Short Communication **Medical Toxicology: Current research**

Ceftriaxone, an Empirical Goldmine: A Systematic Review of Randomized Controlled Trials- Mumtaz Shirin- University of Science and Technology Chittagong, Foy's Lake, Chittagong, Bangladesh

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Abstract

Empiric therapy for community and health-care associated bacterial infections with high mortality is challenging with the continued development of resistant strains and the threat of multi-drug–resistant organisms. Pharmacists may impact patients' outcomes by appropriately selecting initial antibiotic treatment, screening for duplication of therapy, and identifying the duration of therapy, regardless of whether a facility holds an antimicrobial stewardship program in place. The choice of ceftriaxone as an empiric therapy has been under-represented in many ways and its choice as first-line antibiotic in fatal infections remain controversial. To investigate the current state of ceftriaxone, alone or as a part of step-down therapy, therapy in terms of clinical and bacteriological efficacy, as well as evaluate the economic burden intravenous ceftriaxone therapy poses in patients with six infections associated with severe mortality and morbidity worldwide and assess the reliability of ceftriaxone as an empirical therapy in these six infections since the increased threat of multi-drug resistant organisms. This systematic review with meta-analysis of randomized controlled trials involves the assessment of the clinical and microbiological efficacy of ceftriaxone compared with that of other antibiotics in community-acquired pneumonia, bacterial meningitis, acute pyelonephritis, gonorrhoea, complicated intra-abdominal infections and efficacy in the perioperative prophylaxis of local and systemic infections published in the dates between 1990 to 2019 was performed. The electronic databases of PubMed, the Cochrane Central Register of Controlled Trials and Google Scholar were reviewed to search for relevant randomized controlled trials. Additional references, review papers, and proceedings of seminars were also searched. We conducted a systematic review and meta-analysis of ceftriaxone for treatment of uncomplicated gonorrhoea compared with four other antibiotics. Thirteen randomized controlled trials (RCTs) totalling treatment of 2557 patients with uncomplicated gonorrhoea were included. Statistically significant differences were observed in side-effects, which were increased after ceftriaxone 250 mg versus cefotaxime 500 mg (odds ratio [OR] 1.87; 95% confidence interval [CI] 1.14-3.08). Cure rates of ceftriaxone 250 mg were significantly better than cefixime 400 mg (OR 1.77; 95% CI 1.11-2.80) as was ceftriaxone 125 mg versus spectinomycin 2 g (OR 3.44; 95% CI 1.08-10.90). There was no statistically significant difference between ceftriaxone 250 mg and cefixime 800 mg in cure rates (OR 1.39; 95% CI 0.92-2.10) or adverse effects (OR 1.29, 95% CI 0.58-2.84) for treating uncomplicated gonorrhoea.

The cure rate after ceftriaxone 250 mg was not significantly different from that after spectinomycin 2 g (OR 1.96; 95% CI 1.00-3.87).In conclusion, this meta-analysis revealed that 250 mg ceftriaxone had a higher efficacy than 400 mg cefixime for uncomplicated gonorrhoea. Also, ceftriaxone 125 mg is a better choice than spectinomycin 2 g for patients with uncomplicated gonorrhoea, but ceftriaxone had higher side-effect rates than cefotaxime. In the current era further randomized controlled clinical trials of ceftriaxone for uncomplicated gonorrhoea are warranted.

Single-dose ceftriaxone, 125 mg or 250 mg intramuscularly (IM), was compared with spectinomycin, 2 g IM, for treatment of men with uncomplicated urethral or anorectal infections due to penicillinase-negative Neisseria gonorrhoeae. Cure rates were 100% for 31 and 28 men treated with 125 mg and 250 mg ceftriaxone, respectively, and 97% for 58 men given spectinomycin. Among patients followed up for greater than or equal to 14 days, post-gonococcal urethritis occurred in 25% of 44 men treated with ceftriaxone and 19% of 47 given spectinomycin (p = NS). The geometric mean minimum inhibitory concentration of ceftriaxone for 79 pre-treatment isolates of N gonorrhoeae was 0.0058 microgram/ml, and all strains were inhibited by less than or equal to 0.063 micrograms/ml. Neither drug caused perceptible toxicity, but patient acceptance was greater for ceftriaxone than for spectinomycin. Ceftriaxone in a single dose of 125 mg is effective against uncomplicated urethral or anorectal gonorrhoea in men and may become a regimen of choice for this infectionFrom 26 April to 30 June 1983 a total of 200 men with uncomplicated gonococcal urethritis were randomly treated with either 2 g spectinomycin or 250 mg ceftriaxone, both administered intramuscularly. Of 197 isolates tested for the presence of the enzyme beta lactamase, 91 (46.2%) were positive (PPNG) and 106 (53.8%) were non-PPNG strains. All 93 patients treated with spectinomycin and followed up and 97 treated with ceftriaxone and followed up were cured. Ceftriaxone 250 mg administered by intramuscular injection is highly effective in treating gonococcal infections caused by both PPNG and non-PPNG strains and is an appropriate alternative to spectinomycin.

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