Mina Amer et al



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3229333

Available online at: <u>http://www.iajps.com</u>

Research Article

PREVALENCE, RISK FACTORS AND OUTCOMES OF ACUTE KIDNEY INJURY IN PATIENTS WITH BURN. A META-ANALYSIS STUDY

¹Dr. Mina Amer, ²Dr. Usama Saeed, ³Dr. Ibn-e-Hassan

¹Quaid-e-Azam Medical College Bahawalpur, ²Services Institute of Medical Sciences, Lahore, ³Nishtar Medical University, Multan.

Article Received: March 2019	Accepted: April 2019	Published: May 2019
Abstract:		
Aim of study: Acute kidney injury (AKI) is a fa	tal complication of burn injury. I	The aim of the study is to determining
the prevalence, risk factors, and outcomes of A	KI in patients with burn injury.	
Method: An electronic search (up to 2017) w	vas performed using Pubmed, En	nbase, Medline, Web of Knowledge,
and the Cochrane Library databases. Finally	, a total of 18 articles (nine pro	spective cohort, seven retrospective
cohort, two case-control) met the inclusion crit	iteria.	
Results: The pooled incidence of AKI was 39.		
for the occurrence of AKI included age (OR		
TBSA (OR = 15.66 [11.01-20.31]), flame burr	n (OR = 1.56 [1.09-2.25]), inhalo	(OR = 2.97 [1.80-4.89]),
abbreviated burn severity index on admission		0
on admission baseline blood urea nitrogen (
and sepsis ($OR = 4.42 [1.75-11.18]$). Additi	onally burn patients with AKI a	are more likely to have long stay in
intensive care unit and high mortality rate.		
Conclusion: AKI is a common complication		
variables as risk factors for the development of		
Key words: Acute kidney injury Burns Therma	al injury Meta-analysis Mortality.	

Corresponding author:

Dr. Mina Amer, *Quaid-e-Azam Medical College Bahawalpur.*



Please cite this article in press Mina Amer et al., **Prevalence, Risk Factors and Outcomes of Acute Kidney Injury** in Patients with Burn. A meta-analysis study., Indo Am. J. P. Sci, 2019; 06(05). Mina Amer et al

INTRODUCTION:

Acute kidney injury (AKI) is a fatal complication of burn injury, which is associated with increased mortality rate, increased hospital stay, and highest cost. The incidence of AKI in burn patients ranged from <1 to 64% is documented in different literature and mortality ranged from 28 to 100%. [1-3] due to the absence of a gold standard criterion for diagnosing AKI incidence ranged widely. [4] In addition, To find out the solution for this problem and establish a uniform definition for AKI, Acute Dialysis Quality Initiative developed and proposed the Risk, Injury, Failure, Loss of function, End-stage renal disease (RIFLE) (fig 1) criteria in 2004. [5]

Older age, severity of the burn injury assessed by the total burned surface area (TBSA) fig 2, sepsis and multiorgan dysfunction are well-recognized risk factors for the development of AKI in burn patients. [6-8] factors that contributed for the development of AKI are reduced renal perfusion and inflammation. Renal ischemia is probably not important in the acute phase of burn injury than originally presumed [9].

Instead, inflammation and apoptosis are probably playing an important role. Excessive volume resuscitation to prevent and treat burn shock cause to intra-abdominal hypertension and abdominal compartment syndrome, which is an underestimated contributing factor to the development of late AKI after burn shock [10]. The intensity and duration of inflammatory phases is an important difference between major burn trauma patients and other types of ICU patients, which may last longer in burn patients. [11]

As is fact, prevention of disease onset and its progression can be slowed down by greater understanding of risk factors for an illness, However, many studies are limited by their definition of AKI, single-center study, small sample size, and examination of a single or a few variables. Moreover, the findings on risk factors for AKI in previous had many variations and contradictions. The aim of this study is to find out prevalence, risk factors and outcomes of the AKI in burn patients defined by RIFLE criteria.(fig 1).

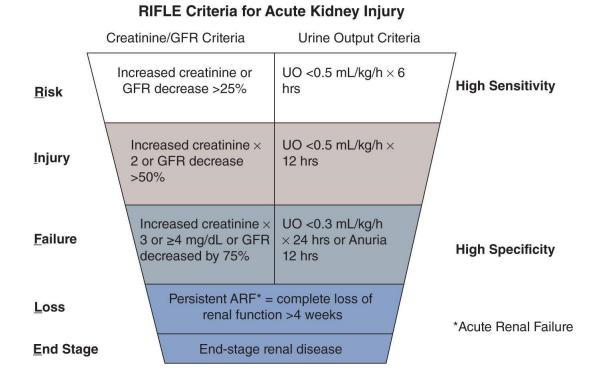
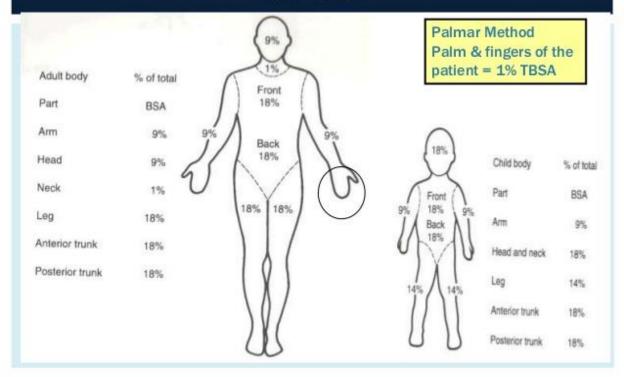


Fig 1: RIFLE Criteria for acute kidney injury

Fig 2: Total burned surface area

TOTAL BODY SURFACE AREA (TBSA) RULE OF 9'S



METHOD:

Search Strategy:

Electronic literature searches of PubMed, Embase, Medline Web of Knowledge, and the Cochrane Library databases up to 2017. The search Mesh terms were used as follows: "acute kidney injury" and "burn". Reference lists of published articles were also hand-searched for additional relevant studies.

Inclusion Criteria:

Only those studies were selected that meet the inclusion criteria i.e. 1) all the participant who admitted to hospital with burn injury; 2) only RIFLE criteria based definition and diagnosis were used for AKI; 3) provide one or more index for the incidence, risk factors, or outcomes of AKI.

Exclusion criteria:

A study was excluded if it was duplicated or did not

fulfill inclusion criteria mentioned above. Reviews and case reports were also excluded.

Data Extraction:

The final data were extracted from the selected studies first author, year of publication, study design, definition of AKI, study population, number of patients with or without AKI, risk factors, and indexes representing clinical outcomes.

Quality Assessment

quality of the studies included in this review using the Newcastle–Ottawa Scald,¹² which allocates a maximum of nine points for quality of the selection (four items, four points), comparability (one item, two points), and outcome or exposure (three items, three points).

Statistical Analysis

A descriptive data was performed to characterized patient basic information, as well as the prevalence and causes of AKI in burn patients, and a metaanalysis was conducted to summarize the risk factors and outcomes with Review Manager 5.1 and Stata 11.0. For continuous variables, the weighted mean difference and 95% confidence intervals (CIs) were calculated. For categorical variables, odds ratio (OR) and 95% CIs were used. Heterogeneity across included studies was assessed using the I2 index and the Q test P value, and was considered significant if P < .1 or I2 > 50%.

