



Original article

Increased incidences of multidrug-resistant gonorrhoea in Taiwanese men: Experiences from a single institute



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ABSTRACT

Objectives: Our objective was to examine the detection rate of routine urine cultures and genital discharge swab cultures for the detection of gonococcal urethritis in male patients. In addition, we evaluated the results of urinalysis for gonococcal infections and investigated the drug sensitivity of *Neisseria gonorrhoeae* strains isolated from these patients.

Materials and methods: From August 2009 to October 2015, 202 men diagnosed with gonococcal infection, based on the results of a urine culture or genital discharge swab culture, were enrolled in this study. Initial clinical symptoms and urinalysis results were collected. The susceptibility of *N. gonorrhoeae* to penicillin, cefmetazole, cefotaxime, ceftazidime, cefuroxime, ceftriaxone, and ofloxacin were determined using agar plate dilution method.

Results: The mean age of the patients was 29.67 ± 10.39 years, and 157 of the 202 male patients (87.6%) were aged between 15 years and 34 years. We determined that the diagnostic value of genital discharge swab culture was significantly higher than that of the urine culture (90.9% vs. 67.4%, respectively). Genital or urethral discharge is the major symptom in these patients (88.89%). The susceptibility of *N. gonorrhoeae* to cefuroxime, cefmetazole, cefotaxime, ceftazidime, penicillin, and ciproxin revealed an increasing prevalence of resistant strains in recent years.

Conclusion: Genital discharge swab culture is a more effective method than urine culture to detect gonorrhoea in patients with dysuria and urethral discharge. The increasing numbers of antibiotic-resistant *N. gonorrhoeae* strains is a major problem in treating gonococcal urethritis.

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1. Introduction

Gonorrhoea is a major sexually transmitted infection (STI) and is a significant worldwide public health problem. Although the number of reported cases in Western Europe and the US has declined in recent years, gonorrhoea remains the second most reported STI in Taiwan.¹ Gonococcal urethritis is a common STI in urological clinics, and the diagnosis of gonococcal urethritis usually depends on the existence of *Neisseria gonorrhoeae* in culture. Most patients who suffer from urethritis will not visit a medical center and would rather be treated at a regional hospital. We believe that

the experience at our institute would be extremely valuable to urologists for diagnosing gonococcal urethritis.

Although clinical guidelines suggest that culture and nucleic acid amplification tests (NAATs) are both available for the detection of genitourinary infection with *N. gonorrhoeae*,^{2,3} in Taiwan detection is more commonly done using culture methods rather than NAATs. Prior studies have shown that the sensitivity and specificity of NAATs are clearly the highest of any of the available test platforms for the diagnosis of gonococcal infections.^{4,5} However, because NAATs are more costly, they are still not widely used in Taiwan. Instead, urine and urethral discharge cultures remain more common. However, for most urologists in clinical practice, genitourinary tract-discharge swab cultures are not routinely collected due to the more complex methods for gathering the specimen. In previous studies, there is no clear detection rate of urine cultures and genitourinary tract discharge cultures, or comparison between the different detection methods used.

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In the current study, we examined the detection rate of urine cultures and genital discharge swab cultures for gonococcal urethritis. We also evaluated the presentation of urinalysis of gonococcal infection and investigated the drug sensitivity of *N. gonorrhoeae* in these patients.

2. Materials and methods

2.1. Patients

Among the Taiwanese male patients visiting our urology outpatient clinics from August 2009 to October 2015 who presented with dysuria and discharge from the urethra or genital organs, either urine cultures or genital discharge swab cultures were collected. All patients who tested positive for *N. gonorrhoeae* were included in the study. A total of 202 Taiwanese male patients were diagnosed with gonococcal infection from the results of the cultures. Clinical presentations when visiting the outpatient clinic were recorded. Urine was also collected from most of the patients for urinalysis.

