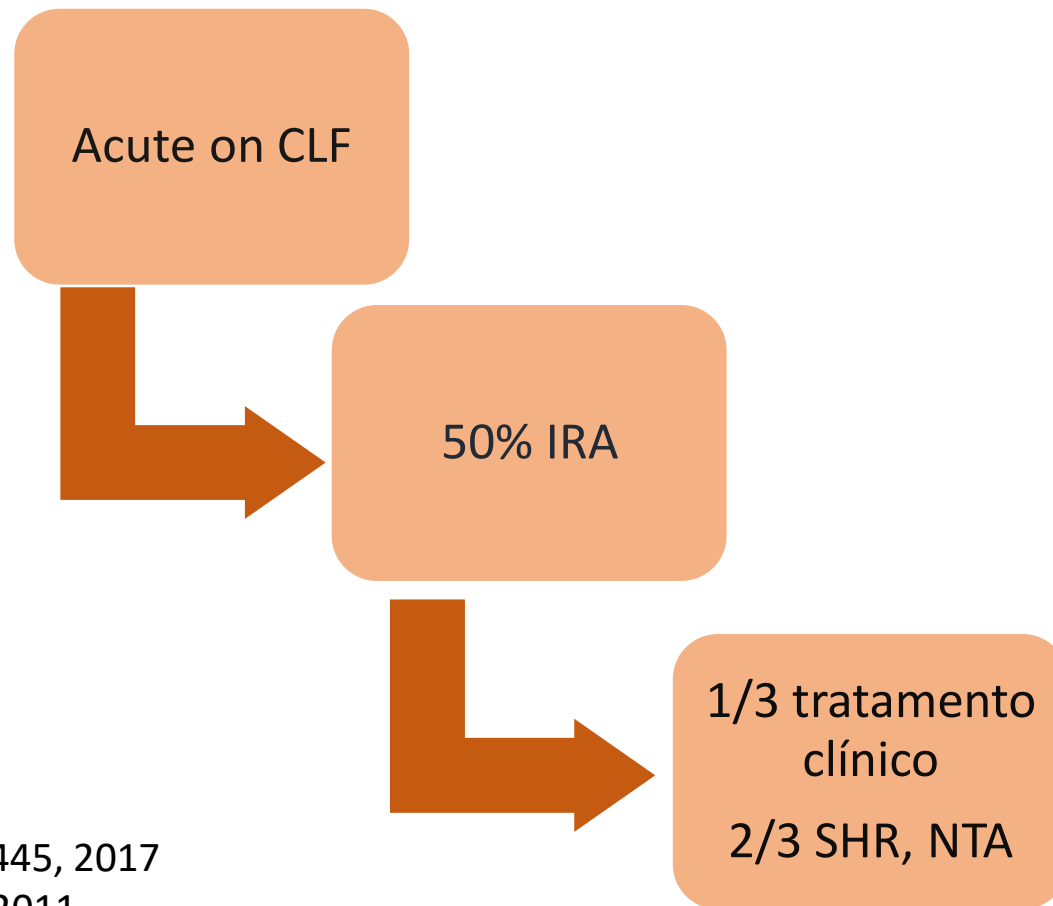




Terapia renal substitutiva: O que muda no cirrótico?

Lúcia Andrade
Professora Associada
Departamento de Clínica Médica- Disciplina de Nefrologia
Faculdade de Medicina da USP

