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A retrospective observational study on the discordance rate of antibiotic dosing among critically ill patients: Considerations for using KDIGO guideline

Worapong Sungsana[1,2], Chotirat Nakaranurack[3], Weerachai Chaijamorn[3], Nattachai Srisawat[4,5,6,7,8]

[1]The College of Pharmacotherapy of Thailand, Nonthaburi, Thailand.

[2]Faculty of Pharmaceutical Sciences, Huachiew Chalermprakiet University, Samut Prakan, Thailand.

[3]Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand.

[4]Division of Nephrology, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand.

[5]Excellence Center for Critical Care Nephrology, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand.

[6]Center of Excellence in Critical Care Nephrology and Critical Care Nephrology Research Unit, Chulalongkorn University, Bangkok, Thailand.

[7]Academy of Science, Royal Society of Thailand, Bangkok, Thailand.

[8]Tropical Medicine Cluster, Chulalongkorn University, Bangkok, Thailand.

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Supplementary materials

Table 1. Estimated glomerular filtration rate equations [1-3]

Equation	Gender	Creatinine (mg/dL)	Cystatin C (mg/L)	Estimated glomerular filtration rate
Cockcroft-Gault (ml/min)	Female or Male	-	-	((140-Age) x BW)/(72 x Scr) [× 0.85 if female]
CKD-EPI eGFRcys 2012 (ml/min/1.73m^2)		-	≤0.8	$133 \times (Scys/0.8)^{-0.499} \times 0.9962^{Age}$ [× 0.932 if female]
		-	>0.8	$133 \times (Scys/0.8)^{-1.328} \times 0.9962^{Age}$ [× 0.932 if female]
CKD-EPI eGFRcr-cys 2021 (ml/min/1.73m^2)	Female	≤0.7	≤0.8	$130 \times (Scr/0.7)^{-0.219} \times (Scys/0.8)^{-0.323} \times 0.9961^{Age}$
			>0.8	$130 \times (Scr/0.7)^{-0.219} \times (Scys/0.8)^{-0.778} \times 0.9961^{Age}$
		>0.7	≤0.8	$130 \times (Scr/0.7)^{-0.544} \times (Scys/0.8)^{-0.323} \times 0.9961^{Age}$
			>0.8	$130 \times (Scr/0.7)^{-0.544} \times (Scys/0.8)^{-0.778} \times 0.9961^{Age}$
	Male	≤0.9	≤0.8	$135 \times (Scr/0.9)^{-0.144} \times (Scys/0.8)^{-0.323} \times 0.9961^{Age}$
			>0.8	$135 \times (Scr/0.9)^{-0.144} \times (Scys/0.8)^{-0.778} \times 0.9961^{Age}$
		>0.9	≤0.8	$135 \times (Scr/0.9)^{-0.544} \times (Scys/0.8)^{-0.323} \times 0.9961^{Age}$
			>0.8	$135 \times (Scr/0.9)^{-0.544} \times (Scys/0.8)^{-0.778} \times 0.9961^{Age}$
CKD-EPI eGFRcr 2021 (ml/min/1.73m^2)	Female	≤0.7	-	$143 \times (Scr/0.7)^{-0.241} \times 0.9938^{Age}$
		>0.7	-	$143 \times (Scr/0.7)^{-1.200} \times 0.9938^{Age}$
	Male	≤0.9	-	$142 \times (Scr/0.9)^{-0.302} \times 0.9938^{Age}$
		>0.9	-	$142 \times (Scr/0.9)^{-1.200} \times 0.9938^{Age}$

CKD-EPI: Chronic Kidney Disease Epidemiology Collaboration, eGFR: estimated glomerular filtration rate, MDRD Caucasian: Caucasian Modification of Diet in Renal Disease, Scr: Serum creatinine, Scys: Serum cystatin C, BW: body weight.

Table 2. Meropenem dose adjustments in altered kidney function [4].

SOD	CrCl (ml/min)	If the usual recommended dose is 1 gm q 8 h	If the usual recommended dose is 2 gm q 8 h
1	≥51	1 gm q 8 h	2 gm q 8 h
2	26-50	1 gm q 12 h	2 gm q 12 h
3	11-25	500 mg q 12 h	1 gm q 12 h
4	≤ 10	500 mg q 24 h	1 gm q 24 h

SOD, stage of dosing; CrCl, creatinine clearance

Table 3. Imipenem/cilastatin dose adjustments in altered kidney function [5].

