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Introduction:

Biapenem (1β-methyl-carbapenem) is a newer carbapenem for treatment of infections moderate to severe in nature. It's stability against most β-lactamases, including AmpC and extended-spectrum β-lactamases (ESBLs), along with a broad spectrum activity against Gram-positive and Gram-negative aerobic and anaerobic bacteria[1,2] makes it promising for future. It's mechanism of action is same as meropenem which binds with penicillin binding proteins and inhibits bacterial cell wall synthesis. The 1-β-methyl group of biapenem makes it more stable against the hydrolysis by human renal dehydropeptidase-I (DHP-I) than is meropenem[3].

Material & Methods:

20 isolates were taken randomly from urine, ET (Endotracheal Tube) secretion and sputum. The isolates were tested for the antimicrobial susceptibility of Biapenem by Kirby-Bauer disc diffusion method on Mueller-Hinton Agar media (Hi-Media) and interpreted as per the CLSI guidelines 2023 based on the zone size diameter of Meropenem.

Results:

Out of 20 isolates 8 isolates found to be resistant to both meropenem and biapenem . The rests 12 isolates found to be sensitive to both meropenem and biapenem. Interestingly the sensitivity profile of these 20 isolates found to be completely similar i.e. those sensitive to meropenem are also sensitive to biapenem and those resistant to meropenem also resistant to biapenem. This single centered in vitro study showed non inferiority of biapenem to meropenem.

service_name	organism_name	antibiotic_name	mic	pattern	BIAPENEM
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	>=16	Resistant	R
ET SECRETION FOR C/S	Acinetobacter baumannii	Meropenem	>=16	Resistant	R
ET SECRETION FOR C/S	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
ET SECRETION FOR C/S	Acinetobacter baumannii	Meropenem	>=16	Resistant	R
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	1	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
SPUTUM FOR CULTURE AND SENSITIVITY	Klebsiella pneumoniae	Meropenem	>16	Resistant	R
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Pseudomonas aeruginosa	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	<=0.25	Susceptible	S
ET SECRETION FOR C/S	Klebsiella pneumoniae	Meropenem	>=16	Resistant	R
URINE FOR CULTURE & SENSITIVITY	Escherichia coli	Meropenem	>=16	Resistant	r
ET SECRETION FOR C/S	Klebsiella pneumoniae	Meropenem	>=16	Resistant	R
URINE FOR CULTURE & SENSITIVITY	Klebsiella pneumoniae	Meropenem	>=16	Resistant	R

Discussion:

Carbapenems are excellent bactericidal antimicrobial agents with good tissue penetration and broad spectrum of coverage including gram negative, gram positive and anaerobes. Biapenem has similar antimicrobial profile like meropenem and our study will help in proving evidence that in vitro profile of biapenem is non inferior to meropenem. It is launced in Japan[4,5] and so literatures are limited in this agent.

Conclusion:

Our study showed that biapenem is non inferior to meropenem in invitro profile and can be an alternative choice for moderate to severe infections.

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