RESULT AND DISCUSSION:

A total of 1649 relevant articles were retrieved from Pubmed, Embase, Web of Knowledge, the Cochrane Library databases. After combining and removing duplicates, 997 studies remained. Based on titles and abstracts, 936 were further excluded. The remaining 61 articles were subsequently screened in full text. Thirty-four studies were excluded because they did not use RIFLE criteria to diagnose AKI. No risk factors for AKI could be extracted in seven articles. In addition, there was one letter, and one study with no comparison group. Finally, 18 articles were included in the meta-analysis. The details of selection are shown in Figure 3 and table 1.

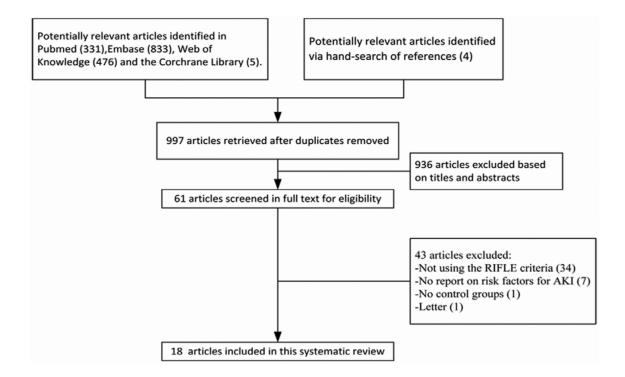


Fig 3: study selection

IAJPS 2019, 06 (05), 10831-10841

Mina Amer et al

Coca et al	304 (81/223)	45 ± 18	40 ± 16	55	182	Retrospective cohort
$(2007)^{20}$	127 (31/96)	55.1 (47.4–62.7)	35.9 (31.8–40.1)	21	74	Prospective, cohort
Steinvall et al	29 (19/10)	50.4 ± 4.6	55.5 ± 6	12	8	Prospective, case-
$(2008)^{26}$	40 (9/31)	44.67 ± 18.03	34.84 ± 9.17	4	13	control
Mariano et al	123 (56/67)	6.74 ± 5.4	7.4 ± 5.4	33	47	Prospective, cohort
(2008) ³⁶ Sabry	60 (32/28)	46 ± 14	41.9 ± 16	26	23	Retrospective cohort
et al (2009) ⁹	221 (62/159)	50.8 ± 18.3	39.1 ± 14	43	118	Retrospective cohort
Palmieri et al	221 (104/117)	47.23 ± 17.06	38.07 ± 14.02	78	83	Retrospective cohort
$(2009)^{37}$	973 (656/1317)	33 (24–500)	30 (22–44)	86	86	Retrospective cohort
Palmieri et al	396 (151/245)	41 ± 16	39.5 ± 16.91	120	178	Retrospective cohort
$(2010)^4$	45 (11/34)	53.9 ± 13.1	49.1 ± 13.5	9	26	Retrospective cohort
Mosier et al	85 (48/37)	51.9 ± 14.5	46.2 ± 15.2	42	30	Prospective, cohort
$(2010)^{16}$	90 (55/35)	51.82 ± 14.11	$45.4\pm14.8\ 2$	48	29	Prospective, cohort
Schneider et al	22 (6/16)	4 (2–6)	(1–6)	5	7	Prospective, cohort
$(2012)^{6}$	97 (40/57)	48.7 ± 16.4	45.9 ± 13.8	36	42	Prospective, case-
Chung et al $(2012)^{38}$ 1	59 (23/36)	37.26 ± 8.97	37.39 ± 11.6	-		control
$(2012)^{38}$ 1	30 (14/16)	40.46 ± 16.5	41.3 ± 15	-		Prospective, cohort
Hu et al $(2012)^{19}$ H	19 (9/10)	59.7 ± 12.4	48.2 ± 18.8	6	5	Prospective, cohort
$(2012)^{19}$ Hong						Prospective, cohort
et al (2013) ¹⁰						Prospective, cohort
Kym et al $(2015)^{11}$						
· /						
Yang et al $(2014)^5$						
(2014) ^a Yavuz et al						
$(2014)^{31}$ Yim						
(2014) 1 m et al $(2015)^{18}$						
Liang et al						
$(2015)^{12}$						
Sen et al						
$(2015)^{17}$						
Rakkolainen						
and Vuola						
$(2016)^{13}$						
AKI, acute						
kidney injury.						
Kiancy injury.						

Table 1. Basic characteristics of the included studies

Prevalence of AKI:

The pooled incidence of AKI was 39.6% (95% confidence interval = 34.7-44.4%). And the all the range of prevalence seen in table 2.

C. h.	C4 12	Detterte	Patients With AKI (n)	AKI Incidence Rate (%) (95%	72 1	D
Subgroup	Studies	Patients		CI)	<i>I</i> ² Index (%)	P
All	18	3941	1407	39.6 (34.7–44.4)	85.5	<.01
Prospective	9	592	240	40.1 (29.7-50.5)	85.9	<.01
Retrospective	7	3298	1142	37.6 (32.0-43.1)	87.0	<.01
Case-control	2	51	25	46.6 (9.1–84.0)	88.5	<.01

Tabl 2: prevalence AKI according to RIFLE criteria

AKI, acute kidney injury; CI, confidence interval.

Risk Factors

Seventeen potential risk factors (reported in at least three studies) are summarized in the present metaanalysis. Forest plots for potential risk factors predisposing to AKI are shown in Figure 4.

Age:

Fifteen studies including 4786 patients indicated that there was a significant association between age and the occurrence of AKI in burn patients (random effect model, I2 = 77%; OR = 3.78, 95% CI = 1.28–6.27, P < .01; Figure 4A).

Sex:

When the 16 studies in which the authors reported gender were aggregated, sex was not associated with the occurrence of AKI in burn patients (fixed effect model, I2 = 29%; OR = 1.00, 95% CI = 0.98–1.19, P > .05; Figure 4B).

TBSA:

Fifteen studies including 1819 patients indicated that AKI was more likely to occur in patients with larger burn area (random effect model, I2 = 85%; OR = 15.66, 95% CI = 11.01–20.31, P < .01; Figure 2C).

Pathogenesis:

Ten studies including 716 patients indicated that flame burn was a risk factor for AKI in patients with burn injury (fixed effect model, I2 = 31%; OR = 1.56, 95% CI = 1.09–2.25, P < .05; Figure 2E). Four studies including 571 patients indicated that AKI was less likely to occur in patients with chemical burn (fixed effect model, I2 = 0%; OR = 0.34, 95% CI = 0.18–0.62, P < .01; Figure 2F). There was no association between scald burn or electrical burn and the occurrence of AKI (fixed effect model; OR = 0.76, 95% CI = 0.42–1.36, and OR = 0.92, 95% CI = 0.52– 1.61, respectively, P > .05; Figure 4G, H).

Inhalation Injury:

Twelve studies with a total of 3633 patients indicated that AKI was more likely to occur in burn patients with inhalation injury.

Sequential Organ Failure Assessment Score:

Four studies including 223 patients indicated that AKI was more likely to occur in burn patients with higher SOFA score on admission

Body Mass Index:

Four studies with a total of 299 patients indicated that there was no association between body mass index (BMI) and the occurrence of AKI in burn patients

Mean Arterial Pressure:

Four studies including 310 patients indicated that there was no association between mean arterial pressure (MAP) and the occurrence of AKI in burn patients

Urine Output:

Three studies with a total of 310 patients indicated that there was no association between urine output at first 24 hours and the occurrence of AKI in burn patients (random effect model, I2 = 97%; OR = -0.23, 95% CI = -0.69 to 0.23, P > .05)

Blood Urea Nitrogen:

Three studies including 155 patients indicated that AKI was more likely to occur in burn patients with higher worst blood urea nitrogen (BUN) at first day post injury (fixed effect model, I2 = 35%; OR = 2.11, 95% CI = 0.72-3.51, P < .01; Figure 3P).

