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Bacterial Susceptibility Pattern of the Bacteria That Cause Skin and Soft Tissue Infections to Cephalexin and Co-Trimoxazole

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Abstract: Skin and soft tissue infections (SSTIs) are a common reason for presentation to outpatient practices. In our hospital settings, there are reports of high antibiotic resistance and lots of antibiotics have become useless because of this reason. We planned to study the pattern of infection and bacterial resistances of the bacteria that cause SSTI in the patients that are referred to infectious disease clinic. The overall bacterial susceptibility of the 98 growth shows that only 49(50%) of them were sensitive to cephalexin, 14(14.2%) were intermediate and 35(35.8%) were resistant. The results regarding co-trimoxazole were 34(34.6%), 11(11.3%) and 53(54.1%) for sensitive, intermediate and resistant species respectively. Strategies like treatment after getting antibiogram results seem to be necessary in treatment of SSTIs.

Key words: Antimicrobial · Bacteria Resistance

INTRODUCTION

Skin and soft tissue infections (SSTIs) are a common reason for presentation to outpatient practices, emergency rooms and hospitals [1]. The incidence of skin and soft tissue infections in the ambulatory setting has more than doubled over a ten-year period to 3.4 million emergency department visits in 2005 [2]. The main reason for this increase is emergence of resistance species especially methicillin-resistant *Staphylococcus aureus* [3, 4].

SSTIs are usually treated with topical or oral antibiotics, but comorbid conditions like diabetes mellitus or invasion of the infection to deeper tissues can necessitate intravenous antibiotic therapy [5].

The need to control antibiotic resistance is felt now is more than ever [6]. There are reports of high antibiotic resistance in our hospital settings and lots of antibiotics have become useless because of that [6-12].

Treatment of SSTIs should include drainage of the abscess if possible and starting a proper antibiotic or a combination of antibiotics [13]. If these antibiotics be chosen correctly there would be lesser antibiotic resistance due to fully eradication of the bacterial cause, thus microbiological studies concerning these infections are important [14]. In this study we are to evaluate bacterial resistance patternof the bacteria that cause SSTI in the patients that are referred to infectious disease clinic of Shahidbeheshti clinic of infectious diseases.

MATERIALS AND METHODS

In this retrospective study, by referring to the Shahidbeheshti Hospital laboratory, data of SSTI samples including sex, age and antibiotic susceptibility to cephalexin and co-trimoxazole of every case [15] has been added to checklists and all data were analyzed with SPSS software version 11.5. Names of the patients remained unrevealed. Antimicrobial susceptibility was evaluated by the Kirby-Bauer disk diffusion method in guidelines of Clinical and Laboratory Standards Institute [16].

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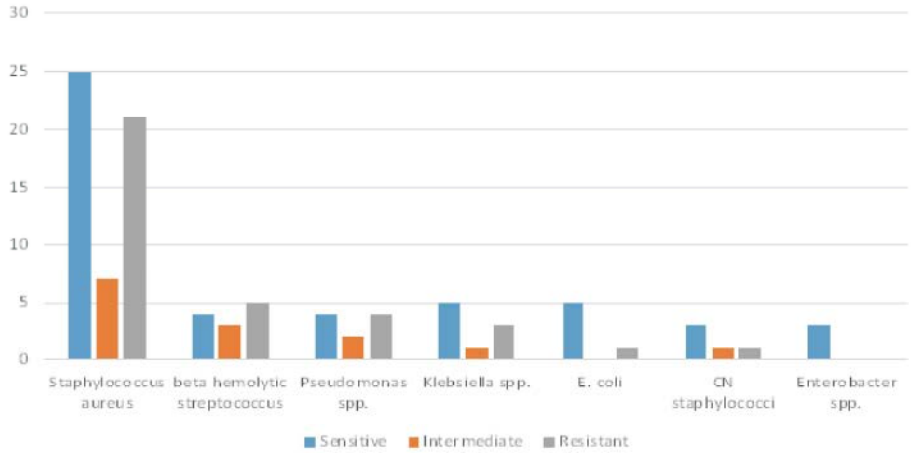

Fig 1: Distribution of different bacterial type susceptibility pattern to cephalexin in patients with SSTIs CN *Staphylococci*= coagulase-negative *Staphylococci*