SOD	CrCl (ml/min)	If the usual recommended dose is 500 mg q 6 h	If the usual recommended dose is 1 gm q 8 h	If the usual recommended dose is 1 gm q 6 h
1	≥60	500 mg q 6 h	1 gm q 8 h	1 gm q 6 h
2	30-59	500 mg q 8 h		500 mg q 6 h
3	15-29	500 mg q 12 h		250 mg q 6 h
4	<15	Do not administer imipenem/cilastatin unless hemodialysis is instituted within 48 hours.		

SOD, stage of dosing; CrCl, creatinine clearance

Table 4. Ertapenem dose adjustments in altered kidney function.

SOD	CrCl (ml/min)	Dosage regimen
1	> 30	1 gm q 8 h
2	≤ 30	1 gm q 12 h

SOD, stage of dosing; CrCl, creatinine clearance

Table 5. Piperacillin/tazobactam dose adjustments in altered kidney function [6].

SOD	CrCl (ml/min)	If the usual recommended dose is 4.5 gm q 6 h drip in 30 min	If the usual recommended dose is 3.375 gm q 8 h drip in 4 h
1	≥100	4.5 gm q 6 h (extended infusion preferred)	3.375 or 4.5 gm q 6 h
2	40-99	4.5 gm q 6 h	3.375 gm q 8 h
3	20-39	4.5 gm q 8 h or 3.375 gm q 6 h	3.375 gm q 8 or 12 h
4	<20	4.5 gm q 12 h or 2.25 gm q 6 h	3.375 gm q 12 h

SOD, stage of dosing; CrCl, creatinine clearance

Table 6. Modified sulbactam based dose adjustment in altered kidney function from Jaruratanasirikul S., et al. [7].

CrCl (ml/min)	SOD	Serum albumin <2.5 gm/dL	SOD	Serum albumin ≥2.5 gm/dL
≥90	1	12 gm/day	1	12 gm/day
60- 89	2	9 gm/day		12 gm/day
30- 59	3	6 gm/day		12 gm/day
<30	4	4 gm/day	2	8 gm/day

SOD, stage of dosing; CrCl, creatinine clearance

Table 7. Modified fosfomycin dose adjustment in altered kidney function from Monte Carlo simulation studies [8-11].

SOD	CrCl (ml/min)	Maintenance dose
1	≥ 40	16 gm/day divided 2 to 4 doses
2	30-39	12 gm/day divided 2 to 3 doses
3	10-29	8 gm/day divided 2 to 3 doses
4	< 10	6 gm/day divided 1 to 2 doses

SOD, stage of dosing; CrCl, creatinine clearance

Table 8 Aminoglycosides dose adjustments in altered kidney function [12, 13].

SOD	CrCl (ml/min)	Maintenance dose of amikacin	Maintenance dose of gentamicin
1	≥ 60	15-20 mg/kg q 24 h	5-7 mg/kg q 24 h
2	40-59	15-20 mg/kg q 36 h	5-7 mg/kg q 36 h
3	20-39	15-20 mg/kg q 48 h	5-7 mg/kg q 48 h
4	< 20	15-20 mg/kg/dose	5-7 mg/kg/dose

SOD, stage of dosing; CrCl, creatinine clearance

Table 9 Colistin dose adjustments in altered kidney function [14].

SOD	CrCl (ml/min)	Loading dose	Maintenance dose
1	> 80	300 mg	150 mg q 8-12 h
2	41-80		150 mg q 12 h
3	21-40		100 mg q 12 h
4	≤ 20		150 mg q 24 h

SOD, stage of dosing; CrCl, creatinine clearance

Table 10 Vancomycin initial dose adjustments in altered kidney function [15].