Serum Creatinine:

Eight studies including 881 patients indicated that AKI was less likely to occur in burn patients with higher baseline serum creatinine at first day post injury

Sepsis:

Three studies with a total of 310 patients indicated that patients with sepsis were more likely to develop AKI (random effect model, I2 = 71%; OR = 4.42, 95% CI = 1.75–11.18, P < .01;

Δ Age

Α	Age		AKI		n	on-AKI			Mean Difference	Mean Difference
	Study or Subgroup	Mean		Total			Total	Weight		
	Coca 2007	45	18	656	40	16	1317	10.5%		
	Hong 2013	53.9	13.1	11	49.1	13.5	34	4.5%		
	Hu 2012	41	16	151	39.5	16.91	245	9.2%	1.50 [-1.82, 4.82]	, , .
	Kym 2014	51.9	14.5	48	46.2	15.2	37	6.4%		, <u> </u>
	Liang 2015	37.26	8.97	23	37.39	11.6	36	7.4%		
	Mariano 2008	50.4	4.6	19	55.5	6	10	8.3%		
	Mosier 2010	50.8	18.3	62	39.1	14	159	7.6%		
	Palmieri 2009 Palmieri 2010	6.74	5.4	56 32	7.4 41.9	5.4	67 28	10.3% 5.4%		
	Rakkolainen 2016	46 59.7	14 12.4	9	41.9	16 18.8	10	2.4%		
	Sabry 2009	44.67	18.03	9	34.84	9.17	31	3.0%		
	Schneider 2012	47.23	17.06	104	38.07	14.02	117	8.4%		
	Sen 2015	40.46	16.5	14	41.3	15	16	3.4%		
	Yang 2014	51.82	14.11	55	45.4	14.8	35	6.6%		
	Yim 2015	48.7	16.4	40	45.9	13.8	57	6.5%		
	Total (95% CI)			1289				100.0%	3.78 [1.28, 6.27]	
	Heterogeneity: Tau ² =				= 14 (P	< 0.000	01); l ²	= 77%		-20 -10 0 10 20
	Test for overall effect:	Z = 2.97	(P = 0.	003)						non-AKI AKI
в										
	Male									
			AKI		non-/	AKI			Odds Ratio	Odds Ratio
	Study or Subgroup	Eve	ents T	otal	Events	Total	Wei	ght M	I-H. Fixed, 95% CI	M-H. Fixed, 95% Cl
	Chung 2012		564	656	1133	1317	40.	3%	1.00 [0.76, 1.30]	+
	Coca 2007		55	81	182	223			0.48 [0.27, 0.85]	
	Hong 2013		9	11	26	34		9%	1.38 [0.25, 7.77]	
	Hu 2012		120	151	178	245			1.46 [0.90, 2.37]	+
	Kym 2014		42	48	30	37		6%	1.63 [0.50, 5.35]	
	Mariano 2008		12	19	8	10		5%	0.43 [0.07, 2.61]	
	Mosier 2010		43	62	118	159		7%	0.79 [0.41, 1.50]	
	Palmieri 2009		33	56	47	67		7%	0.61 [0.29, 1.29]	
	Palmieri 2010		26	32	23	28		8%	0.94 [0.25, 3.50]	
	Rakkolainen 2016		6	9	5	10			2.00 [0.31, 12.84]	· · · · ·
	Sabry 2009		4	9	13	31		2%	1.11 [0.25, 4.94]	
	Schneider 2012		78	104	83	117		4%	1.23 [0.68, 2.23]	
	Steinvall 2008		21	31	74	96		4%	0.62 [0.26, 1.52]	
	Yang 2014		48	55	29	35		7%	1.42 [0.43, 4.63]	
	Yavuz 2014		5	6	7				6.43 [0.60, 68.31]	, ,
	Yim 2015		36	40	42	57			3.21 [0.98, 10.56]	
	1111 2015		50	40	42	57	1.	570	5.21 [0.30, 10.30]	
	Total (95% CI)		্র	370		2482	100.	0%	1.00 [0.85, 1.19]	•
	Total events	1	102		1998					
	Heterogeneity: Chi ²			5 (P =		$^{2} = 299$	6		-	
	Test for overall effect					207	•			0.05 0.2 1 5 20
			.01 (0.01	·					non-AKI AKI
С	Total TBSA									
-										
		n	on-AKI			AKI			Mean Difference	Mean Difference
	Study or Subgroup	n Mean	SD	Total	Mean	SD		Weight	IV. Random, 95% C	I IV. Random. 95% CI
	Coca 2007	Mean 34	<u>SD</u> 19	Total 81	24	<u>SD</u> 18	223	7.9%	IV. Random, 95% C 10.00 [5.24, 14.76]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013	Mean 34 69.6	5D 19 28.1	Total 81 11	24 40.6	SD 18 17.7	223 34	7.9% 3.8%	IV. Random, 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012	Mean 34 69.6 70	5D 19 28.1 35	Total 81 11 151	24 40.6 42.65	SD 18 17.7 27.09	223 34 245	7.9% 3.8% 7.4%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88]	I IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014	Mean 34 69.6 70 63.1	SD 19 28.1 35 19.4	Total 81 11 151 48	24 40.6 42.65 40.3	SD 18 17.7 27.09 16.1	223 34 245 37	7.9% 3.8% 7.4% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015	Mean 34 69.6 70 63.1 76.78	SD 19 28.1 35 19.4 18.25	Total 81 11 151 48 23	24 40.6 42.65 40.3 64.78	SD 18 17.7 27.09 16.1 16.63	223 34 245 37 36	7.9% 3.8% 7.4% 7.0% 6.4%	IV. Random, 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008	Mean 34 69.6 70 63.1 76.78 51.3	SD 19 28.1 35 19.4 18.25 5.4	Total 81 151 48 23 19	24 40.6 42.65 40.3 64.78 44.9	SD 18 17.7 27.09 16.1 16.63 6.2	223 34 245 37 36 10	7.9% 3.8% 7.4% 7.0% 6.4% 8.0%	V. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015	Mean 34 69.6 70 63.1 76.78 51.3 42.5	SD 19 28.1 35 19.4 18.25 5.4 17.6	Total 81 151 48 23 19 62	24 40.6 42.65 40.3 64.78 44.9 41.8	SD 18 17.7 27.09 16.1 16.63 6.2 19.4	223 34 245 37 36 10 159	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7%	V. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02]	Cl IV. Random. 95% Cl
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010	Mean 34 69.6 70 63.1 76.78 51.3	SD 19 28.1 35 19.4 18.25 5.4	Total 81 151 48 23 19	24 40.6 42.65 40.3 64.78 44.9	SD 18 17.7 27.09 16.1 16.63 6.2	223 34 245 37 36 10	7.9% 3.8% 7.4% 7.0% 6.4% 8.0%	V. Random, 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02] 19.10 [13.67, 24.53]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7	SD 19 28.1 35 19.4 18.25 5.4 17.6 17	Total 81 151 48 23 19 62 56	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13	223 34 245 37 36 10 159 67	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.7%	V. Random, 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [11.06, 25.14]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19	Total 81 151 48 23 19 62 56 32	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7	223 34 245 37 36 10 159 67 28	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.7% 7.2%	V. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.63] 18.10 [11.06, 25.14] 8.00 [-7.58, 23.58]	Cl IV. Random. 95% Cl
