Activity of Fusidic-Acid Tested Against Contemporary *Staphylococcus aureus* Collected from United States Hospitals

Abstract 226

Mariana Castanheira, Ph.D.[1], Rodrigo E. Mendes, Ph.D.[1], Paul R. Rhomberg[1], Ronald N. Jones, M.D.[1]

[1]JMI Laboratories, North Liberty, IA, USA

Background:

Fusidic acid (FA) is an established anti-staphylococcal agent used in clinical practice in Europe, Australia and Canada for at least three decades. FA is currently under clinical development for therapy of acute bacterial skin and skin-structure infections (ABSSSI) in the USA. This study assessed the activities of FA and comparators tested *against S. aureus* isolates.

Methods:

S. aureus (7,340) were collected from 51 institutions distributed within all USA census regions in 2008 −2009. Identification was performed by standard algorithms and Vitek 2. Isolates were tested for susceptibility (S) by CLSI methods (M07-A8 and M100-S20). *S. aureus* were analyzed based on resistance (R) patterns. A pan-R pattern was defined as *S. aureus* exhibiting an R phenotype to at least 5 antimicrobial classes (projected breakpoint).

Results:

Isolates were mainly from bacteremia (46.0%), SSSI (31.5%) and respiratory tract infections (16.6%). Overall, FA inhibited 99.6% of tested S. aureus at ≤1 µg/mL. FA ($MIC_{50/90}$, 0.12/0.25 µg/mL) and tigecycline (TG; $MIC_{50/90}$, 0.12/0.25 µg/mL; 100.0% S) showed equivalent activity against *S. aureus*, while FA was two-to 16-fold more active than daptomycin (DA; $MIC_{50/90}$, 0.25/0.5 µg/mL; 99.9% S), vancomycin (VA; $MIC_{50/90}$, 1/1 µg/mL; 100.0% S) and linezolid (LZ; $MIC_{50/90}$, 2/2 µg/mL; 99.9% S). Gentamicin (97.9% S), tetracycline (95.5% S) and trimethoprim/ sulfamethoxazole (98.6% S) also exhibited coverage against nearly all S. aureus. FA had consistent modal MIC and MIC_{50} values (0.12 µg/mL) across all R subsets. Only FA (MIC_{90}, 0.25 µg/mL), TG (MIC_{90}, 0.25 µg/mL), DA (MIC_{90}, 0.5 µg/mL), VA (MIC_{90}, 1 µg/mL) and LZ (MIC_{90}, 2 µg/mL) sustained potency against strains with pan-R patterns.

Conclusion:

FA demonstrated potent activity against this current collection of *S. aureus* from USA hospitals. FA activity was comparable to TG, which were at least two-fold more active than other agents with similar clinical indications.

Organism/ Resistance pattern[a] (no. tested/% of total)	Number (cumulative %) inhibited at MIC (µg/mL)							
	≤0.06	0.12	0.25	0.5	1	2	4	8
All *S. aureus* (7,340/100.0)	1070(14.6)	**5327(87.2)**[b]	826(98.4)	70(99.4)	20(99.6)	10(99.8)	9(99.9)	8(100.0)
2008 *S. aureus* (3,962/54.0)	397(10.0)	**3066(87.4)**	434(98.4)	48(99.6)	5(99.7)	3(99.8)	3(99.8)	6(100.0)
2009 *S. aureus* (3,378/46.0)	673(19.9)	**2261(86.9)**	392(98.5)	22(99.1)	15(99.6)	7(99.8)	6(99.9)	2(100.0)
MRSA (3,877/52.8)	493(12.7)	**2884(87.1)**	435(98.3)	38(99.3)	15(99.7)	8(99.9)	3(>99.9)	1(100.0)
MSSA (3,463/47.2)	577(16.7)	**2443(87.2)**	391(98.5)	32(99.4)	5(99.6)	2(99.6)	6(99.8)	7(100.0)
OX, ER, CP (1,364/18.6)	149(10.9)	**1017(85.5)**	184(99.0)	9(99.6)	3(99.9)	2(100.0)	–	–
OX, ER, CL, CP (1,156/15.7)	97(8.4)	**859(82.7)**	168(97.2)	20(99.0)	7(99.6)	4(99.9)	1(100.0)	–
OX, ER (751/10.2)	141(18.8)	**574(95.2)**	27(98.8)	3(99.2)	4(99.7)	0(99.7)	2(100.0)	–
ER (729/10.0)	115(15.8)	**523(87.5)**	83(98.9)	5(99.6)	1(99.7)	1(99.9)	1(99.9)	1(100.0)
ER, CP (177/2.4)	27(15.3)	**125(85.9)**	20(97.2)	2(98.3)	2(99.4)	1(100.0)	–	–
OX, CL, CP (137/1.9)	23(16.8)	**104(92.7)**	7(97.8)	2(99.3)	0(99.3)	0(99.3)	0(99.3)	1(100.0)
ER, CL, CP (112/1.5)	12(10.7)	**83(84.8)**	16(99.1)	1(100.0)	–	–	–	–
Pan-R (170/2.4)	31(18.2)	**116(86.5)**	22(99.4)	22(99.0)	0(99.0)	1(100.0)	–	–

a. Most prevalent resistance patterns noted among *S. aureus*. MRSA = methicillin-resistant *S. aureus*; MSSA = methicillin-susceptible *S. aureus*. CL, clindamycin; CP, ciprofloxacin; ER, erythromycin; and OX, oxacillin. Pan R = pan resistance phenotype (resistance at least 5 antimicrobial classes). Criteria for susceptibility were those published by CLSI (M100-S20, 2010). Intermediate and resistant results grouped as resistant.

b. Modal MIC and MIC_{50} values are bold, while MIC_{90} results are underlined.