SOD	CrCl (ml/min)	Loading dose	Maintenance dose
1	> 90	25-30 mg/kg	15-20 mg/kg q 8-12 h
2	50-90	20-25 mg/kg	15-20 mg/kg q 12 h
3	15-49		10-15 mg/kg q 24 h
4	< 15		10-15 mg/kg q 48-72 h

SOD, stage of dosing; CrCl, creatinine clearance

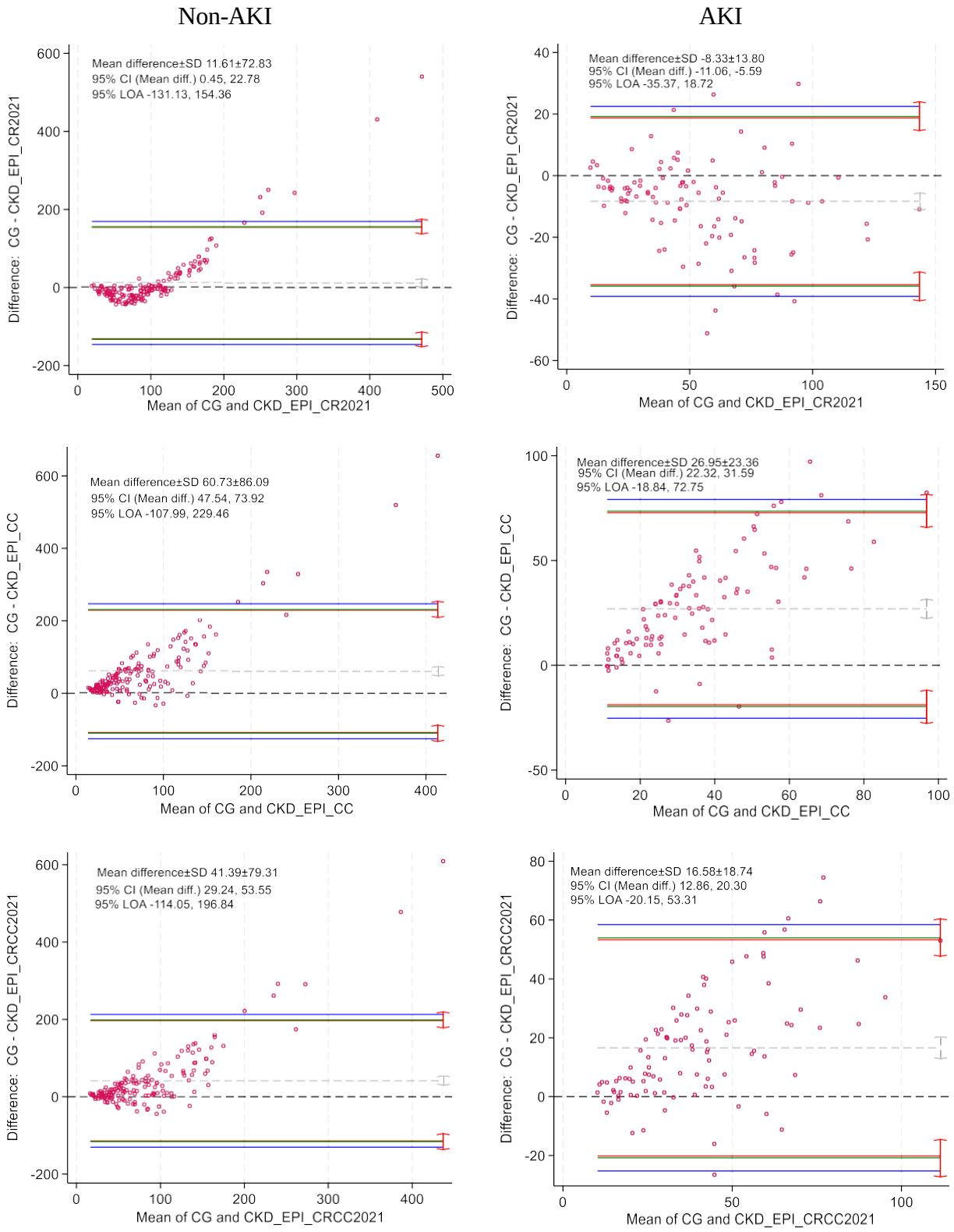

Figure 1. Bland–Altman analysis of the non-AKI group (166 cystatin C sampling points) and AKI group (100 cystatin C sampling points). Grey dashed lines represent bias and 95% CI. Red lines represent 95% Limits of Agreement (LoA) and 95% CI for the upper and lower LoA.

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