

ORIGINAL ARTICLE

A Comparison of Spectinomycin with Ceftriaxone as Treatment for Uncomplicated Gonorrhoea

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ABSTRACT

Objective: To compare the efficacy of spectinomycin with ceftriaxone as treatment for Uncomplicated Gonorrhoea.

Design of the Study: It was a cross-sectional survey.

Place and Duration of Study: This study was carried at Department of Pharmacology DHQ Teaching Hospital Kohat and Khaleefa Gul Nawaz Teaching Hospital Bannu from March 2019 to March 2020.

Patients and Methods: For the trial, 200 participants were enrolled. Two groups of 100 patients each were formed by randomly dividing the patients. Injections of spectinomycin (2 gm) and ceftriaxone (500 mg) were administered intramuscularly to Group A and Group B, respectively. After 5 days, all patients underwent reexaminations, and their clinical and laboratory results were noted and reviewed.

Results of the Study: When administered spectinomycin, patients in Group A (n = 100) indicated 95% full response, 3% partial response, and 2% no reaction, but when given ceftriaxone, patients in Group B (n = 100) indicated 91% full response, 3% partial response, and 6% no response at all. Furthermore, the aetiology of gonorrhoea infection is not statistically associated with getting older.

Conclusion: The cure rates for spectinomycin and ceftriaxone are statistically indistinguishable. However, spectinomycin may only be used in cases of ceftriaxone resistance because it causes pain at the injection site, is less effective for pharyngeal gonorrhoea, and is contraindicated during pregnancy and breast-feeding.

Keywords: Neisseria Gonorrhoea, Ceftriaxone, Spectinomycin

INTRODUCTION

Gonorrhoea is caused by the Gram-negative diplococcus *Neisseria gonorrhoeae* (STI). Transmission rates have increased in numerous countries, including Australia, in the previous five years.¹ Annual global incidence rates range from 78 to 106 million cases of gonorrhoea, with 19/1000 females and 24/1000 males.² *N. gonorrhoeae* is able to infect the urogenital tract, the pharynx, and the rectum because it is able to avoid the host's immunological reactions. Symptomless *N. gonorrhoeae* infections are highly contagious because they are passed from one person to another through sexual contact.³ While gonorrhoea itself is not inflammatory, it can lead to a number of complications like endometritis, urethritis, pelvic inflammatory disease, salpingitis and epididymitis. Male urethritis causes tenderness or soreness in the testicles, painful micturition, while obstetric iatrogenic disorder (PID) is associated with infertility and stillbirths.^{4,5}

Antibiotics, especially penicillin, have historically proved quite useful in treating gonorrhoea. Changes in drug targets, upregulated appearance of efflux pumps, and the attainment of antibiotic humiliating enzymes are only a few of the mechanisms that have contributed to the fast spread of antimicrobial resistance.^{6,7} Antibiotic overuse has contributed to the evolution of antimicrobial resistance in *N. gonorrhoeae*, as it has in other drug-resistant diseases.^{8,9} In the absence of new drugs, current treatment guidelines recommend a combination of spectinomycin and ceftriaxone. However, the gonococcal population is becoming resistant to all available treatments, and dual therapy has not been successful in lowering gonorrhoea infection rates to yet.¹⁰

Patients allergic to or resistant to penicillin or cephalosporin were the first to benefit from the use of spectinomycin, an aminocyclitol antibiotic discovered and first used in 1961. Bacterial protein elongation and synthesis can be inhibited by the antibiotic spectinomycin, which attaches to the 30S ribosomal subunit and prevents the transfer of peptidyl tRNA.¹¹ Ceftriaxone is now approved for the treatment of infections of the gastrointestinal tract, genitourinary tract, respiratory tract, meningococcal disease, group A streptococcus, and soft tissues. Allergic reactions, leukopenia, glossitis, and cholelithiasis are some of the documented side effects.¹²

PATIENTS AND METHODS

After approval by the hospital's ethics committee, this study was carried out at Department of Pharmacology DHQ Teaching Hospital Kohat and Khaleefa Gul Nawaz Teaching Hospital Bannu from March 2019 to March 2020. After taking patients' histories and signed informed consent forms, patients of both genders age between 14 to 55 years were included in this study. Sample size of 200 male and female patients was calculated taking 95% significance level and 5% margin of error and expected effectiveness of Spectinomycin be 85%.¹⁸ Patients who have diabetes, chronic liver disease, and TB were excluded from study, the diagnosis was nearly always easy to make in male patients with hazy discharge from urethra and symptoms of dysuria after recent sexual activity. Diagnosis was confirmed by analysing the urine and doing a gramme stain on the urethral discharge. Gram staining and culture were performed on all of the high vaginal swabs collected from the female patients. Patients were split in half at random. Group-A received an intramuscular injection of 2 grams of spectinomycin as a single dose. Patients in Group B received an intramuscular injection of 500 milligrammes of ceftriaxone as a single dosage. All patients were reexamined clinically and underwent additional laboratory tests 5 days after their initial treatment. Urine microscopy, gramme staining, prostate fluid and vaginal secretion microscopy were all performed during the follow-up appointment after 5 days and documented on a proforma. Patient's age has represented by Mean±SD and gender has been shown in frequency and percentage. SPSS version 21 will be used to enter and analyse all of the gathered data.