Cirróticos com IRA

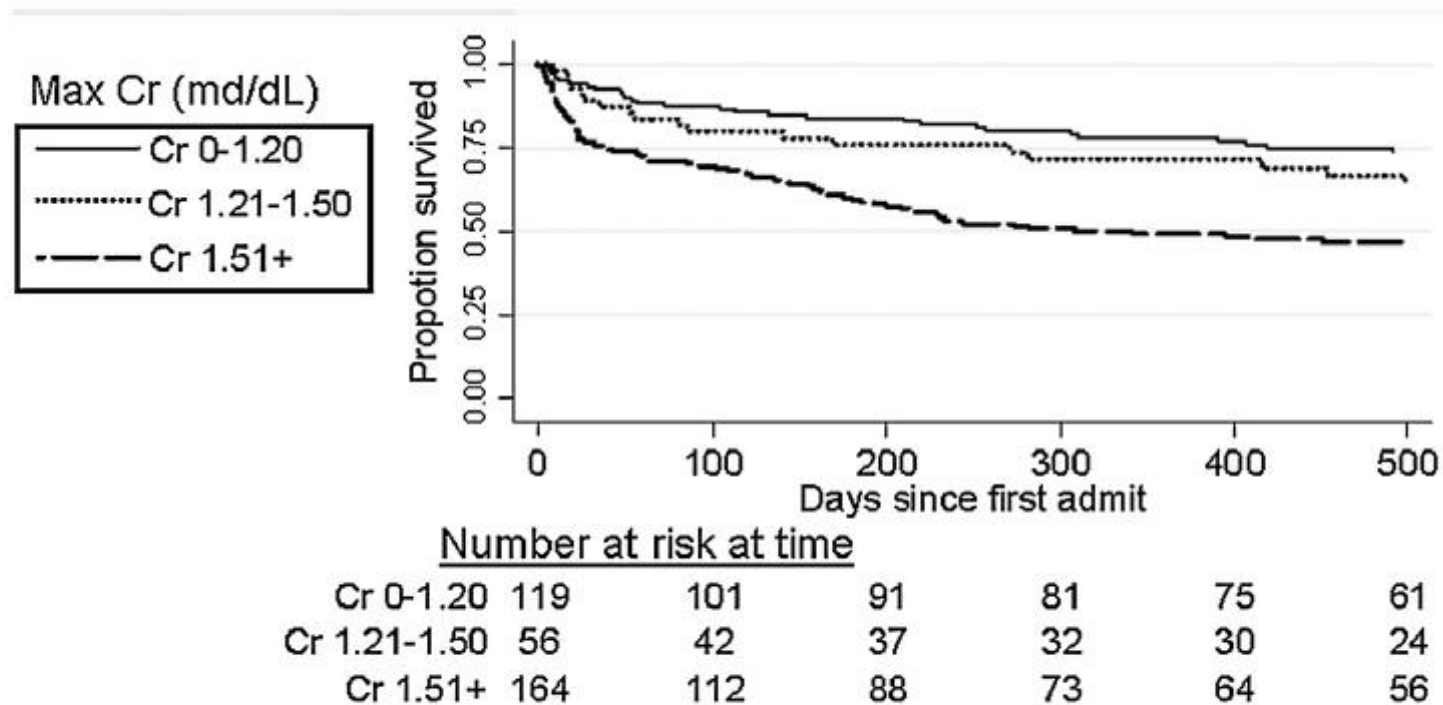


Hepatology 48: 2064–2077, 2008

Clin Gastroenterol Hepatol 15: 438–445, 2017

Gastroenterology 140: 488–496.e4, 2011

IRA e mortalidade em pacientes com cirrose



Impacto da elevação da creatinina em 339 pacientes (636 admissões) os quais haviam sido admitidos por complicações da cirrose.

Time scale: Days since patient's first admission

Data from 636 admissions were used. Deaths were recorded for 169 out of 339 patients in this sample.



Management of renal dysfunction in patients with liver cirrhosis: role of pretransplantation hemodialysis and outcomes after liver transplantation

Ashok Thorat^a, and Long-Bin Jeng^{a,b,*}

^aOrgan Transplantation Center, China Medical University Hospital, 2, Yuh-Der Road, Taichung, Taiwan, 40447

^bDepartment of Surgery, China Medical University Hospital, Taichung, Taiwan

Meta-análise: 9 estudos, 464 pacientes, cirróticos, avaliando diálise pré ou pós TX

Management of renal dysfunction in patients with liver cirrhosis: role of pretransplantation hemodialysis and outcomes after liver transplantation

Ashok Thorat^a, and Long-Bin Jeng^{a,b,*}

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^bDepartment of Surgery, China Medical University Hospital, Taichung, Taiwan

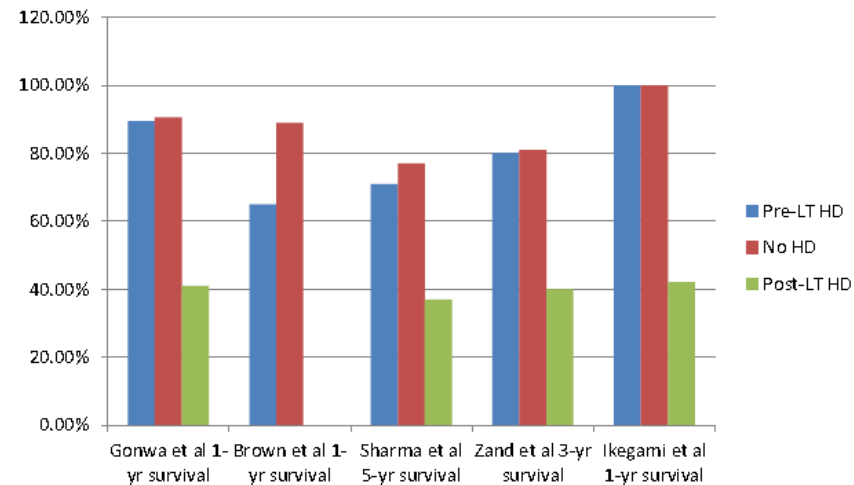


Fig. 1 – Survival of renal failure patients with and without hemodialysis before liver transplantation according to meta-analysis.