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5	Total 81 151 48 23 19 62 56 32 9	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4	223 34 245 37 36 10 159 67 28 10	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [18.5, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [11.06, 25.14] 8.00 [-7.58, 23.58] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34]	Cl IV. Random. 95% Cl
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1	223 34 245 37 36 10 159 67 28 10 31 117 16	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.46, 26.02] 19.10 [13.67, 24.53] 18.10 [11.06, 24.53] 18.10 [17.58, 25.88] 26.15 [15.88, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14	Total 81 151 48 23 19 62 56 32 9 9 9 104 14 55	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1	223 34 245 37 36 10 159 67 28 10 31 117 16 35	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02] 19.10 [11.67, 24.53] 18.10 [11.67, 24.53] 18.10 [11.67, 24.53] 28.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1	223 34 245 37 36 10 159 67 28 10 31 117 16	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02] 19.10 [11.67, 24.53] 18.10 [11.67, 24.53] 18.10 [11.67, 24.53] 28.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 9.10 [11.67, 24.53] 18.10 [11.66, 25.44] 8.00 [-7.88, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI)	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14 21.3	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1 14.9	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02] 19.10 [11.67, 24.53] 18.10 [11.67, 24.53] 18.10 [11.67, 24.53] 28.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² =	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14 21.3 Chi ² = 93	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1 14.9	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 9.10 [11.67, 24.53] 18.10 [11.66, 25.44] 8.00 [-7.88, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05]	Cl IV. Random. 95% Cl
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI)	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14 21.3 Chi ² = 93	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1 14.9	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 9.10 [11.67, 24.53] 18.10 [11.66, 25.44] 8.00 [-7.88, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05]	CI IV. Random. 95% CI
	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² =	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14 21.3 Chi ² = 93	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1 14.9	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 9.10 [11.67, 24.53] 18.10 [11.66, 25.44] 8.00 [-7.88, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05]	Cl IV. Random. 95% Cl
P	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% Cl) Heterogeneity: Tau ^a = Test for overall effect:	Mean 34 69.6 700 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C Z = 6.60	SD 19 28.1 35 19.4 18.25 5.4 17.6 17.6 17.03 25 21.14 21.3 chi² = 93 (P < 0.	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.1 14.9	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 9.10 [11.67, 24.53] 18.10 [11.66, 25.44] 8.00 [-7.88, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05]	Cl IV. Random. 95% Cl
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² =	Mean 34 69.6 700 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C Z = 6.60	SD 19 28.1 19.4 18.25 5.4 17.6 17.03 25 21.14 21.3 Chi ² = 9: (P < 0.	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13.99 20.1 14.83 13.99 20.1 14.1 14.9 < 0.0000	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [11.06, 24.53] 28.02 [15.25, 30.35] 19.10 [13.67, 24.53] 18.10 [17.68, 25.88] 26.15 [15.88, 36.32] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31]	2) IV. Random. 95% Cl
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect:	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C Z = 6.60	SD 19 28.11 35 19.4 18.25 5.4 17.66 17 13.366 17.03 25 21.14 21.3 Chi ² = 9((P < 0. Chi ² = 9(Chi ² = 9)(Chi	Total 81 11 151 48 23 19 62 56 32 9 9 9 104 14 55 40 714 3.03, df	24 40.6 42.65 40.3 44.9 41.8 22.6 37.6 34.74 38.78 43.67 38.4 38.8 = 14 (P	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.8 13.99 20.1 14.1 14.9 < 0.000	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105 01); I ²	7.9% 3.8% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.36] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [11.06, 25.14] 8.00 [-7.58, 23.58] 26.15 [15.96, 30.32] 9.20 [5.06, 13.57] 15.40 [7.75, 22.30] 15.66 [11.01, 20.31] Mean Difference	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u>	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 66.69 54.2 65.41; C Z = 6.60 TBSA Mean	SD 19 28.1 35 19.4 18.25 5.4 17.6 17.6 17.03 25 21.14 21.3 Chi ² = 9(3 (P < 0. A AKI SD	Total 81 11 151 48 23 19 62 56 56 56 56 32 9 9 9 9 104 14 55 40 714 8.03, df 00001)	24 40.6 42.65 64.78 44.9 41.8 22.6 27.1 37.6 34.74 43.87 38.78 43.67 38.4 38.8 = 14 (P no Mean	SD 18 17.7 27.09 16.1 16.63 6.2 19.4 13 6.7 21.4 14.83 