suffering from urethritis [5,6]. It is worth noting that clinical diagnosis of the etiology of STIs is unreliable due to the nonspecificity of symptoms [7-9]. However, a significant portion of infections are asymptomatic, which facilitates undetected transmission and increases the risk of long-term complications in sexual partners [4,10-13].

Therefore, etiological diagnosis based on laboratory testing is essential, as early detection allows appropriate patient management and helps limit transmission and prevent complications [14,15]. However, traditional diagnostic methods have limited sensitivity, and their accuracy depends strongly on sampling technique and pathogen load, increasing the risk of false-negative results [16,17].

Nucleic acid amplification tests (NAATs), particularly polymerase chain reaction (PCR), are recommended laboratory methods for detection of urogenital infections due to their superior sensitivity and specificity compared to culture, microscopy, or antigen detection methods [18].

Traditionally, urethral swab sampling has been regarded as the standard specimen for the detection of urethral pathogens. However, urethral swabbing is an invasive procedure and, depending on the technique used, it can cause discomfort or fear in patients. These factors may negatively impact patient compliance and limit participation in screening.

First-void urine (FVU) represents a non-invasive alternative that captures exfoliated epithelial cells and pathogens shed into the distal urethra. Several studies have reported comparable performance between FVU and urethral swabs; moreover, in men, FVU is recognized by guidelines as the optimal specimen for the diagnosis of urogenital chlamydia and gonorrhea [18].

However, the question remains whether urine-based PCR can be considered consistently superior to urethral swab-based testing across different pathogens, clinical presentations, preanalytical conditions, and test systems. This uncertainty provides the rationale for the present study. To our knowledge, this is the first prospective paired comparison of FVU and urethral swab specimens for PCR-based STI detection conducted in Georgia.

Optimizing specimen selection has implications beyond analytical sensitivity. It may influence patient-centered care,

screening uptake, public health control, and early detection of asymptomatic infections.

This prospective paired specimen-comparison study aimed to compare FVU and urethral swab specimens for PCR-based detection of four common STI pathogens in men attending a dermatovenereology center.

Materials and Methods.

Study design and setting:

A prospective paired specimen-comparison study was conducted among men attending a dermatovenereology service in Georgia. Participants were recruited from patients presenting for STI-related consultation, screening, or evaluation of genitourinary symptoms at the Georgian National Center of Dermatology and Venereology. Each participant provided both a urethral swab and an FVU specimen during the same clinical visit. Molecular testing was performed under identical laboratory conditions for both specimen types.

The study was conducted from February 2025 through February 2026 at the National Center of Dermatology and Venereology in Tbilisi, Georgia, with molecular testing performed at the affiliated laboratory of the Aleksandre Natishvili Institute of Morphology, Ivane Javakhishvili Tbilisi State University. Reporting was prepared with reference to STARD recommendations for paired diagnostic studies [19,20].

Ethical statement:

The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the institutional ethics committee (approval No. 11_09/2024). Written informed consent was obtained from all participants before enrollment. Clinical and laboratory data were processed in anonymized form.

Given the sensitive nature of STI-related clinical information, all data on sexual behavior, symptoms, and laboratory results were recorded in anonymized form and analyzed without personal identifiers.

Participants:

The study included 148 men aged 22-49 years who reported multiple sexual partners, defined for this study as two or more sexual partners within the preceding 3 months. Both symptomatic and asymptomatic men were eligible. Participants were excluded if they had received relevant antimicrobial therapy within 4 weeks before sampling, had undergone STI treatment within the preceding 30 days, or had incomplete paired specimen data. Participants were consecutively recruited during routine clinical visits.

Participants were classified as symptomatic if they reported urethral discharge, dysuria, urethral burning, genital discomfort, or other genitourinary symptoms. Sexual behavior and symptom status were based on participant self-report during clinical evaluation. Participants without these features were classified as asymptomatic (Table 1).

Specimen collection:

Participants were instructed not to urinate for at least 2 hours before sampling. A physician collected the urethral swab first, followed immediately by collection of the initial 20–30 mL of

FVU in a sterile container. Both specimens were transported to the laboratory within 2 hours at room temperature and processed according to the manufacturers' protocols.