Prognosis of Patients with Cirrhosis and AKI Who Initiate RRT

Andrew S. Allegretti,¹ Xavier Vela Parada,¹ Nwamaka D. Eneanya,¹ Hannah Gilligan,¹ Dihua Xu,¹ Sophia Zhao,¹ Jules L. Dienstag,² Raymond T. Chung,² and Ravi I. Thadhani¹

Division of Nephrology and Liver Center and Gastrointestinal Division, Department of Medicine, Massachusetts General Hospital, Boston, Massachusetts

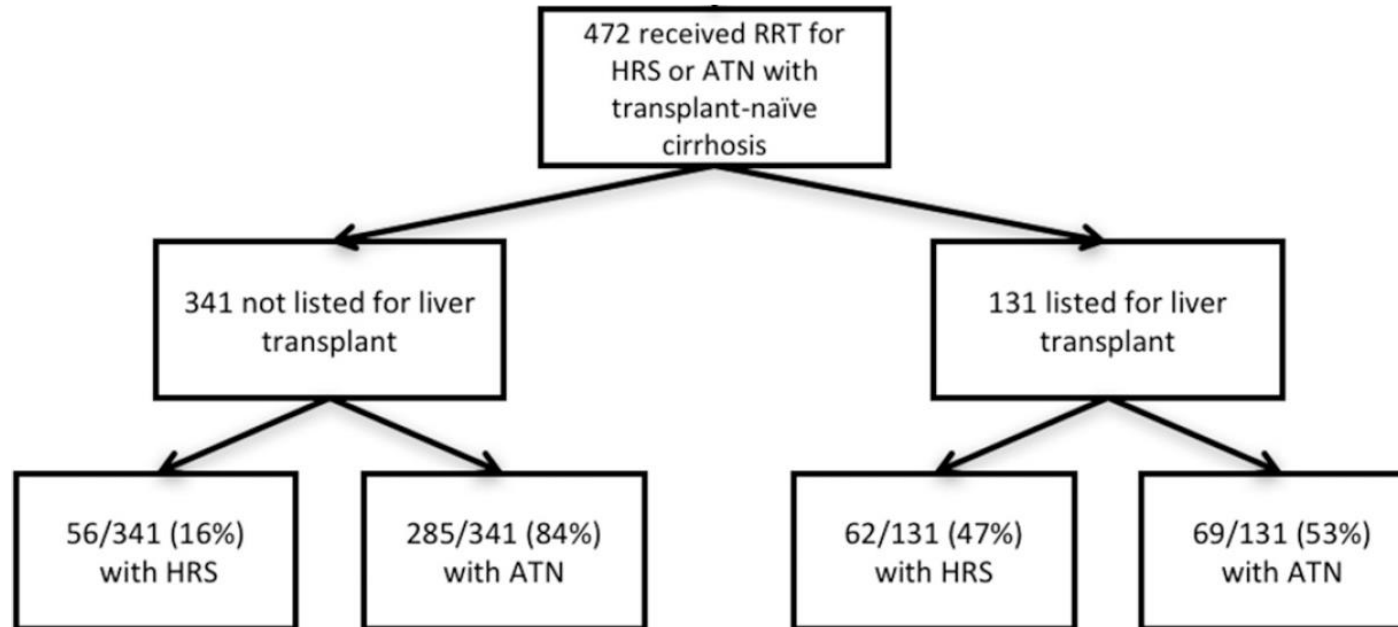
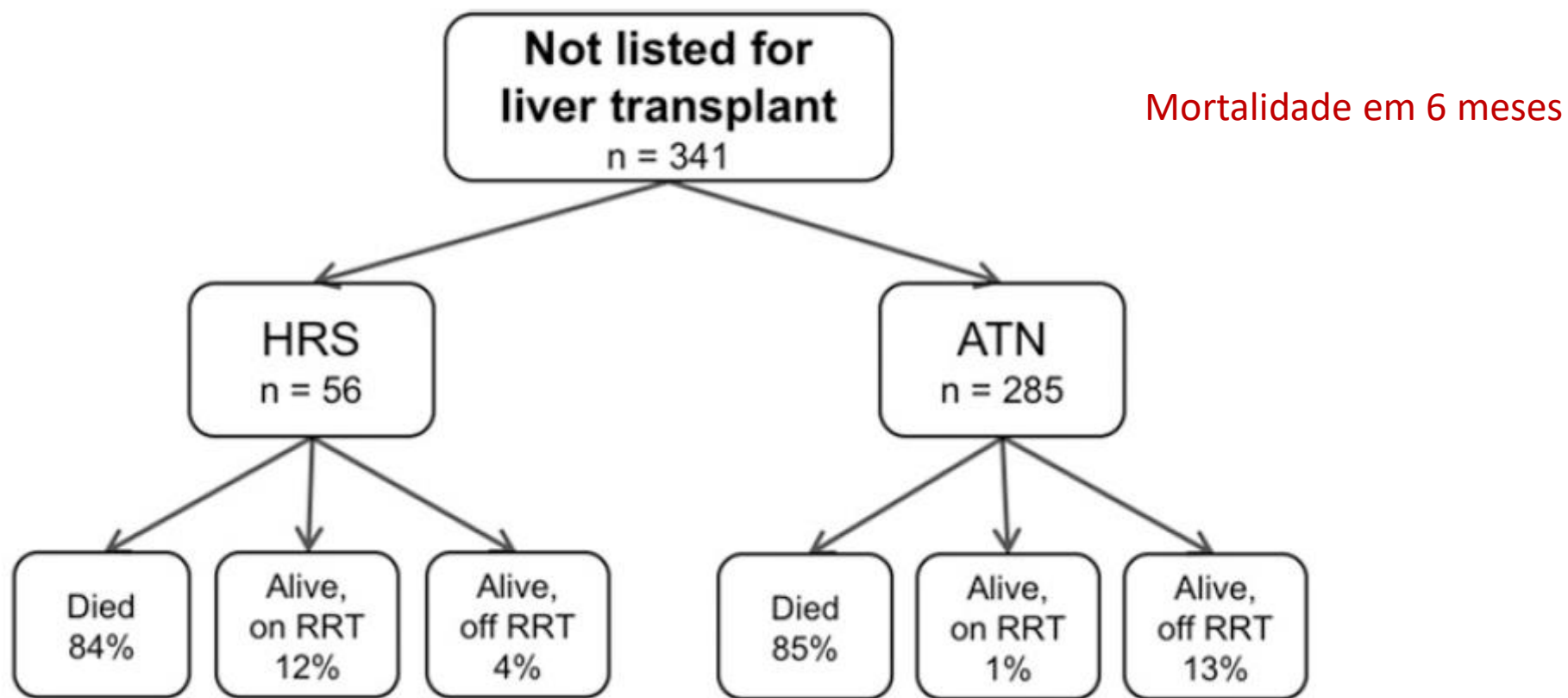


