

A COMPARISON OF CEFTRIAXONE AND CIPROFLOXACIN'S EFFICACY IN THE TREATMENT OF GONORRHOEA

Mohammad Iftikhar Adil¹, Tariq Zubair², Surrya Israr³, Mohammad Bilal⁴, Shams Ur Rahman⁵

¹Department of Pharmacology, Gajju Khan Medical College, Swabi, Pakistan

²Department of Medicine, Gajju Khan Medical College, Swabi, Pakistan

³Department of Gynaecology, Gajju Khan Medical College, Swabi, Pakistan

⁴Department of Ophthalmology, Gajju Khan Medical College, Swabi, Pakistan

⁵Department of Medicine, Gajju Khan Medical College, Swabi, Pakistan

ABSTRACT

Introduction: A bacterial illness that is extremely infectious and spreads via sexual contact between men and women, gonorrhoea is a serious public health problem. It is among the most ancient sexually transmitted infections (STDs), and *Neisseria* is the cause. Rarely, gonorrhoea may also result in pharyngeal, ocular, articular, and dermatological diseases in addition to its predominant urogenital signs and symptoms. Various antibiotics, including spectinomycin, penicillins, tetracyclines, macrolides, fluoroquinolones, and sulpha medicines, have been used to treat gonorrhoea. Some of these medicines have become less effective in treating gonorrhoea due to an increase in resistant infections.

Objective: This research compared the efficaciousness of Ceftriaxone and Ciprofloxacin in managing gonococcal infections.

Study Design: Observational Study.

Place of Duration of Study: The research was carried out from January 2003 to March 2004 at the New Gulail Polyclinic in Saudi Arabia.

Material and Methods: With the Institutional Ethical Committee's consent, 200 patients received Ceftriaxone and Ciprofloxacin to treat gonorrhoea. Enrolling the patients included the use of a purposeful sampling approach. Every patient was split into two groups of 100 individuals, each at random. Group B received a single intravenous dose of 500 mg of Ceftriaxone injection, whereas Group A received a 500 mg tablet of Ciprofloxacin. After five days, all of the patients had follow-up exams, and the results of their lab and clinical examinations were noted and evaluated.

Results: Patients in Group A (n=100) receiving Ciprofloxacin demonstrated 80% full response, 9% partial response, and 11% no response on the fifth day after treatment. In contrast, patients in Group B (n=100) receiving Ceftriaxone demonstrated 90% full response, 4% partial response, and 6% no response.

Conclusion: Ceftriaxone has shown superior efficacy in treating gonorrhoea when compared to Ciprofloxacin. After taking an antibiotic for the first time, it is advised that all patients have another examination to check that the gonorrhoea has completely healed.

Key Words: *Neisseria gonorrhoea*, sexually transmitted infection (STI), Sexually Transmitted Disease

INTRODUCTION

Gonorrhoea is mucopurulent inflammation of the urogenital tract and is one of the highly common

sexually transmitted diseases caused by *Neisseria gonorrhoea*, a gram-negative diplococci.¹ The gonococcal infection may infect both men and women via a variety of unprotected sexual contact activities, such as oral, anal, or vaginal intercourse. Ophthalmia neonatorum may also occur when the illness is vertically transferred from the sick mother to the unborn child after delivery. Within 48 hours after delivery, this infection often coexists with chemosis and lid edema.^{2,27} Male-to-female unprotected sexual contact increases the risk of infection transmission by 80%, while female-to-male contact increases the risk of infection transmission by 20%.³ In the event of maltreatment or non-treatment,

Correspondence:

Mohammad Iftikhar Adil

Assistant Professor

Department of Pharmacology, Gajju Khan Medical College, Swabi, Pakistan

Cell: 0300-5217818

Email: iftikharadil22@yahoo.com

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men and women experience several evident

Problems such as arthritis and cervicitis lead to pelvic inflammatory disease (PID), which may result in ectopic pregnancy, peri-hepatitis (Fitz Hugh Curtis syndrome), infertility, encephalitis, endocarditis, and epididymitis.^{4,27} It is established that males who have a history of syphilis or gonorrhea have a higher chance of developing prostatic cancer. The relationship between gonorrhea and prostatic cancer has been extensively researched, although no clear correlation has been identified to date.⁵ Studies and reports on the clinical effectiveness of different medications used to treat gonorrhea have been conducted in different parts of the world. These investigations have shown that N. gonorrhea is becoming less antibiotic-resistant in various parts of the globe.⁶⁻⁹ The rise of gonorrhea strains resistant to antibiotics is an increasing problem that has made selecting medications a challenging undertaking. Various antibiotics, including sulpha medicines, penicillins, tetracyclines, azithromycin, Ciprofloxacin, Ceftriaxone, spectinomycin, and Cefixime, are used to treat gonorrhea. Since Ceftriaxone and Ciprofloxacin are used more often in our setup, we chose to compare the efficacy of these two antibiotics in our research.