DNA extraction and PCR testing:

DNA was extracted using the GeneJET Viral DNA/RNA Purification Kit (Thermo Fisher Scientific, USA). PCR testing was performed on paired FVU and urethral swab specimens. The STI-focused analysis included four pathogens: *C. trachomatis*, *N. gonorrhoeae*, *M. genitalium*, and *T. vaginalis*.

The Alpha IVD STI Real-Time PCR Kit-1 was used for detection of *N. gonorrhoeae*, *M. genitalium*, and *T. vaginalis*, and the TaqPath Menu | GeneProof Chlamydia trachomatis PCR Kit was used for the detection of *C. trachomatis*. All assays were performed and interpreted according to the manufacturers' validated protocols and quality-control recommendations. Each pathogen in each specimen was classified as detected or not detected.

Outcomes and statistical analysis:

The primary outcome was the paired detection yield of FVU compared with the urethral swab for each STI pathogen. Detection yield was defined as the number and percentage of participants with a positive PCR result for each pathogen in each specimen type.

Secondary outcomes included paired agreement, discordance direction, and overall detection of at least one STI pathogen. Co-detection was defined as the detection of two or more of the four STI pathogens in the same participant. For participant-level co-detection analysis, a pathogen was considered detected if it was positive in either paired specimen type.

Categorical variables were summarized as counts and percentages. Age was summarized as the mean and range. Detection rates were calculated using the total number of participants as the denominator. Absolute detection differences were calculated as the FVU detection percentage minus the urethral swab detection percentage.

Because FVU and urethral swab specimens were obtained from the same participants, paired binary results were compared using two-sided exact McNemar tests. Cohen's kappa was used to describe agreement beyond chance. A p -value <0.05 was considered statistically significant. Because no independent reference standard was available, analyses focused on paired positivity, agreement, and discordant results between FVU and urethral swab specimens.

Results.

Participant characteristics:

A total of 148 men were included. The age range was 22-49 years, and the mean age was 31.5 years. 126 participants were symptomatic, and 22 were asymptomatic. 20 participants out of 148 had no STI pathogen detected by the four-pathogen PCR panel. Of these 20 STI-negative participants, 18 were symptomatic, and 2 were asymptomatic. Among asymptomatic participants, 20 of 22 had at least one STI pathogen detected.

Overall STI detection:

At least one of the four STI pathogens was detected in 128 of 148 participants (86.5%) by FVU compared with 100 of 148

participants (67.6%) by urethral swab. At the participant level, 100 men were positive in both specimen types, 28 were FVU-positive/urethral swab-negative, none were FVU-negative/urethral swab-positive, and 20 were negative in both specimen types. The paired difference was statistically significant (exact McNemar $p < 0.001$). Cohen's kappa for the aggregated "any STI pathogen" endpoint was 0.491.

Organism-specific detection yield:

FVU yielded equal or higher detection counts than urethral swab for all four pathogens. *C. trachomatis* was detected in 43 FVU specimens and 38 urethral swab specimens, corresponding to detection rates of 29.1% and 25.7%, respectively. *N. gonorrhoeae* was detected in 55 FVU specimens and 45 urethral swab specimens, corresponding to detection rates of 37.2% and 30.4%. *M. genitalium* was detected in 75 FVU specimens and 62 urethral swab specimens, corresponding to detection rates of 50.7% and 41.9%. *T. vaginalis* was detected in 27 specimens of each type, with identical detection rates of 18.2% (Table 2).

Paired agreement and discordance:

All organism-specific discordant results favored FVU. For *C. trachomatis*, 38 pairs were positive in both specimens, 5 were FVU-positive/urethral swab-negative, none were FVU-

-negative/urethral swab-positive, and 105 were negative in both specimens. The paired difference did not reach statistical significance (exact McNemar $p = 0.063$), and agreement was almost perfect (kappa=0.915).

For *N. gonorrhoeae*, 45 pairs were positive in both specimens, 10 were FVU-positive/urethral swab-negative, none were FVU-negative/urethral swab-positive, and 93 were negative in both specimens. The paired difference was statistically significant ($p = 0.002$), with high agreement (kappa=0.850).

For *M. genitalium*, 62 pairs were positive in both specimens, 13 were FVU-positive/urethral swab-negative, none were FVU-negative/urethral swab-positive, and 73 were negative in both specimens. The paired difference was statistically significant ($p = 0.0002$), with high agreement (kappa=0.825).