2.2. Urine culture and genital swab culture

The basic definition of detection rate is “the proportion of affected individuals with a positive test result”; however, for this study we chose to define our detection rate as the ratio of the true positive value to the sum of the true value plus the false negative value. Urine cultures and urethral swab specimens were inoculated onto Thayer–Martin medium (BD Modified Thayer-Martin (MTM II)

Agar (Sterile), BECTON DICKINSON HOLDINGS PTE. LTD., United States) and cultured in candle jars at 36°C for 24–48 hours. Isolates were identified by colony morphology, Gram staining, and oxidase testing. A presumptive identification is regarded as sufficient for diagnosis in many settings. Gonococcal isolates that met these criteria were picked and subcultured using GC Agar Base. Susceptibility to penicillin, cefmetazole, cefotaxime, ceftazidime, cefuroxime, ceftriaxone, and ofloxacin was determined by agar plate dilution using GC Agar plates (GC Agar Base, CM0367B, Oxoid™, England). For disk susceptibility testing, GC Agar Base with 1% defined growth supplement was used [1.1 g L-cysteine, 0.03 g guanine HCl, 3 mg thiamine HCl, 13 mg para-aminobenzoic acid, 0.01 g B12, 0.1 g cocarboxylase, 0.25 g nicotinamide adenine dinucleotide, 1 g adenine, 10 g L-glutamine, 100 g glucose, 0.02 g ferric nitrate (in 1 L H₂O)].⁶ The susceptibility of the tested antimicrobial agents listed in Table 1 were determined using the standard agar dilution method according to the guidelines established by the Clinical and Laboratory Standards Institute.⁶

2.3. Statistical analysis

Categorical variables were compared using the chi-square test or Fisher's exact test. Continuous variables were expressed as median values. A *p* value ≤ 0.05 was considered statistically significant.

3. Results

From 2009 through 2015, 202 isolates of *N. gonorrhoeae* were recovered from clinical specimens. The number of annual accumulative isolates gradually increased (Figure 1), from 16 cases in 2009 to 48 in 2015, to date. The mean age of the patients was 29.4 ± 10.2 years, with the majority distributed within the younger age groups (Figure 2). Seventy eight percent (159 out of 202) of all gonorrhea-infected patients were < 35 years of age.

When the symptoms of the patients with which they initially presented with at urological clinics were reviewed, genitourinary tract discharge was found to be the most common (88.9%) reason for their visit (Table 1) and dysuria was the second most common (77.8%). The remaining symptoms were urinary frequency (7.4%), scrotal or lower abdominal pain (6.3%), fever (2.1%), and gross hematuria (1.1%). The urinalysis results for these patients showed that pyuria was the predominant symptom (91.2%, 155 out of 170 patients), whereas only a small number (17.1%, 29 out of 170 patients) presented with hematuria. Polymicrobial infections were found in

Table 1
Clinical characteristics of gonococcal infections.

Clinical presentation	Positive, n (%)
Genital or urethral discharge	189 (88.9)
Dysuria	147 (77.8)
Frequency	14 (7.4)
Scrotal pain or lower abdominal pain	12 (6.3)
Fever	4 (2.1)
Gross hematuria	2 (1.1)
Pyuria	155 (91.2)
Hematuria	29 (17.1)
Urine culture	156 (84.3)
Genital discharge culture	107 (97.3)
Mixed flora	17 (8.2)

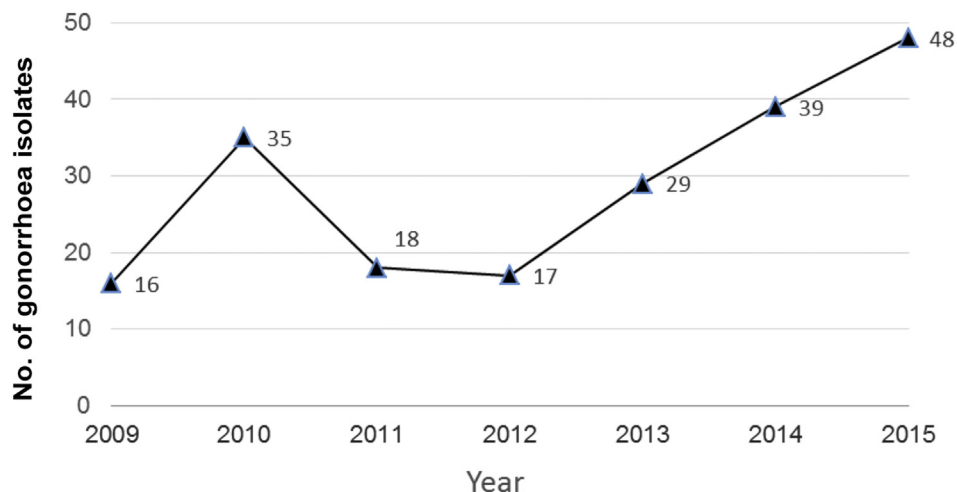


Figure 1. Gonorrhoea isolates of each accumulative years.

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