13.99 20.1 14.9 < 0.0000 	223 34 245 37 36 10 159 67 28 01 31 117 16 35 57 1105 01); I ²	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 4.4% 6.1% 8.1% 8.1% 7.2% 4.4% 6.1% 8.1% 7.2% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.56] 12.00 [2.7, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 7.4.53] 18.10 [11.62, 26.12] 19.10 [13.62, 6.02] 9.20 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 54.2 65.41; C 65.41; C TBS/ Mean 58	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 25.5 17.6 17 19.25 13.36 17.03 25 21.14 21.3 Chi² = 93 (P < 0. Aki SD SD ST 4 37	Total 81 111 151 148 23 19 62 55 56 56 56 56 56 56 56 56 56	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 27.1 38.78 43.67 38.78 43.67 38.8 = 14 (P no Mean 38.43	SD I8 17.7 27.09 16.1 16.63 16.2 19.4 13 6.7 21.4 13 13.99 20.1 14.1 14.9 < 0.0000 0.0000	223 34 245 37 36 67 28 10 159 67 28 10 117 16 35 57 1105 01); I ²	7.9% 3.8% 7.4% 6.4% 8.0% 7.7% 7.2% 6.4% 8.1% 4.4% 6.1% 8.1% 4.2% 7.1% 7.0% 100.0% = 85%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [11.06, 25.14] 8.00 [-7.88, 23.58] 26.15 [15.98, 36.32] 9.20 [5.06, 13.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2010 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 54.2 65.41; C 65.41; C TBS/ Mean 58	SD 19 28.1 35 19.4 18.25 5.4 17.6 17 19 12.5 13.36 17.03 25 21.14 21.3 26 21.14 21.3 Chi ² = 9.3 (P < 0. A AKI SD 37 23.7 23.7	Total 81 11 151 48 23 19 62 56 56 56 56 32 9 9 9 9 104 14 55 40 714 8.03, df 00001)	24 40.6 42.65 40.3 64.78 44.9 22.6 27.1 37.6 38.78 43.67 38.78 43.67 38.78 38.8 = 14 (P no Mean 38.43 27.1	SD 18 17.7 27.09 16.1 16.63 19.4 13.39 20.1 14.1 14.9 < 0.0000 AKI SD Tr 21 15	223 34 245 37 36 10 159 67 7 28 10 31 117 16 35 57 1105 57 1105 28 245 37 28 33 4 245 57 10 31 10 10 159 28 36 10 10 159 28 57 10 10 10 11 11 17 16 10 159 10 10 10 10 10 11 11 17 10 10 10 11 11 17 16 10 10 10 10 10 10 10 10 10 10	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 4.4% 6.1% 8.1% 8.1% 7.2% 4.4% 6.1% 8.1% 7.2% 4.2% 7.1% 7.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.83] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [11.67, 24.53] 18.10 [11.06, 25.44] 8.00 [7.58, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.82, 23.89] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.2 45.4 45.6 60.89 54.2 55.4 7.98 49.67 66.69 54.2 56.41; C Z = 6.60 TBSJ Mean 58 51.31	SD 19 28.1 35 19.4 18.25 5.4 17.6 17.7 19 12.5 13.36 17.03 25 21.14 21.3 25 21.14 21.3 Chi² = 93 0 (P < 0.) A AKI SD 7 23.7 23.7 21.7 21.7	Total 81 11 151 48 23 31 9 9 256 32 56 32 56 32 9 9 9 9 104 14 8.03, df 000001) 714 8.03, df 000001)	24 40.6 42.65 40.3 64.78 44.9 41.8 22.6 27.1 37.6 27.1 38.78 43.67 38.78 43.67 38.8 = 14 (P no Mean 38.43	SD 18 17.7 27.09 16.1 16.63 19.4 13.39 20.1 14.1 14.9 < 0.0000 AKI SD Tr 21 15	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105 001); I ² 001; I ² 001 15 ⁹ 37 15 ⁹ 37 15 ⁹ 37 15 ⁹ 37 15 ⁹ 37 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 15 ⁹ 10 10 15 ⁹ 10 10 10 10 10 10 10 10 10 10	7.9% 3.8% 7.4% 6.4% 8.0% 7.7% 6.4% 6.4% 6.1% 6.1% 6.1% 6.1% 6.1% 8.1% 4.2% 7.7% 7.2% 7.7% 7.2% 8.1% 7.0% 8.1% 7.1% 7.2% 8.1% 7.4% 7.4% 8.0% 7.4% 7.4% 7.4% 8.0% 7.4% 7.4% 8.0% 7.4% 7.4% 8.0% 7.4% 7.4% 8.0% 7.4% 7.7% 8.0% 7.7% 7.7% 6.4% 8.0% 7.7% 7.7% 6.4% 8.0% 7.7% 7.7% 6.1% 7.7% 6.1% 7.7% 6.1% 7.7% 7.7% 6.1% 7.7% 7.7% 8.0% 7.7% 7.7% 8.0% 7.7% 7.7% 8.0% 7.7% 8.0% 7.7% 7.7% 7.7% 7.7% 7.7% 7.7% 8.0% 7.7% 7.7% 7.7% 7.7% 7.7% 7.7% 7.7% 7	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.86] 12.00 [2.7, 21.23] 6.40 [1.85, 10.95] 0.70 [-4.62, 46.30] 19.10 [13.67, 24.53] 18.10 [11.06, 25.14] 8.00 [-7.58, 23.58] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48] 3.20 [-2.80, 9.20]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Total (95% CI) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014 Mosier 2010	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 54.2 65.41; C Z 66.69 54.2 65.41; C Z 65.41; C Z 65.41; C 56.39 56.39	SD 19 28.1 35 19.4 18.25 5.4 17.6 17.7 19 12.5 13.36 17.03 25 21.14 21.3 25 21.14 21.3 Chi² = 93 0 (P < 0.) A AKI SD 7 23.7 23.7 21.7 21.7	Total 81 11 151 48 23 19 62 56 63 2 9 9 9 104 14 8.03, df 000001) Total 151 48 62 55 40 714 48.30, df 151 151 151 151 151 151 151 15	24 40.6 42.65 44.9 44.8 22.6 34.74 38.78 43.67 38.4 38.8 38.8 = 14 (P no Mean 38.43 27.1 29.9	SD 18 18 17.7 27.09 16.1 16.63 6.7 21.4 13.3 13.99 20.1 14.1 14.9 < 0.0000 0.0000 n-AKI SD Tr SD Tr 15 19 10	223 34 245 37 36 10 159 67 28 10 31 117 16 35 57 1105 01); I ² 01); I ² 01 159 35	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.2% 4.4% 7.7% 7.2% 4.4% 7.7% 7.2% 4.4% 7.1% 7.2% 4.4% 9.5% 100.0% 100.0% 100.0%	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.83] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [11.67, 24.53] 18.10 [11.06, 25.44] 8.00 [7.58, 23.88] 26.15 [15.98, 36.32] 9.20 [5.06, 13.82, 23.89] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Total (95% CI) Heterogeneity: Tau ^a = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014 Mosier 2010 Yang 2014 Yim 2015	Mean 34 69.6 70 63.1 76.78 51.3 42.5 41.7 45.2 45.6 60.89 47.98 49.67 54.2 65.41; C Z 66.69 54.2 65.41; C Z 65.41; C Z 65.41; C 56.39 56.39	SD 19 28.1 35 19.4 35 19.4 18.25 5.4 17.6 17.03 25 21.14 21.36 (P < 0. (P < 0. 