For *T. vaginalis*, complete concordance was observed: 27 pairs were positive in both specimens, and 121 were negative in both specimens (Table 3).

Co-detection of multiple STI pathogens:

Among the 128 STI-positive participants, 78 had one STI pathogen detected, 32 had two pathogens, 14 had three pathogens, and 4 had all four pathogens detected. Thus, 50 of 128 STI-positive men (39.1%) had two or more STI pathogens detected (Table 4).

Table 1. Participant characteristics.

Characteristic	Value
Participants, n	148
Age, mean, years	31.5
Age range, years	22-49
Symptomatic participants	126/148 (85.1%)
Asymptomatic participants	22/148 (14.9%)
At least one STI pathogen detected	128/148 (86.5%)
No STI pathogen detected	20/148 (13.5%)
STI-positive among symptomatic participants	108/126 (85.7%)
STI-positive among asymptomatic participants	20/22 (90.9%)

Table 2. Detection yield by specimen type.

Pathogen	FVU positive, n (%)	US positive, n (%)	Absolute difference, percentage points
Any STI pathogen	128/148 (86.5%)	100/148 (67.6%)	+18.9
<i>Chlamydia trachomatis</i>	43/148 (29.1%)	38/148 (25.7%)	+3.4
<i>Neisseria gonorrhoeae</i>	55/148 (37.2%)	45/148 (30.4%)	+6.8
<i>Mycoplasma genitalium</i>	75/148 (50.7%)	62/148 (41.9%)	+8.8
<i>Trichomonas vaginalis</i>	27/148 (18.2%)	27/148 (18.2%)	0.0

FVU, first-void urine; US, urethral swab.

Table 3. Paired agreement between FVU and Urethral Swab PCR results.

Endpoint / Pathogen	Concordant positive	Discordant (FVU+/US-)	Discordant (FVU-/US+)	Concordant negative	Exact McNemar p	Kappa
Any STI pathogen	100	28	0	20	<0.001	0.491
<i>Chlamydia trachomatis</i>	38	5	0	105	0.063	0.915
<i>Neisseria gonorrhoeae</i>	45	10	0	93	0.002	0.850
<i>Mycoplasma genitalium</i>	62	13	0	73	0.0002	0.825
<i>Trichomonas vaginalis</i>	27	0	0	121	Not calculated	1.000

FVU, first-void urine; US, urethral swab.

Table 4. Number of STI pathogens detected per participant based on FVU PCR results.

Number of STI pathogens detected	Participants, n (%) among STI-positive participants	Participants, n (%) among all participants
No STI pathogen	-	20/148 (13.5%)
One STI pathogen	78/128 (60.9%)	78/148 (52.7%)
Two STI pathogens	32/128 (25.0%)	32/148 (21.6%)
Three STI pathogens	14/128 (10.9%)	14/148 (9.5%)
Four STI pathogens	4/128 (3.1%)	4/148 (2.7%)