Table 2. Characteristics of 472 patients with cirrhosis initiated on RRT for AKI, by vital status at 6 mo

Characteristic	Alive at 6 mo (n=114)	Died by 6 mo (n=358)	P Value
Age, yr	56 (54 to 58)	58 (56 to 59)	0.28
Female sex	39 (34)	123 (34)	0.97
White race	97 (85)	272 (76)	0.04
Non-Hispanic ethnicity	109 (96)	332 (93)	0.28
Comorbidities			
Diabetes mellitus	51 (45)	119 (33)	0.03
Coronary artery disease	32 (28)	94 (26)	0.70
CKD	24 (21)	55 (15)	0.15
Hypertension	74 (65)	189 (53)	0.02
Reason for admission			<0.001
Complications of cirrhosis	53 (46)	118 (33)	
AKI	25 (22)	41 (11)	
Infection	20 (18)	129 (36)	
Other	16 (14)	70 (20)	
Other hospitalization characteristics			
Sepsis	57 (50)	222 (62)	0.02
Admission/transfer to intensive care unit	71 (63)	315 (88)	<0.001
Intravenous vasopressor use	65 (57)	286 (80)	<0.001
Mechanical ventilation	41 (36)	210 (59)	<0.001
Length of stay, d	38 (32 to 44)	20 (18 to 22)	<0.001
Initial renal replacement modality			0.01
Intermittent hemodialysis	77 (68)	194 (54)	
Continuous veno-venous hemofiltration	37 (32)	164 (46)	
Cause of cirrhosis^a			0.10
Alcohol	36 (32)	139 (39)	
Hepatitis C	17 (15)	69 (19)	
Nonalcoholic steatohepatitis	16 (14)	25 (7)	
Multifactorial	16 (14)	43 (12)	
Other	29 (25)	80 (22)	
Prior complications of liver disease			
Ascites	95 (83)	292 (82)	0.67
Encephalopathy	78 (68)	201 (56)	0.02
Gastrointestinal bleeding	74 (65)	227 (63)	0.77
Spontaneous bacterial peritonitis	35 (31)	79 (22)	0.06
Hepatocellular carcinoma	10 (9)	31 (9)	0.97
MELD score	33 (32 to 35)	35 (34 to 35)	0.12
CLIF-C ACLF score	55 (52 to 57)	61 (60 to 63)	<0.001
Cause of AKI			<0.001
Hepatorenal syndrome	43 (38)	75 (21)	
Acute tubular necrosis	71 (62)	283 (79)	
Laboratory values			
Sodium, meq/L	135 (134 to 136)	136 (135 to 136)	0.27
BUN, mg/dl	62 (56 to 68)	66 (62 to 69)	0.26
Creatinine, mg/dl	4.6 (4.2 to 5.0)	4.2 (4.0 to 4.4)	0.02
Urine sodium, mmol/L ^b	31 (25 to 37)	33 (27 to 38)	0.66
White blood count, K/ μ l	11.5 (10.0 to 13.1)	14.2 (13.2 to 15.2)	0.01
Hemoglobin, g/dl	9.0 (8.7 to 9.2)	9.3 (9.2 to 9.5)	0.04
Platelets, K/ μ l	96 (83 to 108)	95 (88 to 102)	0.92
Albumin, g/dl ^c	3.1 (3.0 to 3.2)	3.0 (2.9 to 3.0)	0.03
International normalized ratio	1.9 (1.8 to 2.0)	2.2 (2.1 to 2.3)	<0.001
Total bilirubin, mg/dl	12 (9 to 14)	13 (12 to 15)	0.32
Aspartate aminotransferase, U/L ^d	306 (–17 to 629)	544 (366 to 721)	0.20
Alanine aminotransferase, U/L ^d	89 (40 to 137)	195 (129 to 261)	0.01
Alkaline phosphatase, U/L ^d	128 (113 to 143)	155 (139 to 171)	0.01