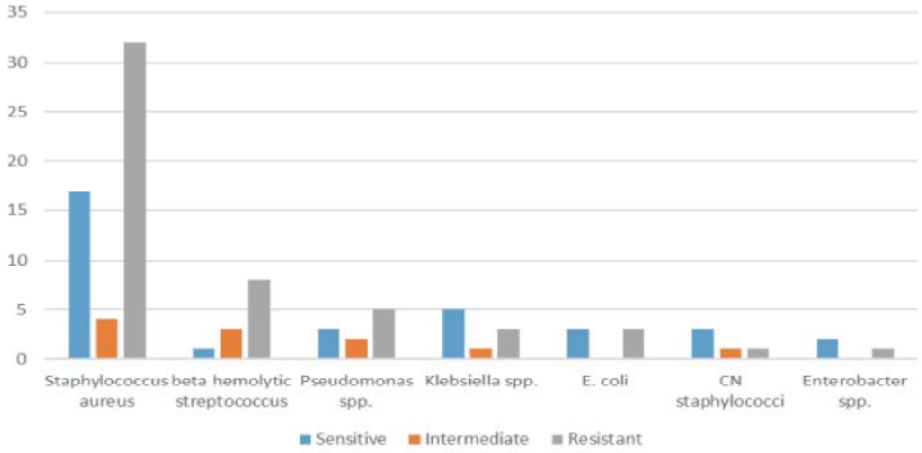

Fig 2: Distribution of different bacterial type susceptibility pattern to co-trimoxazole in patients with SSTIs CN *Staphylococci*= coagulase-negative *Staphylococci*

RESULTS

Data of 98 patients entered our checklists. There were 47 (48%) male patients and 51 (52%) female ones. Mean age of the patients was 59.3 years. The overall bacterial susceptibility of the 98 growth shows that only 49(50%) of them were sensitive to cephalexin, 14(14.2%) were intermediate and 35(35.8%) were resistant. There results regarding co-trimoxazole were 34(34.6%), 11(11.3%) and 53(54.1%) for sensitive, intermediate and resistant species respectively. Distribution of different bacterial type susceptibility pattern to the tested antibiotics can be seen in figure 1 and 2 and resistance rate of different bacterial types can be seen in Table 1.

Table 1: Resistance rate (%) of different bacterial types to cephalexin and co-trimoxazol in patients with SSTIs

Bacterial type	Cephalexin	Co-trimoxazole
Staphylococcus aureus	39.6	60.3
Beta hemolytic *Streptococcus*	41.6	66.6
Pseudomonas spp.	40	50
Klebsiella spp.	33.3	33.3
E. coli	16.6	50
CN *Staphylococci*	20	20
Enterobacter spp.	0	33.3
Overall	35.8	54.1

Table 2: Comparison of the results of different species sensitivity pattern of bacteria causing SSTI in the present study and the study of Sepehri *et al.* [21]

	Present study		Sepehri *et al.* study	
Bacterial type	Ce.	Co.	Ce.	Co.
Staphylococcus aureus	60.4	39.7	68.3	34.4
Beta hemolytic *Streptococcus*	58.4	33.4	40	15.4
Pseudomonas spp.	60	50	0	8.3
Klebsiella spp.	66.7	66.7	11.1	55.6
E. coli	83.4	50	33.3	33.3
CN *Staphylococci*	80	20	-	-
Enterobacter spp.	100	66.7	-	-

Ce=Cephalexin, Co=Co-trimoxazole

DISCUSSION

This study evaluated 98 bacterial isolates recovered from SSTI patients referred to Shahidbeheshti clinic of infectious diseases and analyzed their antimicrobial resistance pattern to cephalexin and co-trimoxazole.

In a study that was conducted by Goh *et al.* [17] there were 100% sensitivity to cephalexin and co-trimoxazole in *Staphylococcus aureus*. But our results showed high resistance of *Staphylococcus aureus* against it. Regarding beta hemolytic *Streptococcus* Jain *et al.* [18] reported 12.2% resistance against co-trimoxazole that is much less than ours 66.6% resistance. Resistance rate of *Pseudomonas* spp. to co-trimoxazole was announced 86% in the study of Nikokar *et al.* [19] that is higher than that reported in our study. *Enterobacter* spp. have been reported to have high resistance rates in previous studies [20], but all of our 3 isolates of *Enterobacter* was sensitive to cephalexin. This may be because of our limited study number.

Another study that conducted in Iran on antibiotic susceptibility of isolates that cause SSTI by Sepehri *et al.* [21] showed that the overall antibiotic susceptibility pattern of different bacterial types that cause SSTI to cephalexin was 41.8% sensitive, 17.7% intermediate and 40.5% resistant and 26.3% sensitive, 19.5% intermediate and 54.2% resistant for co-trimoxazole. Our results are in concordance with these results and show the same antibiotic usage pattern of these two antibiotics in the two studies. The results of comparing species sensitivities of the two studies are illustrated in table 2.

Our results of antibiotic resistance of bacteria that cause SSTI to cephalexin and co-trimoxazole are high especially regarding cephalexin resistance of the most prevalent bacterial causes of SSTI and these antibiotics are somehow useless because of more than 50% or even near 100% resistance rates in some species. Strategies like treatment after getting antibiogram results seem to be necessary in treatment of SSTIs.

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