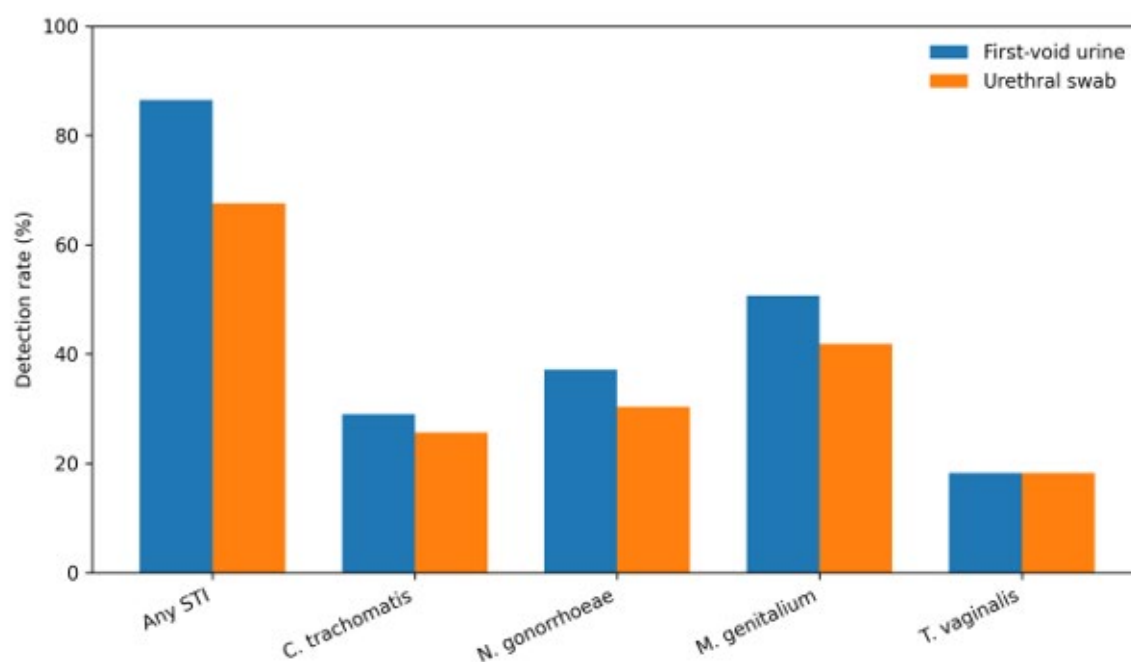


Figure 1. Detection yield of FVU and urethral swab specimens for the four STI pathogens and the aggregated “any STI pathogen” endpoint.

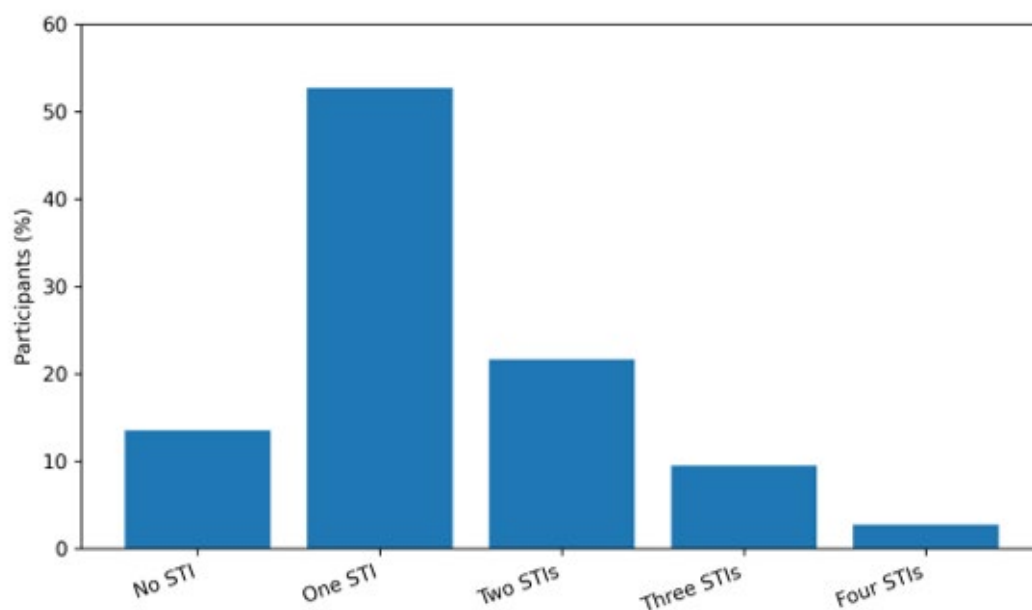


Figure 2. Distribution of the number of STI pathogens detected per participant in the overall cohort (n=148), based on FVU PCR results.
Footnote: Because no urethral-swab-only positive results were observed, participant-level combined paired PCR results were identical to FVU PCR results.

Discussion.

This prospective paired study of 148 men with multiple sexual partners found that FVU provided equal or higher PCR detection yield than a physician-collected urethral swab for all four STI pathogens analyzed. The difference was statistically significant for *N. gonorrhoeae* and *M. genitalium*, showed a non-significant trend for *C. trachomatis*, and showed complete concordance for *T. vaginalis*. Importantly, all discordant organism-specific results were FVU-positive/urethral swab-negative.