Prognosis of Patients with Cirrhosis and AKI Who Initiate RRT

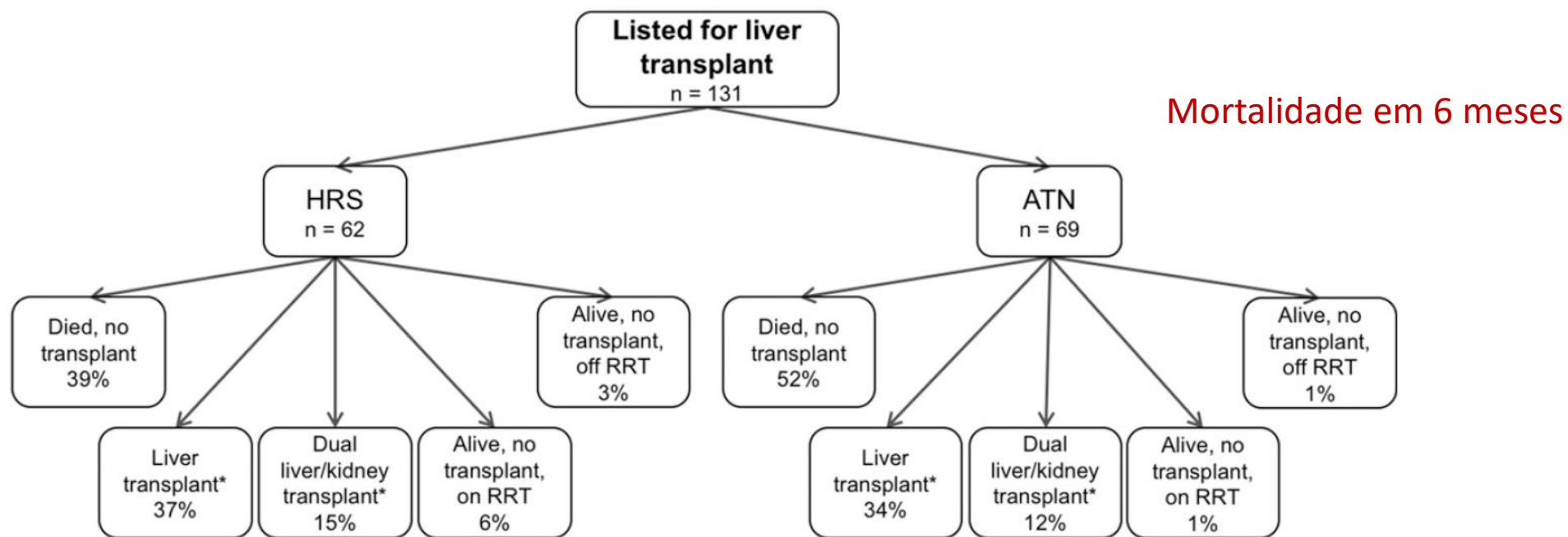
Andrew S. Allegretti,¹ Xavier Vela Parada,¹ Nwamaka D. Eneanya,¹ Hannah Gilligan,¹ Dihua Xu,¹ Sophia Zhao,¹ Jules L. Dienstag,² Raymond T. Chung,² and Ravi I. Thadhani¹



Clin J Am Soc Nephrol 13: 16–25, 2018.

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Table 4. Multivariable Cox regression models for 6-mo outcomes among 472 patients with cirrhosis initiated on RRT for AKI

Model	Hazard Ratio	95% CI	P Value
A. Not listed for liver transplant, death by 6 mo			
Hepatorenal syndrome ^a	0.81	(0.59 to 1.11)	0.19
Age (per 10 yr)	1.17	(1.06 to 1.28)	0.001
MELD score (per 5 points)	1.28	(1.19 to 1.37)	<0.001
Initial renal replacement: CVVH ^b	1.63	(1.28 to 2.08)	<0.001
B. Listed for liver transplant, death by 6 mo			
Hepatorenal syndrome ^a	0.73	(0.44 to 1.19)	0.21
Age (per 10 yr)	1.05	(0.81 to 1.36)	0.71
MELD score (per 5 points)	0.88	(0.73 to 1.07)	0.21
Initial renal replacement: CVVH ^b	1.95	(1.19 to 3.19)	<0.01
C. Listed for liver transplant, death or transplant by 6 mo			
Hepatorenal syndrome ^a	0.93	(0.64 to 1.35)	0.70
Age (per 10 yr)	1.22	(1.00 to 1.50)	0.05
MELD score (per 5 points)	1.25	(1.07 to 1.46)	<0.01
Initial renal replacement: CVVH ^b	2.58	(1.72 to 3.87)	<0.001

95% CI, 95% confidence interval; MELD, Model for End-Stage Liver Disease; CVVH, continuous veno-venous hemofiltration.
^aReference group: acute tubular necrosis.
^bReference group: initial renal replacement: hemodialysis.



