Cellular and Molecular Biology
ISSN: 1165-158X

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nclusion: Carbapenem and tetracycline were the most e ective antibiotics. Ther
tion between integrase 1 gene and MDR strain (P = .00001).

Keywords: Int1 gene; Shigella; Antibiotic Resistance; Carbapenem

Introduction

Class 1 and 2 integrons have the highest prevalence in Gram-negative bacteria [1]. The structure of class 1 integron consists of 5' and 3' protected regions and a variable region containing gene cassettes. Majority of the previous studies have shown that class 2 integron consists of the same arrays of 4 gene cassettes containing 3 antibiotic resistance gene cassettes (tfrA1, sat, aadA1) including trimethoprim, streptothricin and spectinomycin/streptomycin resistance as well as the orfX gene cassette with unknown function [2].

Integrons have an important proven role in disseminating

were examined and recorded in each culture media. Shigella colonies on the McConkey medium were seen as lactose-negative [colourless] or the same color as the medium with a diameter of 2-3 mm and on the XLD medium were seen as red or pink without a black center with a diameter of 1-2 mm.

Pure culture preparation

Grown and confirmed colonies as well as suspected ones on McConkey and XLD media were re-cultured and purified on blood agar medium and used to continue the research. This bacterium forms Gray colonies on the surface of the blood agar medium.

A completely isolated colony suspected of Shigella was carefully selected from the 24-hr blood agar plate. The wire loop was contacted to the center of the colony, and then a suspension was prepared in 1 ml of the sterile physiology serum and used for all the biochemical tests.

Di erential and biochemical tests to con rm Shigella samples

TSI Agar, SIM, urea test, LIA, Simon Citrate, MR-VP sugar fermentation tests were performed for phenotypic investigations on all samples.

Preparation of the glycerol containing culture medium for long-term storage

In order to perform additional tests on bacterial samples, the bacteria must be kept in proper condition. Brain Heart Broth [BHB]-based culture medium was used for this purpose. Therefore, 7.4 gr BHB powder was dissolved in 200 ml distilled water. It was then boiled and 15% glycerol was added to the medium and shaken well to obtain a uniform solution. Then, it was aliquated into microtubes in small amounts of 1-2 ml. Then, it was autoclaved at 121°C, 15 atm pressure for 15 min. After the autoclave, the Shigella isolates were inoculated into the medium and stored at -70°C.

Evaluation of bacterial susceptibility to antibiotics [Antibiogram]

Agar disk diffusion method was used to determine the antibiotic resistance pattern. Discs were placed on Müller Hinton agar medium [Merck, Germany] with half McFarland concentration at 2.5 cm distances. Then, the plate was incubated at 37°C for 18-24 hr. Next, the plates were examined under the lamp and the non-growth halo diameter was measured with ruler. The antibiogram test report for each antibiotic was determined as sensitive, resistant and intermediate.

Molecular experiments

DNA extraction and PCR: Bacterial culture [fresh culture] was m 1-2 ml. Th Tw T(tinue(re5(center)0.6oth glycerol))0.5(a1h)TjcFa 1-45(A),

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highly prevalent in developing countries [14]. Our results showed that S. sonnei was the main species in this study with 62.5% of all Shigella species and then S. flexneri with 21.875% was in the second degree. This finding was similar to data reported from Iran (Shiraz) as well as other countries, including Thailand [15]. This pattern was different from

against Shigella. Chloramphenicol (88%), gentamicin (79%) and ceftazidime (79%) can be the next treatments of choice. Shigella is also resistant to ampicillin (94%) primarily and cotrimoxazole (91%) secondarily.

Cotrimoxazole is a drug often used for the experimental treatment of diarrheal diseases [20]. Widespread use of this drug has led to the emergence of resistant strains of Shigella. In this study, Shigella showed high resistance to cotrimoxazole (91%). Previous reports in Iran have mentioned the resistance level of 92.2 to 94% against cotrimoxazole [21-22]. High resistance to cotrimoxazole has also been reported from Turkey (95%) [23]. According to our regional reports from Iran, ampicillin resistance was 94% and the previous study reported 57% [24]. These results strongly indicated that the use of cotrimoxazole and ampicillin is not appropriate for the treatment of severe diarrhea and dysentery in the West of Iran. S. flexneri resistant to ciprofloxacin was also identified from parts of India (46.25%) [23]. In the present study, 6 patients (18%) with Shigella isolates were resistant to nalidixic acid. In two reports from Tehran and Tabriz, 17.4% and 31% of the isolated Shigella strains were resistant to nalidixic acid, respectively [25].

Previous studies in Iran have also shown Shigella resistance to cephalosporins in the range of 7.57-3.7% between 2008 and 2018 [26]. This shows increasing resistance to cephalosporins in Iran compared to the other countries [27]. This finding is worrying, as previous studies in China, the Middle East and Southeast Asia have reported less resistance

23. Jafari F, Hamidian M, Rezadehbashi M, Doyle M, Salmanzadeh-Ahrabi S, et al. (2009)