The study population consisted predominantly of sexually active men of reproductive age, which corresponds to the demographic group most strongly associated with STI transmission worldwide. Although symptomatic presentation was the most common reason for consultation, 20 of 22 asymptomatic participants (90.9%) tested positive for at least one of the studied STI pathogens, emphasizing the clinical importance of screening strategies beyond symptom-based diagnostics [10,21].

The study deliberately focused on four clinically established sexually transmitted pathogens and excluded *M. hominis*, *U. urealyticum*, and *U. parvum*. This restriction is methodologically important because detection of these organisms may represent colonization rather than active STI, particularly in asymptomatic individuals [22]. By limiting the primary analysis to *C. trachomatis*, *N. gonorrhoeae*, *M. genitalium*, and *T. vaginalis*, the study avoids inflating or distorting agreement statistics due to high-prevalence organisms of uncertain clinical significance.

The higher detection yield observed with FVU is biologically plausible. The first urine stream may collect urethral secretions, infected epithelial cells, and organisms shed from a wider distal urethral surface than a single swab can sample. Contemporary European and UK guidance recognizes FVU as an appropriate specimen for urogenital *Chlamydia trachomatis* testing in men, a preferred specimen for nucleic acid amplification testing. FVU and urethral swab specimens are both accepted for molecular detection of urethral *C. trachomatis* and *N. gonorrhoeae* infections [23,24]. In contrast, urethral swab performance may depend on operator technique, insertion depth, rotation, and the adequacy of mucosal sampling.

Taken together, these findings support FVU as a practical, non-invasive alternative specimen to physician-collected urethral swabs for routine NAAT-based detection of the studied STI pathogens in comparable dermatovenereology settings. This approach may be particularly useful for screening or evaluating men in whom urethral swab collection is poorly tolerated, difficult to implement, or may reduce willingness to undergo testing.

The organism-specific findings are clinically relevant. For *N. gonorrhoeae*, FVU detected 10 additional cases compared with the urethral swab, and the paired difference was statistically significant. For *M. genitalium*, FVU detected 13 additional cases, also with a statistically significant paired difference. These findings suggest that FVU may be useful for detecting pathogens that are unevenly distributed or present in material shed into the urethral lumen. For *C. trachomatis*, FVU detected five additional cases, but the difference was not statistically significant. For *T. vaginalis*, both specimen types produced

identical results, suggesting that either specimen type may be adequate under the conditions of this study.

At the aggregated “any STI pathogen” level, kappa was lower than organism-specific kappa values. This should not be interpreted as poor specimen performance. Rather, it reflects the fact that FVU detected 28 additional participants with at least one STI pathogen, whereas no participant was positive only by urethral swab. Therefore, overall agreement decreases mathematically because of asymmetric discordance, favoring FVU. Organism-specific kappa values remained high or perfect, ranging from 0.825 to 1.000.

A notable finding was the high STI detection rate among asymptomatic participants: 20 of 22 asymptomatic men had at least one STI pathogen detected, this further highlights the limitations of symptom-based diagnostic approaches and supports the implementation of screening programs in sexually active high-risk populations. However, this result should be interpreted within the context of the study population, which consisted of men attending a dermatovenereology service and may not represent the general male population. This finding is consistent with WHO recommendations to strengthen access to STI screening, diagnostic, and treatment services as part of the 2030 global strategy to reduce STI burden [1].

Multiple-pathogen co-detection was common. Among STI-positive participants, 39.1% had two or more STI pathogens detected. This finding highlights the value of multiplex molecular testing in high-risk populations, where a single pathogen diagnosis may not fully capture the infectious burden [22]. Nevertheless, clinical management should remain pathogen-specific and guideline-based.

From a dermatovenereology perspective, FVU provides a non-invasive sampling option that does not require urethral instrumentation. Its potential advantages for patient acceptability, self-collection, and screening uptake warrant direct evaluation in future studies. FVU may improve access to diagnostic services, particularly among asymptomatic individuals, thereby contributing to more effective STI prevention and control [1,8].

The findings additionally emphasize the importance of multiplex molecular testing and integrated clinical interpretation, particularly in the context of frequent co-detection.