A Escolha do método dialítico



A escolha do método dialítico

- Dados hemodinâmicos;
- A presença do “underfilling”;
- A presença de DHE (hipoNa, acidose, etc);
- A necessidade de balanço hídrico negativo;
- A presença de edema cerebral;
- A presença de edema pulmonar;
- Politransusão;
- A necessidade de se fazer no intra-operatório



Início precoce

Impacto na sobrevida?

Timing

**Estudo retrospectivo
127 pacientes de UTI
Fatores de risco
independentes para
mortalidade**

	Survivors (n = 48)		Non-survivors (n = 62)		p
	N	%	N	%	
Platelet count (1000/mm ³)	208.8 +/- 129.7		181.7 +/- 102.4		0.239
pH	7.25 +/- 0.15		7.20 +/- 0.18		0.103
Lactate (mmol/l)	3.10 +/- 2.93		4.60 +/- 4.60		0.045
Serum urea (g/l)	1.41 +/- 0.86		1.16 +/- 0.80		0.125
Creatinin (mg/l)	38.1 +/- 26.1		29.2 +/- 19.5		0.051
PaO ₂ /FiO ₂	281.1 +/- 134.5		247.3 +/- 125.1		0.183
RRT procedure					
Delay (h)	27.6 +/- 55.6		29.5 +/- 42.0		0.850
Delay ≤16 h (n (%))	12 (25)		31 (50)		0.008
Dialysis volume (ml/kg per h)	13.2 +/- 7.3		15.7 +/- 7.3		0.088
Filtration volume (ml/kg per h)	17.1 +/- 10.1		19.1 +/- 8.4		0.272
Hemodiafiltration volume (ml/kg per h)	30.3 +/- 13.8		34.3 +/- 12.6		0.126
Evolution after day 1					
Duration of mechani- cal ventilation (d)	14.3 +/- 12.4		11.3 +/- 13.9		0.243
Duration of shock (d)	4.5 +/- 4.8		5.3 +/- 4.3		0.276
Duration of RRT (d)	4.4 +/- 4.0		5.3 +/- 5.7		0.250