4 AKI SD 21.14	Total 81 81 11 151 48 233 19 62 56 32 9 9 9 104 14 555 40	24 40.6 42.65 44.9 44.9 44.8 22.6 27.1 37.6 34.74 38.78 38.7 38.4 38.8 = 14 (P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SD 8 18 17.7 17.709 16.1 16.63 6.2 19.4 13 6.7 21.4 13.99 20.1 14.13 14.9 <0.0000 0 n-AKI 15 19 10 14 14	223 34 245 37 36 10 159 36 67 28 10 31 117 16 35 57 1105 01); I ² 01; I ² 01; I ² 55 57	7.9% 3.8% 7.4% 7.0% 6.4% 8.0% 7.7% 7.7% 7.7% 6.1% 8.1% 6.1% 6.1% 6.1% 6.1% 6.1% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 8.1% 7.0% 7.2% 8.1% 7.2% 8.1% 7.2% 8.1% 7.2% 8.1% 7.2% 8.1% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.45, 60.95] 0.70 [4.42, 60.22] 19.10 [13.67, 24.53] 18.10 [1-06, 22.45] 28.02 [5.06, 13.34] 6.00 [-10.39, 22.39] 28.29 [21.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 3.20 [-26.09, 20] 3.179 [24.07, 39.51] 17.70 [9.11, 26.29]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014 Mosier 2010 Yang 2014 Yim 2015 Total (95% Cl)	Mean 34 69.6 69.6 70 63.1 76.78 76.78 71.7 45.2 41.7 45.6 60.89 47.96 65.41: C 2 = 6.60 TBSJ 56.39 51.31 33.11 56.39 43.6	SD 19 28.1 35 19.4 18.25 5.4 17.6 17.1 19 12.5 13.36 17.03 25 21.14 21.3 chi² = 93 chi² = 93 chi² = 37 23.7 21.14 SD 4 AKI SD 17.6 20.7 21.14 21.14 21.14 21.14 SD 4 AKI SD 21.14 22.7 21.14 22.5.1	Total 81 811 151 158 19 62 56 52 9 9 9 104 14 555 40 714 8.03, df 000001) 151 48 62 55 40 356 356	24 40.6 42.65 40.3 64.78 22.6 27.1 37.6 38.78 43.67 38.78 43.67 38.8 = 14 (P no Mon 38.43 27.1 29.9 38.43 27.1 29.9 24.6 25.9	SD 8 18 17.7 17.709 16.1 16.63 6.2 19.4 13 6.7 21.4 13.99 20.1 14.1 14.9 < 0.0000 14.1 15 19 10 14 14 14.1	223 34 245 37 36 10 159 67 28 10 67 28 10 57 1105 57 1105 37 159 57 57 57 57 53 1	7.9% 3.8% 7.4% 7.0% 6.4% 7.7% 4.8% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 5.1% 4.2% 7.0% 4.2% 7.0% 4.4% 6.1% 4.2% 7.0% 4.4% 5.2% 4.4% 5.2% 4.4% 7.2% 7.2% 4.4% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [1.06, 25.14] 8.00 [-7.88, 23.58] 26.15 [15.98, 36.32] 9.20 [2.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48] 3.20 [-2.80, 9.20] 31.79 [24.07, 39.51] 17.70 [9.11, 26.29] 19.51 [3.11, 22.61]	2 IV. Random, 95% CI
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2009 Schneider 2012 Sen 2015 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014 Mosier 2010 Yang 2014 Yim 2015 Total (95% CI) Heterogeneity: Tau ² =	Mean 34 69.6 670 76.78 751.3 42.5 66.68 70.76 65.41; C C Z = 6.60 TBS/ Mean 51.31 33.1 56.39 43.6 = 116.41;	SD 19 28.1 35 19.4 18.25 5.4 17.66 5.4 17.67 19 12.55 21.14 21.3 21.3 (P < 0. 0	Total 81 81 11 151 48 23 19 62 56 56 32 9 9 104 40 714 48 8.03, df 000001) Total 151 48 62 55 40 3566 37.87,	24 40.6 42.65 40.3 64.78 41.8 22.6 27.1 38.78 43.67 38.78 43.67 38.78 43.67 38.78 43.67 38.8 = 14 (P Mean 29.9 24.6 29.9 24.6 25.9 df = 4 (SD 8 18 17.7 17.709 16.1 16.63 6.2 19.4 13 6.7 21.4 13.99 20.1 14.1 14.9 < 0.0000 14.1 15 19 10 14 14 10	223 34 245 37 36 10 159 67 28 10 67 28 10 57 1105 57 1105 37 159 57 57 57 57 53 1	7.9% 3.8% 7.4% 7.0% 6.4% 7.7% 4.8% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 5.1% 4.2% 7.0% 4.2% 7.0% 4.4% 6.1% 4.2% 7.0% 4.4% 5.2% 4.4% 5.2% 4.4% 7.2% 7.2% 4.4% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [1.06, 25.14] 8.00 [-7.88, 23.58] 26.15 [15.98, 36.32] 9.20 [2.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48] 3.20 [-2.80, 9.20] 31.79 [24.07, 39.51] 17.70 [9.11, 26.29] 19.51 [3.11, 22.61]	Cl IV. Random. 95% Cl
D	Coca 2007 Hong 2013 Hu 2012 Kym 2014 Liang 2015 Mariano 2008 Mosier 2010 Palmieri 2009 Palmieri 2010 Rakkolainen 2016 Sabry 2009 Schneider 2012 Sen 2015 Total (95% Cl) Heterogeneity: Tau ² = Test for overall effect: Full-thickness <u>Study or Subgroup</u> Hu 2012 Kym 2014 Mosier 2010 Yang 2014 Yim 2015 Total (95% Cl)	Mean 34 69.6 670 76.78 751.3 42.5 66.68 70.76 65.41; C C Z = 6.60 TBS/ Mean 51.31 33.1 56.39 43.6 = 116.41;	SD 19 28.1 35 19.4 18.25 5.4 17.66 5.4 17.67 19 12.55 21.14 21.3 21.3 (P < 0. 0	Total 81 81 11 151 48 23 19 62 56 56 32 9 9 104 40 714 48 8.03, df 000001) Total 151 48 62 55 40 3566 37.87,	24 40.6 42.65 40.3 64.78 41.8 22.6 27.1 38.78 43.67 38.78 43.67 38.78 43.67 38.8 = 14 (P Mean 29.9 24.6 29.9 24.6 25.9 df = 4 (SD 8 18 17.7 17.709 16.1 16.63 6.2 19.4 13 6.7 21.4 13.99 20.1 14.1 14.9 < 0.0000 14.1 15 19 10 14 14 10	223 34 245 37 36 10 159 67 28 10 67 28 10 57 1105 57 1105 37 159 57 57 57 57 53 1	7.9% 3.8% 7.4% 7.0% 6.4% 7.7% 4.8% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 6.1% 4.2% 7.7% 4.4% 5.1% 4.2% 7.0% 4.2% 7.0% 4.4% 6.1% 4.2% 7.0% 4.4% 5.2% 4.4% 5.2% 4.4% 7.2% 7.2% 4.4% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2% 7.2	IV. Random. 95% C 10.00 [5.24, 14.76] 29.00 [11.36, 46.64] 27.35 [20.82, 33.88] 22.80 [15.25, 30.35] 12.00 [2.77, 21.23] 6.40 [1.85, 10.95] 0.70 [4.62, 6.02] 19.10 [13.67, 24.53] 18.10 [1.06, 25.14] 8.00 [-7.88, 23.58] 26.15 [15.98, 36.32] 9.20 [2.01, 35.57] 15.40 [7.75, 23.05] 15.66 [11.01, 20.31] Mean Difference IV. Random. 95% CI 19.57 [13.11, 26.03] 24.21 [15.94, 32.48] 3.20 [-2.80, 9.20] 31.79 [24.07, 39.51] 17.70 [9.11, 26.29] 19.51 [3.11, 22.61]	2 IV. Random, 95% CI