Several limitations should be considered when interpreting the findings. Participant eligibility was based partly on self-reported sexual behavior, and symptom classification was also based on participant report. These data may therefore be affected by recall bias, social desirability bias, or incomplete reporting, particularly because sexual history is sensitive information. Furthermore, participants were recruited from a specialized dermatovenereology center and consisted of men with multiple sexual partners. Consequently, this selected clinical population may have a higher probability of STI detection than the general male population, and the observed detection rates should not be extrapolated directly to population prevalence. Discordant results were not resolved using an independent reference method; therefore, the findings should be interpreted as a paired comparison of molecular detection and agreement rather than as a formal assessment of diagnostic accuracy.

Finally, the findings reflect the PCR assay configuration and

laboratory workflow used in this study and require confirmation in larger multicenter studies.

Despite these limitations, the prospective paired design enabled direct within-participant comparison of FVU and urethral swab specimens under standardized laboratory conditions. By restricting the analysis to established sexually transmitted pathogens, the study provides a more clinically focused assessment of specimen agreement. The findings support FVU as a practical, non-invasive specimen for molecular testing of sexually transmitted pathogens in this selected population of men at increased sexual risk.

Conclusion.

In this prospective paired study, FVU showed high organism-specific agreement with physician-collected urethral swabs for PCR detection of *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, and *Trichomonas vaginalis*. FVU demonstrated equal or higher paired PCR positivity across the studied pathogens, with statistically significant paired differences for *N. gonorrhoeae* and *M. genitalium*. These findings support FVU as a practical, non-invasive alternative specimen for routine NAAT-based detection of established sexually transmitted pathogens in this selected clinical population, while larger multicenter studies are needed to confirm broader applicability.

Conflict of Interest.

The authors declare no conflicts of interest.

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Author Contributions.

D.S. contributed to study conception, clinical evaluation, specimen collection, data interpretation, and manuscript preparation. Z.B. contributed to laboratory procedures and data collection. K.T. contributed to study design, data interpretation, and manuscript preparation. L.S. contributed to statistical analysis and manuscript revision. G.D. contributed to study supervision and critical revision. N.C. contributed to the supervision, review, and editing of the manuscript. All authors have read and approved the final version of the manuscript.

REFERENCES

1. World Health Organization. Guidelines for the management of asymptomatic sexually transmitted infections. Geneva: World Health Organization; 2025.
2. Rogers SM, Turner CF, Hobbs M, et al. Epidemiology of undiagnosed trichomoniasis in a probability sample of urban young adults. *PLoS One*. 2014;9:e90548.
3. Herath S, Balendran T, Herath A, et al. Comparison of diagnostic methods and analysis of socio-demographic factors associated with *Trichomonas vaginalis* infection in Sri Lanka. *PLoS One*. 2021;16:e0258556.
4. Unemo M, Bradshaw CS, Hocking JS, et al. Sexually transmitted infections: challenges ahead. *Lancet Infect Dis*. 2017;17:e235-e279.
5. Cavanagh N, White J. Sexually transmitted causes of urethritis, proctitis, pharyngitis, vaginitis and cervicitis. *Medicine*. 2022;50:247-253.
6. de Souza LS, Sardinha JC, Talhari S, et al. Main etiological agents identified in 170 men with urethritis attended at the Fundação Alfredo da Matta, Manaus, Amazonas, Brazil. *An Bras Dermatol*. 2021;96:176-183.
7. World Health Organization. Guidelines for the management of symptomatic sexually transmitted infections. Geneva: World Health Organization; 2021.
8. Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *MMWR Recomm Rep*. 2021;70:1-187.
9. Taylor SN, DiCarlo RP, Martin DH. Comparison of clinical presentation of chlamydial and gonococcal urethritis. *Clin Infect Dis*. 2018;67:350-357.
10. World Health Organization. Global health sector strategy on sexually transmitted infections 2016-2021: towards ending STIs. Geneva: World Health Organization; 2016.
11. Newman L, Rowley J, Vander Hoorn S, et al. Global estimates of the prevalence and incidence of four curable sexually transmitted infections in 2012 based on systematic review and global reporting. *PLoS One*. 2015;10:e0143304.
12. Taylor-Robinson D, Jensen JS. *Mycoplasma genitalium*: from chrysalis to multicolored butterfly. *Clin Microbiol Rev*. 2011;24:498-514.
13. Lewis D, Newton DC, Guy RJ, et al. The prevalence of *Chlamydia trachomatis* infection in Australia: a systematic review and meta-analysis. *BMC Infect Dis*. 2012;12:113.
14. Tuddenham S, Hamill MM, Ghanem KG. Diagnosis and treatment of sexually transmitted infections. *JAMA*. 2022;327:161-172.
15. Caruso G, Giammanco A, Virruso R, et al. Current and future trends in the laboratory diagnosis of sexually transmitted infections. *Int J Environ Res Public Health*. 2021;18:1038.
16. Gaydos CA, Theodore M, Dalesio N, et al. Comparison of three nucleic acid amplification tests for detection of *Chlamydia trachomatis* in urine specimens. *J Clin Microbiol*. 2004;42:3041-3045.
17. Wi TE, Ndowa FJ, Ferreyra C, et al. Diagnosing sexually transmitted infections in resource-constrained settings: challenges and ways forward. *J Int AIDS Soc*. 2019;22:e25343.
18. White JA, Dukers-Muijers NHTM, Hoebe CJP, et al. 2025 European guideline on the management of *Chlamydia trachomatis* infections. *Int J STD AIDS*. 2025;36:434-449.
19. Cohen JF, Korevaar DA, Altman DG, et al. STARD 2015 guidelines for reporting diagnostic accuracy studies: explanation and elaboration. *BMJ Open*. 2016;6:e012799.
20. Bossuyt PM, Reitsma JB, Bruns DE, et al. STARD 2015: an updated list of essential items for reporting diagnostic accuracy studies. *BMJ*. 2015;351:h5527.
21. Centers for Disease Control and Prevention. Chlamydial infections. In: Sexually transmitted infections treatment guidelines, 2021 [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; 2021. <https://www.cdc.gov/std/treatment-guidelines/chlamydia.htm>.
22. European Association of Urology. EAU Guidelines on Urological Infections [Internet]. Arnheim: European Association of Urology; 2026. <https://uroweb.org/guidelines/urological-infections>.