Int J Artif Organs 2012; 35 (12): 1039-1046



Timing

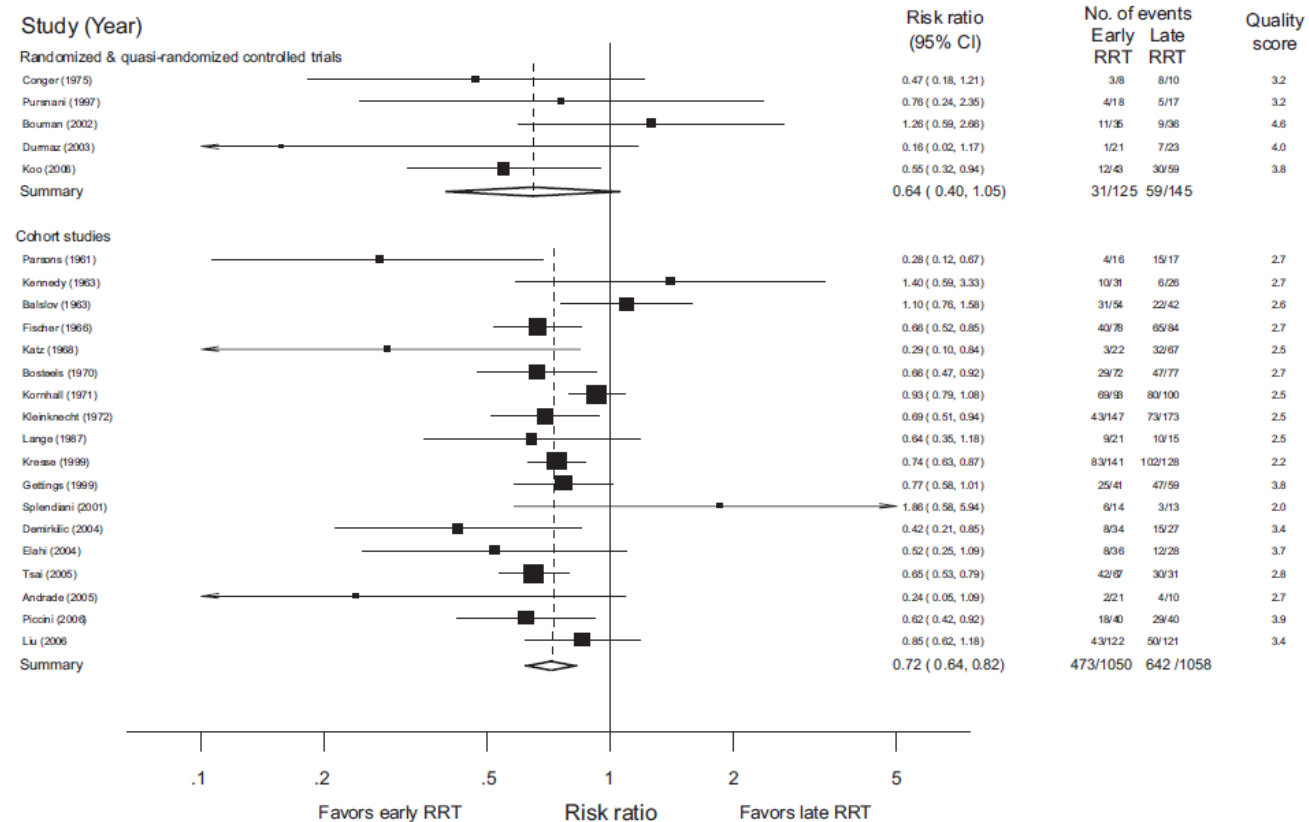
TABLE II - INDEPENDENT MORTALITY RISK FACTORS

	Odds ratio	Confidence interval	<i>P</i>
Mechanical ventilation	12.817	(1.305 – 125.868)	0.0286
Time to RRT initiation >16 h	5.652	(1.954 – 16.351)	0.0014
Urine output <500 ml / 24 h	4.518	(1.666 – 12.251)	0.0030
SAPS II >70	3.454	(1.216 – 9.815)	0.0200