Figure 2. Forest plots for significant risk factors for acute kidney injury with data available in at least three studies. Squares: odds ratios or weighted mean differences; horizontal lines: 95% CIs; diamonds: pooled odds ratios. CI, confidence interval.

10

10

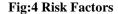
50

50

ABSI J non-AKI AKI Mean Difference Mean Difference Study or Subgroup Mean SD Total Mean SD Total Weight IV, Fixed, 95% CI IV. Fixed, 95% CI Hong 2013 12.3 3.6 11.29 2.33 11 8.2 2.4 48 8.54 1.89 34 37 6.0% 38.7% 4.10 [1.82, 6.38] 2.75 [1.85, 3.65] Kym 2014 -1.4 2.4 Palmieri 2010 8.6 1.8 32 6.6 28 47.4% 2 00 [1 19 2 81] 10.6 Rakkolainen 2016 9 8.5 10 2.10 [0.12, 4.08] 2 7.9% Total (95% CI) 100 109 100.0% 2.42 [1.87, 2.98] ٠ Heterogeneity: Chi² = 3.74, df = 3 (P = 0.29); l² = 20% -10 -5 5 10 Ó Test for overall effect: Z = 8.51 (P < 0.00001) non-AKI AKI K SOFA Mean Difference non-AKI Mean Difference AKI Study or Subgroup Mean SD Total Mean SD Total Weight Mean 50 . 10.98 4.62 IV. Random, 95% CI IV. Random. 95% CI 48 7.51 3.15 37 22.8% 23 6.1 1.2 36 32.3% 32 3.2 2 28 28.3% Kym 2014 3.47 [1.82, 5,12] Liang 2015 Palmieri 2010 7.4 1.6 6.3 2.5 1.30 (0.54, 2.06) 3.10 [1.96, 4.24] 4.2 2.9 Rakkolainen 2016 7.8 2.3 9 10 16.6% 3.60 [1.26, 5.94] 112 111 100.0% 2.69 [1.39, 3.98] Total (95% CI) Heterogeneity: Tau² = 1.20; Chi² = 11.36, df = 3 (P = 0.010); l² = 74% -10 -5 Test for overall effect: Z = 4.07 (P < 0.0001) non-AKI AKI SOFA (omitting Liang 2015) non-AKI Mean Difference Mean Difference AKI Mean SD Total Mean SD Total Weight IV. Fixed. 95% CI 10.98 4.62 48 7.51 3.15 37 27.7% 3.47 [1.82, 5.12] 6.3 2.5 32 3.2 2 28 58.4% 3.10 [1.96, 4.24] 7.8 2.3 9 4.2 2.9 10 13.8% 3.60 [1.26, 5.94] Study or Subgroup IV. Fixed. 95% CI Kym 2014 Palmieri 2010 -Rakkolainen 2016 Total (95% CI) 89 75 100.0% 3.27 [2.40, 4.14] Heterogeneity: Chi² = 0.22, df = 2 (P = 0.90); l² = 0% -10 -5 Ó 5 Test for overall effect: Z = 7.36 (P < 0.00001) non-AKI AKI М вмі AKI non-AKI Mean Difference Mean Difference Study or Subgroup Mean SD Total Mean SD Total Weight IV. Random, 95% CI IV, Random, 95% CI 23.33 1.76 23 23.46 1.49 30.1 8.8 62 27.9 11.7 36 43.6% 159 36.8% Liang 2015 -0.13 [-1.00, 0.74] Mosier 2010 2.20 [-0.65, 5.05] Rakkolainen 2016 35.7 10.4 9 24.3 2.9 10 19.6% 11.40 [4.37, 18.43] 94 Total (95% CI) 205 100.0% 2.98 [-1.17, 7.14] Heterogeneity: Tau² = 10.11; Chi² = 12.20, df = 2 (P = 0.002); l² = 84% Test for overall effect: Z = 1.41 (P = 0.16) -50 25 -25 non-AKI AKI N MAP AKI non-AKI Mean Difference Mean Difference Mean SD Total Mean SD Total Weight IV. Random. 95% C 79.55 8.3 14 81.12 1.98 36 32.2% -1.57 (5.97, 2.83) 80.52 2.35 23 70.44 16.13 117 33.5% 10.08 [7.00, 13.16] 61.53 13.41 104 82.53 5.6 16 33.3% -21.00 [-24.76, -17.24] IV. Random, 95% CI Study or Subaroup IV. Random, 95% CI Liang 2015 Schneider 2012 -Sen 2015 141 169 100.0% -4.15 [-23.13, 14.83] Total (95% CI) Heterogeneity: Tau² = 277.63; Chi² = 157.09, df = 2 (P < 0.00001); l² = 99% Test for overall effect: Z = 0.43 (P = 0.67) -50 -25 ò 25 non-AKI AKI O Urine output AKI non-AKI Mean Difference Mean Difference Mean SD Total Mean SD Total Weight 0.73 0.03 23 0.75 0.02 36 40.3% 0.6 0.35 62 1.16 0.67 159 38.9% 1.1 1.4 1.12 0.8 16 20.9% Study or Subaroup IV. Random, 95% CI IV. Random, 95% C -0.02 [-0.03, -0.01] Liang 2015 Mosier 2010 -0.56 [-0.70, -0.42] Sen 2015 -0.02 [-0.72, 0.68] Total (95% CI) 99 211 100.0% -0.23 [-0.69, 0.23] Heterogeneity: Tau² = 0.14; Chi² = 60.13, df = 2 (P < 0.00001); l² = 97% Test for overall effect: Z = 0.98 (P = 0.33) -4 ò -2 2 non-AKI AKI Ρ BUN AKI non-AKI Mean Difference Mean Difference Study or Subgroup Mean SD Total Mean SD Total Weight IV. Fixed, 95% CI IV. Fixed, 95% CI 15.82 5.32 48 14.91 3.79 17.6 3.81 9 14.2 3.78 37 51.7% 0.91 [-1.03, 2.85] 31 24.4% 3.40 [0.58, 6.22] Kym 2014 Sabry 2009 14 10.3 3.4 Sen 2015 13.7 4.4 16 24.0% 3.40 [0.56, 6.24] Total (95% CI) 84 100.0% 2.11 [0.72, 3.51] 71 Heterogeneity: $Chi^2 = 3.07$, df = 2 (P = 0.22); $I^2 = 35\%$ Test for overall effect: Z = 2.97 (P = 0.003) -10 -5 5 10 non-AKI AKI

Q Serum creatinine

			AKI		n	on-AK			Mean Difference		Mean Difference			
	Study or Subgroup	Mean	SD) Tota	I Mean	SD	Total	Weight	IV, Random, 95%	CI	IV. Random, 95% CI			
	Coca 2007	0.7	0.3	81	0.8	0.3	223	17.5%	-0.10 [-0.18, -0.02	2]	-			
	Hong 2013	1.19	0.2	2 11	0.96	0.2	34	15.3%	0.23 [0.09, 0.37	7]	-			
	Kym 2014	0.93	0.33	48	0.71	0.17	37	16.4%	0.22 [0.11, 0.33	3]	+			
	Liang 2015	1.02	0.33	23	0.83	0.11	36	15.1%	0.19 [0.05, 0.33	3]	-			
	Sabry 2009	0.96	0.19) 9	0.97	0.22	31	14.8%	-0.01 [-0.16, 0.14	4]	+			
	Sen 2015	1.12	1.03	14	0.81	0.24	16	3.9%	0.31 [-0.24, 0.86	5]				
	Yim 2015	0.93	0.23	40	0.77	0.24	57	16.9%	0.16 [0.07, 0.25	5]	*			
	Total (95% CI)			226	;		434	100.0%	0.12 [-0.00, 0.24	1	•			
	Heterogeneity: Tau ² =	0.02 CH	$i^2 = 3$	9 74 0	f = 6 (P)	< 0.000	001): 12	= 85%		-2				
	Test for overall effect:	Z = 1.91	(P =	0.06)							non-AKI AKI			
l	Sepsis		AKI		non-A	KI			Odds Ratio		Odds Ratio			
	Study or Subgroup			Total	Events		Weig	aht M-	H. Random. 95% C	I	M-H. Random, 95% Cl			
	Coca 2007		40	81	33	223	40.	1%	5.62 [3.17, 9.95]					
	Mosier 2010		7	62	12	159	30.	9%	1.56 [0.58, 4.16]					
	Yim 2015		35	40	24	57	29.	0%	9.63 [3.29, 28.19]					
	Total (95% CI)			183		439	100.	0%	4.42 [1.75, 11.18]		-			
	Total events		82		69									
				= 6.93.		P = 0.0	3); l ² =	71%		<u> </u>				
	Heterogeneity: Tau ² Test for overall effect	= 0.47; 0	Chi ² =		df = 2 (F	P = 0.0)3); ² =	71%		0.01 0.	1 1 10 10 non-AKI AKI			



Clinical Outcomes: ICU Length:

When the data from six studies with total 772 patients that reported on intensive care unit (ICU) length were aggregated, we found burn patients developed AKI were associated with longer ICU stay (random effect model, I2 = 70%; OR = 13.25, 95% CI = 5.85-20.64, P < .01; fig 5

ICU Mortality. Three studies including 579 patients indicated that patients with AKI have significantly greater ICU mortality (fixed effect model, I2 = 0%;

OR = 6.63, 95% CI = 3.73-11.80, P < .01; Figure 5B).