23. British Association for Sexual Health and HIV. BASHH summary guidance on testing for sexually transmitted infections [Internet]. 2023. https://www.bashh.org/_userfiles/pages/files/resources/bashh_summary_guidance_on_stis_testing_2023.pdf.

24. Horner P, Blee K, O'Mahony C, et al. 2016 European guideline on the management of non-gonococcal urethritis. Int J STD AIDS. 2016;27:928-937.

Первая порция мочи и мазок из уретры для молекулярного выявления инфекций, передаваемых половым путем, у мужчин с множественными половыми партнерами

РЕЗЮМЕ

Актуальность: Инфекции, передаваемые половым путем, остаются важной клинической проблемой и значимым бременем для глобального общественного здравоохранения. Методы амплификации нуклеиновых кислот рекомендуются для молекулярного выявления урогенитальных инфекций, передаваемых половым путем. Хотя для тестирования ИППП у мужчин традиционно используются мазки из уретры, их получение является инвазивной процедурой и может вызывать значительный дискомфорт. Первая порция мочи представляет собой перспективный неинвазивный альтернативный материал для молекулярного тестирования ИППП у мужчин.

Цель исследования: Сравнить первую порцию мочи и мазок из уретры для ПЦР-выявления инфекций, передаваемых половым путем, у мужчин с множественными половыми партнерами.

Материал и методы: В проспективное парное сравнительное исследование были включены 148 мужчин в возрасте 22-49 лет. Сначала врач брал мазок из уретры, затем сразу собирали первые 20-30 мл мочи. ПЦР-тестирование проводили для выявления *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium* и *Trichomonas vaginalis*. Парные результаты анализировали с помощью точного теста Мак-Немара и коэффициента каппа Коэна.

Результаты: По крайней мере один возбудитель ИППП был выявлен у 128 из 148 мужчин (86,5%). В первой порции мочи хотя бы один возбудитель был выявлен у 128 пациентов, тогда как в мазке из уретры - у 100 пациентов. Все 28 дискордантных результатов на уровне пациента были положительными в моче и отрицательными в мазке ($p < 0,001$). Первая порция мочи показала более высокую выявляемость *C. trachomatis* (43 против 38; $p = 0,063$), *N. gonorrhoeae* (55 против 45; $p = 0,002$) и *M. genitalium* (75 против 62; $p = 0,0002$). Выявление *T. vaginalis* было одинаковым в обоих типах материала (27 против 27).