Since its introduction in 1987, Ciprofloxacin has been a part of the second generation of fluoroquinolones, which exhibit greater efficacy against atypical and gram-negative microorganisms. Its effectiveness against gram-positive organisms is restricted. Soft tissue, gastrointestinal, genitourinary, and respiratory infections are among the many conditions for which it may be utilized. It impedes DNA replication, which prevents germs from proliferating. It is not recommended for use in children under the age of eighteen due to the possibility of tendon rupture, myasthenia gravis, and articular cartilage injury, in addition to the usual adverse effects.²⁴ Compared to some antibiotics such as cephalosporins, the risk of adverse effects is higher^{23,24}. Ceftriaxone, a third-generation broad-spectrum cephalosporin, was introduced in the United States in 1984 and approved for different infections like respiratory, Genitourinary, Gastrointestinal, Meningococcal, Gonococcal, and soft tissue infections. Adverse effects are hypersensitivity, blood clots, pancytopenia, and glossitis. A sore throat and pseudo cholelithiasis.²⁵

MATERIALS AND METHODS

The institutional ethics committee approved this research before being carried out in the New Gulail

Polyclinic in Jeddah, Saudi Arabia. All research participants gave their permission before administering the medications above. This research comprised 200 individuals diagnosed with gonorrhea who visited the New Gulail Polyclinic's medical department between January 2003 and March 2004. Their medical history, clinical data, and test results were documented on a particular proforma. There were 152 men and 48 women among the subjects, ages 14 to 55. When a male patient had dysuria with a recent history of sexual exposure and hazy urethral discharge, the clinical diagnosis was rather simple. Their urethral discharge was stained with gram stain to confirm the diagnosis, and their urine was examined. High vaginal swabs were taken from each female patient for confirmation by gram staining and culture. The primary diagnostic criterion for females was the intracellular presence of gram-negative diplococci in vaginal discharge since they often exhibit no symptoms. Without considering gender, the patients were randomly split into two groups of 100. Patients in Group A received an oral pill containing 500 mg of Ciprofloxacin, whereas patients in Group B received an injection of 500 mg of Ceftriaxone intravenously (IV). While ceftriaxone I/M and I/V injections had the same plasma levels after 24 hours, Workowski (2010) found that I/M injections had a depot effect on gonorrhea-coccal infection. Five days after starting therapy, all patients underwent clinical examinations, laboratory tests were performed, and data was collected for analysis. Urine microscopy, gram staining, prostatic fluid microscopy in men, and vaginal secretion microscopy in women were performed during the follow-up and documented on a proforma.

RESULTS

Every one of the 200 patients in this research, 48 girls (23.66%) and 152 males (76.33%), aged 14 to 55, had a clinical diagnosis of gonorrhea. Table 1 displays the age and sex distribution of the patients; the majority of the patients were in the 20-40 age range.

The clinical presentation of male and female patients is shown in Table 2. The main symptoms of all the male patients were dysuria and the usual thick yellow urethral discharge. The primary complaint in females was purulent and yellow vaginal discharge, with 28 cases reporting dysuria and lower abdomen pain. Those victims' vaginal exams showed that the endocervix was the main infection location. In every instance, Gram staining of the vaginal discharge for

the presence of gram-negative diplococci in pus cells was done in addition to the standard urine testing to confirm the diagnosis. The clinical efficacy of antimicrobial medications in the treatment of gonorrhoea is shown in Table 3. The

Symptoms of dysuria and urethral discharge in men and vaginal discharge in females, as well as gram staining and microscopy of the prostatic fluid in males and vaginal secretion in females, were utilized as criteria to distinguish between a partial reaction and no response at all. On the first day of treatment, Group-A patients (n = 100) received a single oral dosage of 500 mg of Ciprofloxacin. At the 5-day follow-up, 80 patients (80%) reported complete recovery. Nine (9%)

