

Effect of Salicylate On Fusidic Acid and Ciprofloxacin MICs in *Staphylococcus aureus*

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Abstract :

The susceptibility of five isolates of *Staphylococcus aureus* which isolated from wound infections were determined against ciprofloxacin & Fusidic acid .The findings have shown that ciprofloxacin & Fusidic acid were highly effective on *S. aureus* isolates when the Minimum Inhibitory Concentration (MIC) was very low .

Then the effect of salicylic acid on the MICs for these antibiotic was studied . Salicylate was shown to increase the resistance among *S.aureus* isolated when the Minimum Inhibitory Concentration (MIC) was very low .

Then the affect of salicylic of acid on the MICs for these antibiotics was studied . Salicylate was shown to increases the resistance among *S.aureus* isolates to Fusidic acid & Ciprofioxacin .

Introduction :

Staphylococcus aureus causes a variety of suppurative infections and toxicoses in human (1). Hospital strains of *S. aureus* are usually resistant to a variety of different antibiotics . So, some strains are resistant to all clinically useful antibiotic (2) .

Fusidic acid is a best antibiotic for treatment the infections by *S. aureus* (3). Fusidic acid inhibits the translocation step of protein synthesis by interfering with the action of eiongation factor – G (4) .

Salicylate , chemically it is 2 - Hydroxybenzoic acid , which is known for use in topical ointment (5) . It may prove beneficial therapeutically for infection caused by encapsulated bacteria (6) . As growth in presence of salicylate has a number of different effects on bacterial phenotypes (7) . So, previous studies showed that of *S. aureus* in the presence of Salicylate increased phenotypic resistan to antibiotic (8) . As extension to these studies , the effect of Salicylate on the MICs for Fusidic acid & Ciprofioxacin was determined

Material & Methods :

- 1- Bacterial isolates : five isolates of *S.aureus* were collected from patients with wound infections & identified according to (9) .
- 2- MICs determine for Fusidic acid & Ciprofloxacin : were performed by the agar dilution technique on Muller – Hinton agar according to (10) .
- 3- Effect of Salicylate on the MICsfor Fusidic acid & Ciprofloxacin : were done by addition the Salicylate (as 50 mg/ml) to each concentratrion of Fusidic acid & Ciprofloxacin on Muller-Hinton agar (in step No.2) .

Results & Discussion :

The MICs of Fusidic acid & Ciprofloxacin on five isolates *S.aureus* was studied, results of table -1- showed that Fusidic acid & Ciprofloxacin were effective on *S.aureus* isolates when the MICs was very low , similar result was obtained by (11) .

Table -1- The MICs for Fusidic acid & Ciprofloxacin on five isolates of *S.aureus*

Isolates\MICs	Fusidic acid mg/ml	Ciprofloxacin mg/ml
<i>S.aureus</i> :1	4	8
2	0,25	2
3	2	4
4	0,25	4
5	0,5	2

An important point in our study was the Salicylate can induce a phenotypic multiple antibiotic resistance mechanism in *S.aureus* . Result of table -2- revealed that addition of Salicylate 50 mg/ml increased the MICs of Fusidic acid & Ciprofloxacin .

Table -2- Effect of Salicylate on the MICs of Fusidic acid & Ciprofloxacin

Isolates\MICs	Fusidic acid with Salicylate (50 mg/ml)	Ciprofloxacin with Salicylate (50 mg/ml)
<i>S.aureus</i> :1	8	16
2	0, 5	4

3	8	4
4	0, 5	8
5	1,5	8

So, in the presence of Salicylate and these antibiotics , the resistance become was 3-fold greater alone . For example , the MICs of Fusidic acid alone against *S.aureus* isolate (No.3) was 2mg/ml while when adding Salicylate at concentration (50mg/ml), the MIC of Fusid acid increased to 8 mg/ml .

These data correlate with previous studies that demonstrated that compounds with an aromatic ring and a carboxylic acid functional group induce intrinsic antibiotic resistance in *S.aureus* (12) .

Ciprofloxacin inhibits the DNA-replication by affects the DNA-gyrase (13). Fusidic acid inhibit the translocation step of protein synthesis by interfering with the action of elongation factor- G(14). Mutations leading to Fusidic acid resistance in bacteria occur in Fus A, the gene encoding the target of Fusidic acid , EF-G (14). Fus A mutations leading to Fusidic acid resistance also alter resistance also alter resistance to some antibiotics (15) .

Salicylate- altered gene expression plays a role in altering mutation frequencies to antibiotic resistance during resistance antibiotic selection (11).

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الخلاصة :

اختبرت حساسية خمسة عزلات تعود لبكتريا *Stsphylococcus aureus* (والمعزولة من الإصابات الجلدية) لمضادى Ciprofloxacin و Fusidic acid ، ثم لوحظ تأثير حامض السالسلينك Salicylate على حساسية هذه العزلات للمضادين اعلاه ، اوضحت النتائج ان مضادى Ciprofloxacin و Fusidic acid يمتلكان تأثيراً فعالاً ضد عزلات بكتريا *S.aureus* ، وان حامض السالسلينك يزيد من مقاومة بكتريا *S.aureus* للمضادين اعلاه .