Заключение: Первая порция мочи продемонстрировала равную или более высокую молекулярную выявляемость по сравнению с мазком из уретры для всех четырех изученных возбудителей ИППП и может рассматриваться как практичный материал для молекулярного тестирования мужчин.

Ключевые слова: первая порция мочи, мазок из уретры, инфекции, передаваемые половым путем, ПЦР.

შარდის პირველი ულუფის და ურეთრის ნაცხის შედარება სქესობრივი გზით გადამდები ინფექციების მოლეკულური გამოვლენისთვის მრავალი სქესობრივი პარტნიორების მქონე მამაკაცებში

რეზიუმე

აქტუალობა: სქესობრივი გზით გადამდები ინფექციები წარმოადგენს მნიშვნელოვან კლინიკურ და გლობალურ საზოგადოებრივი ჯანმრთელობის პრობლემას. ნუკლეინის მჟავების ამპლიფიკაციის ტესტები რეკომენდებულია უროგენიტალური სქესობრივი გზით გადამდები ინფექციების მოლეკულური გამოვლენისთვის. მიუხედავად იმისა, რომ მამაკაცებში სგგი-ების ტესტირებისთვის ტრადიციულად გამოიყენება ურეთრის ნაცხი, მისი აღება ინვაზიური პროცედურაა და იწვევს მნიშვნელოვან დისკომფორტს. პირველი ულუფის შარდი წარმოადგენს პერსპექტიულ არაინვაზიურ ალტერნატიულ ნიმუშს მამაკაცებში სგგი-ების მოლეკულური ტესტირებისთვის.

კვლევის მიზანი: პირველი ულუფის შარდისა და ურეთრის ნაცხის შედარება PCR მეთოდით სქესობრივი გზით გადამდები ინფექციების გამოსავლენად მამაკაცებში, რომლებსაც ჰყავდათ მრავალი სქესობრივი პარტნიორი.

მასალა და მეთოდები: პროსპექტულ წყვილობრივ შედარებით კვლევაში ჩაერთო 148 მამაკაცი, 22-49 წლის ასაკში. ურეთრის ნაცხს პირველ რიგში იღებდა ექიმი, რის შემდეგაც დაუყოვნებლივ გროვდებოდა შარდის პირველი ულუფის 20-30 მლ. PCR ტესტირება მოიცავდა *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium* და *Trichomonas vaginalis*-ის გამოვლენას. წყვილობრივი შედეგები გაანალიზდა McNemar-ის ზუსტი ტესტითა და Cohen-ის kappa კოეფიციენტით.

შედეგები: მინიმუმ ერთი STI პათოგენი გამოვლინდა 128/148 მამაკაცში (86,5%). პირველი ულუფის შარდში მინიმუმ ერთი პათოგენი გამოვლინდა 128 პაციენტში, ხოლო ურეთრის ნაცხში - 100 პაციენტში. ყველა 28 დისკორდანტული შედეგი იყო შარდში დადებითი და ნაცხში უარყოფითი ($p < 0,001$). პირველი ულუფის შარდმა აჩვენა უფრო მაღალი გამოვლენა *C. trachomatis*-ზე (43 vs 38; $p = 0,063$), *N. gonorrhoeae*-ზე (55 vs 45; $p = 0,002$) და *M. genitalium*-ზე (75 vs 62; $p = 0,0002$). *T. vaginalis*-ის გამოვლენა ორივე მასალაში იდენტური იყო (27 vs 27).

დასკვნა: შარდის პირველი ულუფის კვლევამ აჩვენა თანაბარი ან უფრო მაღალი მოლეკულური გამოვლენის მაჩვენებელი ექიმის მიერ აღებულ ურეთრის ნაცხთან შედარებით ოთხივე შესწავლილი სგგი პათოგენისთვის. მიღებული შედეგები მხარს უჭერს შარდის გამოყენებას როგორც პრაქტიკულ ნიმუშს მამაკაცებში სგგი-ის მოლეკულური დიაგნოსტიკისთვის.

საკვანძო სიტყვები: შარდის პირველი ულუფა, ურეთრის ნაცხი, სქესობრივი გზით გადამდები ინფექციები, PCR.