STUDY RESULTS

Table-1 described patient demographics, including age, gender, and the effect of age on gonorrhoea incidence. Clinical response to antimicrobial treatment for gonorrhoea is shown in Table-2 below. Patients in Group-A (n=100) were monitored on Days 5 and 7 after receiving intravenous spectinomycin on Days 1 and 2, respectively. Full recovery was observed by 95 patients (95%). Only 4 instances (3% of the total) reported having dysuria. Analysis of urine indicated pus cells (+++), whereas gramme

staining of vaginal output in women and prostatic fluid in men confirmed the presence of diplococci in pus cells (++) . Two patients (2% of the total) showed no improvement in symptoms or laboratory results, thus we classed their cases as partially responding. As a result, spectinomycin was practically ineffective for 6 percent of the patients. Patients in Group B (n=100) were treated with a single 500 mg dose of Injection Ceftriaxone I/M on Day 1 with further monitoring on Day 5. Ninety percent (91) of patients were considered cured. In four patients, 3%, minor dysuria was reported on day 5.

Table 1: Details of Age & Gender of enrolled patients

| Variables | Age | Total |
|-----------|----------------|-----------|
| Age | < 20 years | 81(40.5%) |
| | 20 to 40 years | 99(49.5%) |
| | > 40 years | 20(10%) |
| Gender | Male | 152(76%) |
| | Female | 48(24%) |

Table 2: Clinical effectiveness of antibiotics in the treatment of gonorrhoea

| Groups Types | Drugs Name | Single dose | Fully sensitive | Partially sensitive | Non sensitive | p-value |
|--------------|---------------|---------------------|-----------------|---------------------|---------------|---------|
| Group-A | Spectinomycin | 2 gm. intramuscular | 95 (95%) | 03 (3%) | 02 (2%) | P>0.005 |
| Group-B | Ceftriaxone | 500mg intramuscular | 91 (91%) | 03 (3%) | 06 (6%) | |

DISCUSSION

About Before the discovery of antibiotics, "the clap" and "the drip" were common ways of referring to the highly infectious known as gonorrhoea.^{13,20} The prevalence of gonorrhoea has dropped dramatically as a result of public awareness initiatives in affluent countries, but it is on the rise in some developing countries. Number of gonorrhoea cases decreased from 106 million in 2008 to 78 million in 2016, per WHO statistics.^{14,21}

Most of the gonorrhoea victims in this study are 20–40 years old, and the proportion of male patients substantially higher than females with urethral discharge and dysuria is comparable with published studies in other countries.^{15,22} Early diagnosis and treatment for gonorrhoea allows for a complete recovery. To make matters worse, most women who have gonorrhoea don't have any symptoms at all. 3 Other reasons for the rise in gonorrhoea incidence in some regions of the world include the lack of follow-up care after a single course of antibiotics, the selection of ineffective medications, and the evolution of resistant strains of gonococci.^{16,23} For example, N. gonorrhoea can be resistant to antibiotics in two ways: either through plasmid-mediated susceptibility to penicillin and tetracycline.¹⁷ On occasion, spectinomycin-resistant isolates were found in samples from the United States, India, and China, according to a study by Bala et al. & Nguyen et al. that was published in 2005.^{18,24} According to our findings, 95% of patients were susceptible to spectinomycin, whereas 6% were resistant. In 6% of patients, resistance to spectinomycin exists in either a partial (3%) or complete (2%) form. Results of our study are in line with study conducted by Hands field et al. treating 155 individuals with 125mg of ceftriaxone was successful in eradicating Neisseria gonorrhoea in 99% of cases.¹⁹ In our investigation, 500 milligrams of ceftriaxone resulted in 91% elimination of gonococci and 10% resistance. In 1984, Collier conducted a study that found ceftriaxone destroyed 98% of anorectal gonorrhoea and 91% of pharyngeal gonorrhoea, but spectinomycin only eliminated 50% of anorectal and only 30% of pharyngeal gonorrhoea.²⁰ Our findings were also similar with Bai et al. described for patients who have uncomplicated gonorrhoea, ceftriaxone 125 mg is preferable to spectinomycin 2 g.²⁵

CONCLUSION

Cure rates for spectinomycin and ceftriaxone are statistically equivalent. Spectinomycin may only be used in cases where ceftriaxone has failed because of the pain associated with injections, its reduced efficacy against pharyngeal gonorrhoea, and its contraindication during pregnancy and breast-feeding.

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