Length of Stay. When we aggregated seven studies that reported on length of stay (LOS), we found that burn patients with AKI were not associated with increase in LOS fig 5

Mortality. Eleven studies with a total of 3211 patients indicated that mortality was increased significantly in patients with AKI (random effect model; OR = 9.04, 95% CI = 4.43-18.43, P < .01; fig 5

A ICU length

		AKI		n	on-AKI			Mean Difference		Me	an Differen	ce	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% C	I	IV,	Random, 95	% CI	
Coca 2007	32	32	81	13	18	223	19.6%	19.00 [11.64, 26.36]				-	
Hong 2013	16.9	11.3	11	14	17.8	34	17.9%	2.90 [-6.07, 11.87]					
Mosier 2010	37.13	29.22	62	34.08	41.11	159	17.2%	3.05 [-6.63, 12.73]				•	
Palmieri 2009	36.7	36	56	12.8	11	67	17.1%	23.90 [14.11, 33.69]					
Palmieri 2010	42.9	27	32	25.6	14	28	16.1%	17.30 [6.60, 28.00]				-	
Rakkolainen 2016	34.9	21	9	21.6	10.4	10	12.0%	13.30 [-1.86, 28.46]			-	-	
Total (95% CI)			251			521	100.0%	13.25 [5.85, 20.64]					
Heterogeneity: Tau ² =	58.45; 0	Chi ² = 16	5.81, df	= 5 (P	= 0.005); l ² = 7	0%		H		<u> </u>		
Test for overall effect:									-50	-25 no	0 n-AKI AKI	25	50

B ICU mortality

	AK	I I	non-A	KI		Odds Ratio	Odds Ratio				
Study or Subgroup	Events	Events Total		Total	Weight	M-H, Fixed, 95% C	l	M-H, Fixed, 95% Cl			
Hu 2012	43	151	16	245	88.1%	5.70 [3.07, 10.57]					
Palmieri 2009	5	56	1	67	8.4%	6.47 [0.73, 57.12]			+	•	
Palmieri 2010	11	32	0	28	3.5%	30.49 [1.70, 546.53]					
Total (95% CI)		239		340	100.0%	6.63 [3.73, 11.80]				•	
Total events	59		17								
Heterogeneity: Chi ² =	= 1.30, df =	2 (P = (0.52); l² =	0%			0.01	01		10	100
Test for overall effect	: Z = 6.44 (P < 0.0	0001)				0.01	0.1 noi	n-AKI AKI	10	100

C LOS

		AKI		n	on-AKI			Mean Difference		Mea	n Differen	ce	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV. Random, 95% C	I	IV. Ra	andom, 95	% CI	
Coca 2007	37	34	81	14	18	223	15.6%	23.00 [15.23, 30.77]			-	-	
Hong 2013	31.1	40.2	11	56.8	47.1	34	10.3%	-25.70 [-54.25, 2.85]			-		
Kym 2014	37.9	40	48	53.1	25.1	37	14.3%	-15.20 [-29.11, -1.29]			-		
Mosier 2010	52.37	28.75	62	47.56	41.89	159	15.2%	4.81 [-4.87, 14.49]			+		
Palmieri 2009	51	40	56	18	13	67	15.0%	33.00 [22.07, 43.93]			1	-	
Schneider 2012	53.06	41.88	104	37.38	32.72	117	15.2%	15.68 [5.68, 25.68]					
Yang 2014	33.41	40.56	55	55.7	23.1	35	14.5%	-22.29 [-35.46, -9.12]			-		
Total (95% CI)			417			672	100.0%	3.61 [-11.46, 18.67]			+		
Heterogeneity: Tau ² =	363.26;	Chi ² = 7	71.65, 0	df = 6 (F	o < 0.00	001); l²	= 92%		-100	-50		50	100
Test for overall effect:	Z = 0.47	(P=0.	.64)						-100			50	100

D Mortality

	AKI	AKI non-AKI				Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H. Random, 95% C	M-H. Random. 95% CI
Chung 2012	138	656	13	1317	12.3%	26.72 [15.00, 47.62]	
Coca 2007	23	81	17	223	11.9%	4.81 [2.41, 9.59]	
Hong 2013	8	11	0	34	3.9%	167.57 [7.88, 3562.32]	│
Kym 2014	31	48	4	37	9.7%	15.04 [4.56, 49.67]	
Mariano 2008	10	19	8	10	7.3%	0.28 [0.05, 1.67]	
Mosier 2010	22	62	21	159	11.9%	3.61 [1.81, 7.23]	_
Rakkolainen 2016	2	9	0	10	3.7%	7.00 [0.29, 167.93]	
Schneider 2012	37	104	6	117	11.0%	10.22 [4.09, 25.49]	
Steinvall 2008	11	31	7	96	10.3%	6.99 [2.41, 20.28]	
Yang 2014	38	55	2	35	8.3%	36.88 [7.93, 171.63]	
Yim 2015	21	40	4	57	9.8%	14.64 [4.45, 48.18]	
Total (95% CI)		1116		2095	100.0%	9.04 [4.43, 18.43]	•
Total events	341		82				
Heterogeneity: Tau ² =	0.99; Chi ²	= 46.9	8, df = 10	(P < 0	.00001); 1	^e = 79%	
Test for overall effect:	Z = 6.05 (P < 0.0	0001)	2			0.01 0.1 1 10 100 non AKI AKI

Fig 5: Clinical Outcomes

CONCLUSION:

AKI is frequent complication and occurs at a remarkable rate in burn patients; and AKI is associated with long ICU stay and high mortality. Age, total burn TBSA, full-thickness TBSA, flame burn, inhalation injury, ABSI at admission, SOFA at admission, baseline BUN, baseline serum creatinine, and sepsis are proven risk factors for AKI in burn patients. Our findings may help clinicians to develop effective preventive and therapeutic strategies and provide appropriate, timely initial treatment.

REFERENCE:

- 1. Mustonen KM, Vuola J. Acute renal failure in intensive care burn patients (ARF in burn patients). J Burn Care Res 2008;29:227–37.
- Palmieri T, Lavrentieva A, Greenhalgh DG. Acute kidney injury in critically ill burn patients. Risk factors, progression and impact on mortality. Burns 2010;36:205–11.
- 3. Yang HT, Yim H, Cho YS, et al. Assessment of biochemical markers in the early post-burn period for predicting acute kidney injury and mortality in patients with major burn injury: comparison of serum creatinine, serum cystatin-C, plasma and urine neutrophil gelatinaseassociated lipocalin. Crit Care 2014;18:R151.
- Schneider DF, Dobrowolsky A, Shakir IA, Sinacore JM, Mosier MJ, Gamelli RL. Predicting acute kidney injury among burn patients in the 21st century: a classification and regression tree analysis. J Burn Care Res 2012;33:242–51.

- Bellomo R, Ronco C, Kellum JA, Mehta RL, Palevsky P; Acute Dialysis Quality Initiative workgroup. Acute renal failure - definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group. Crit Care 2004;8:R204–12.
- Fitzwater J, Purdue GF, Hunt JL, O'Keefe GE (2003) The risk factors and time course of sepsis and organ dysfunction after burn trauma. J Trauma 54:959–966 8.
- 7. Blot S (2009) Development and validation of a model for prediction of mortality in patients with acute burn injury. Br J Surg 96:111–117 9.
- 8. Colpaert K, Hoste EA (2008) Acute kidney injury in burns: a story of volume and inflammation. Crit Care 12:192
- Langenberg C, Wan L, Egi M, May CN, Bellomo R (2006) Renal blood flow in experimental septic acute renal failure. Kidney Int 69:1996–2002
- Tuggle D, Skinner S, Garza J, Vandijck D, Blot S (2007) The abdominal compartment syndrome in patients with burn injury. Acta Clin Belg Suppl 1:136–140
- 11. Jeschke MG, Mlcak RP, Finnerty CC, Norbury WB, Gauglitz GG, Kulp GA, Herndon DN (2007) Burn size determines the inflammatory and hypermetabolic response. Crit Care 11:R90.