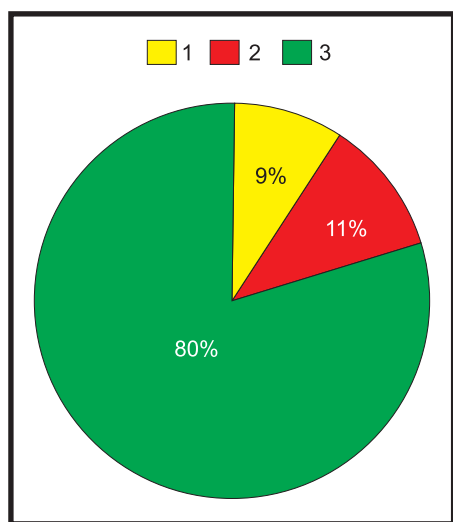


Figure 1: Pie chart showing different responses for ciprofloxacin

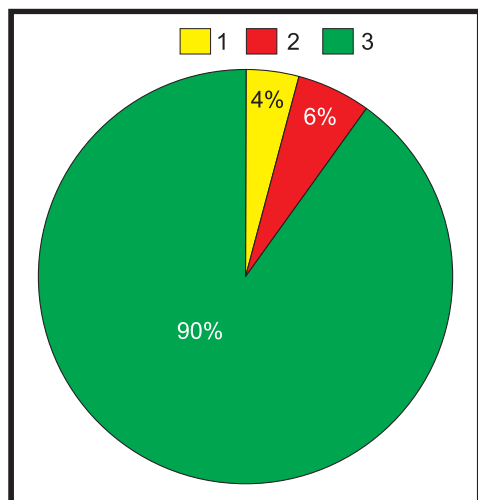


Figure 2: Pie chart showing different responses for ceftriaxone

of the patients complained just of dysuria. In these instances, a urine test indicated pus cells (+++), and gram staining of the male prostatic fluid and the female vaginal discharge indicated the presence of diplococci in pus cells (++). The other 11 patients (11%) did not react at all, showing no improvement in laboratory tests or symptoms, and we regarded those instances as partly responding.

For this reason, Ciprofloxacin was clinically ineffective in a total of 20% of the patients. On the first day after their injection of 500 mg of ceftriaxone single dose I/M, Group-B patients (n = 100) were found to be 90% cured at follow-up on the fifth day. Four individuals (4%) reported minor dysuria on the fifth day. Microscopic analysis of the urine revealed pus cells (++) and gram-negative diplococci (+) intracellularly in the prostatic secretions of men and vaginal secretions of females. These instances were thought to respond to the medication in part. The other 6 instances (6%) had symptoms and the same test results as previously, and they were completely non-responsive to this medication. As a result, Ceftriaxone was either totally or partly clinically ineffective in 10% of the patients in this group.

DISCUSSION

Gonorrhoea is a highly contagious Sexually transmitted disease, and due to its causation and specific clinical features, it was usually referred to as 'the clap and the drip' before the discovery of N.gonorrhoea by Neisser.¹ The prevalence of gonorrhoea has dramatically decreased in industrialized nations as a result of successful public awareness programs. A study from the World Health Organization states that there were 78 million cases of gonorrhoea in 2016 compared to 106 million in 2008.

The majority of gonorrhoea patients in this study are between the ages of 20 and 40, and the proportion of male patients who exhibit symptoms of vaginal discharge and dysuria in female patients and urethral discharge and dysuria in male patients is considerably higher than that of female patients. These findings are consistent with research conducted in other nations.^{3, 12-14}

Gonorrhoea is curable with prompt medical attention. Unfortunately, the majority of women who have gonorrhoea do not exhibit symptoms that would prompt them to see a doctor³. Other factors contribut-

ing to the rise in gonorrhoea incidence in various regions of the globe include the absence of follow-up visits after an antibiotic dosage, inappropriate drug selection, and the emergence of resistant gonococci. Thirteen *N. gonorrhoea* exhibits antimicrobial resistance via plasmid-mediated resistance to Penicillin and Tetracycline, as well as chromosomally-mediated resistance to the same antibiotics and, more recently, resistance to fluoroquinolones.^{17, 19} Fluoroquinolone resistance is widespread around the globe^{18,22}. In several nations, it is no longer regarded as the suitable first-line therapy for gonorrhoea.²⁴

In 20% of the instances, our investigation revealed nonresponsiveness. In 20% of instances, there is either moderate (9%) or total (11%) ciprofloxacin resistance. In 1987, Handsfield reported that 125 mg of Ceftriaxone given to 155 individuals resulted in the eradication of *Neisseria gonorrhoea* in 99% of instances. 90% of the gonococci were eradicated in our trial with Ceftriaxone, comparable to the Handsfield study. Compared to Ciprofloxacin, the resistance to Ceftriaxone documented in various investigations is negligible^{17,22}, and our study shows resistance in only 10% of the cases. Studies conducted in 1984 by Collier and in 1985 by Judson show that Ceftriaxone is more effective in the treatment of gonorrhoea than any antibiotic. So, if ceftriaxone is used in high doses and combined with other antibiotics, it will be more effective than ciprofloxacin.

CONCLUSION

Despite showing minimal resistance, Ceftriaxone, with fewer side effects, is more effective and superior to Ciprofloxacin in the treatment of gonorrhoea.

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