Timing

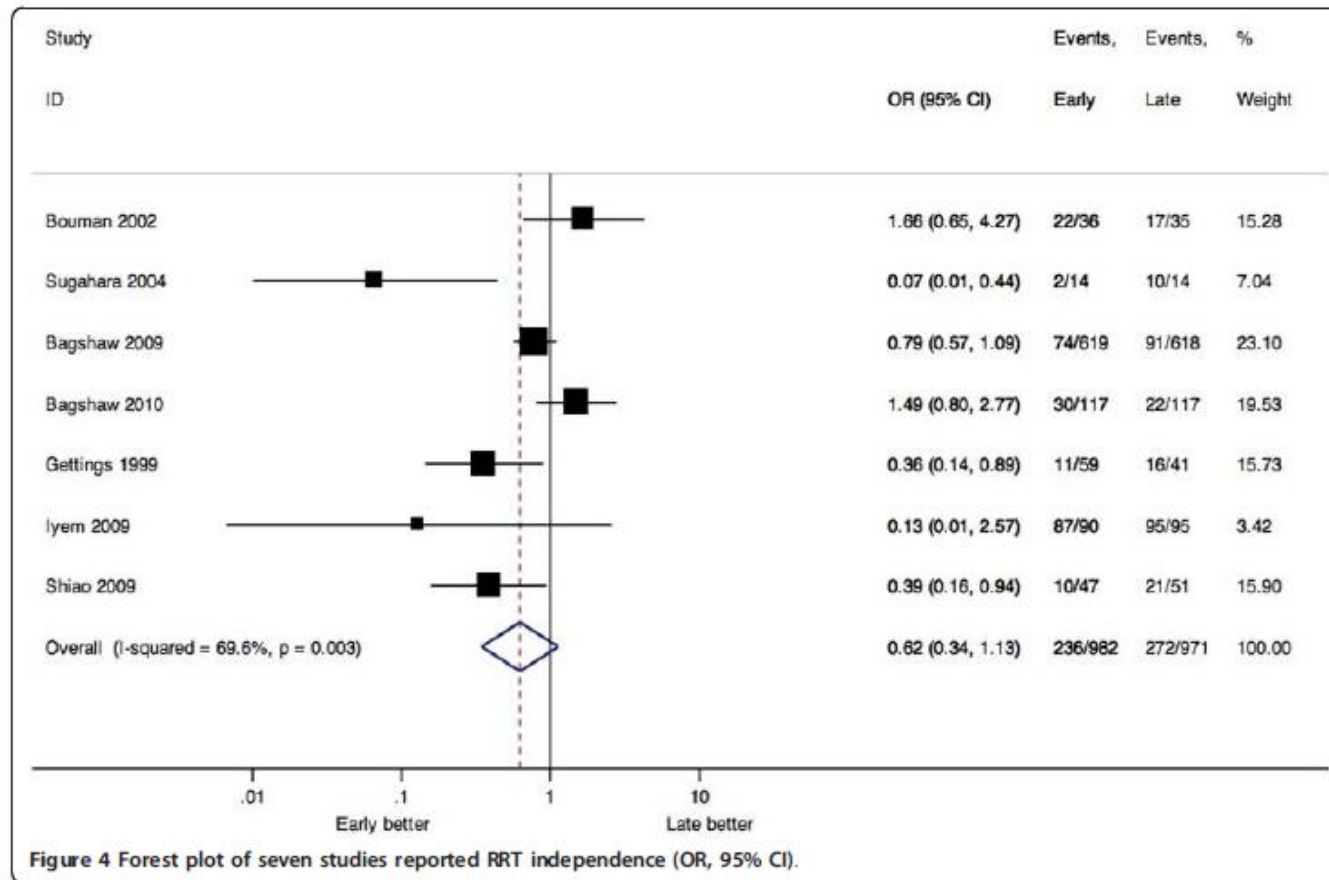
Dialysis Timing in Acute Renal Failure

279



23 estudos

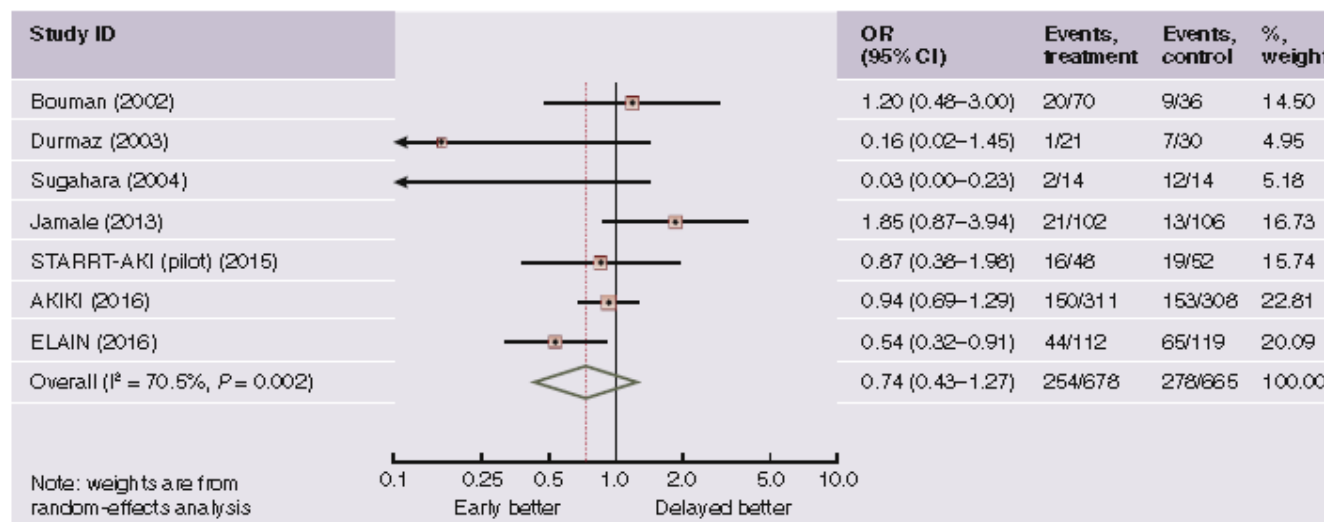
Timing



Meta-análise
14 estudos



“timing” em IRA Estudos a partir do ano de 2000





Estudo BEST Kidney

	Late RRT	Early RTT
Dependência da diálise após alta	24.4%	9%
Mortalidade	73%	59%

23 countries enrolling 1238 patients.

Journal of Critical Care (2009) **24**, 129–140



Door-to-Dialysis Time and Daily Hemodialysis in Patients with Leptospirosis: Impact on Mortality

Table 1. Clinical characteristics of patients at admission^a

Variable	2002 to 2003 (n = 15)	2004 to 2005 (n = 18)	P
Age (yr)	44 ± 4.6	42 ± 3.7	NS
APACHE II score	26 ± 1.2	24.5 ± 1.4	NS
Urinary volume (ml/d)	1135 ± 539	1963 ± 458	NS
Urea (mg/dl)	232 ± 19.5	207 ± 18.4	NS
Creatinine (mg/dl)	6.2 ± 0.6	6.6 ± 0.6	NS
Sodium (mEq/L)	136 ± 1.7	139 ± 1.4	NS
Potassium (mEq/L)	4.2 ± 0.2	4.2 ± 0.2	NS
pH	7.28 ± 0.03	7.26 ± 0.03	NS
Bicarbonate (mEq/L)	18 ± 1	17 ± 1	NS
CPK (IU/L)	1410 ± 244	2069 ± 409	NS
Br (mg/dl)	15.4 ± 2.4	15.3 ± 2.7	NS

^aData are means ± SEM; Mann-Whitney test. Br, direct bilirubin; CPK, creatine phosphokinase.

Door-to-Dialysis Time and Daily Hemodialysis in Patients with Leptospirosis: Impact on Mortality

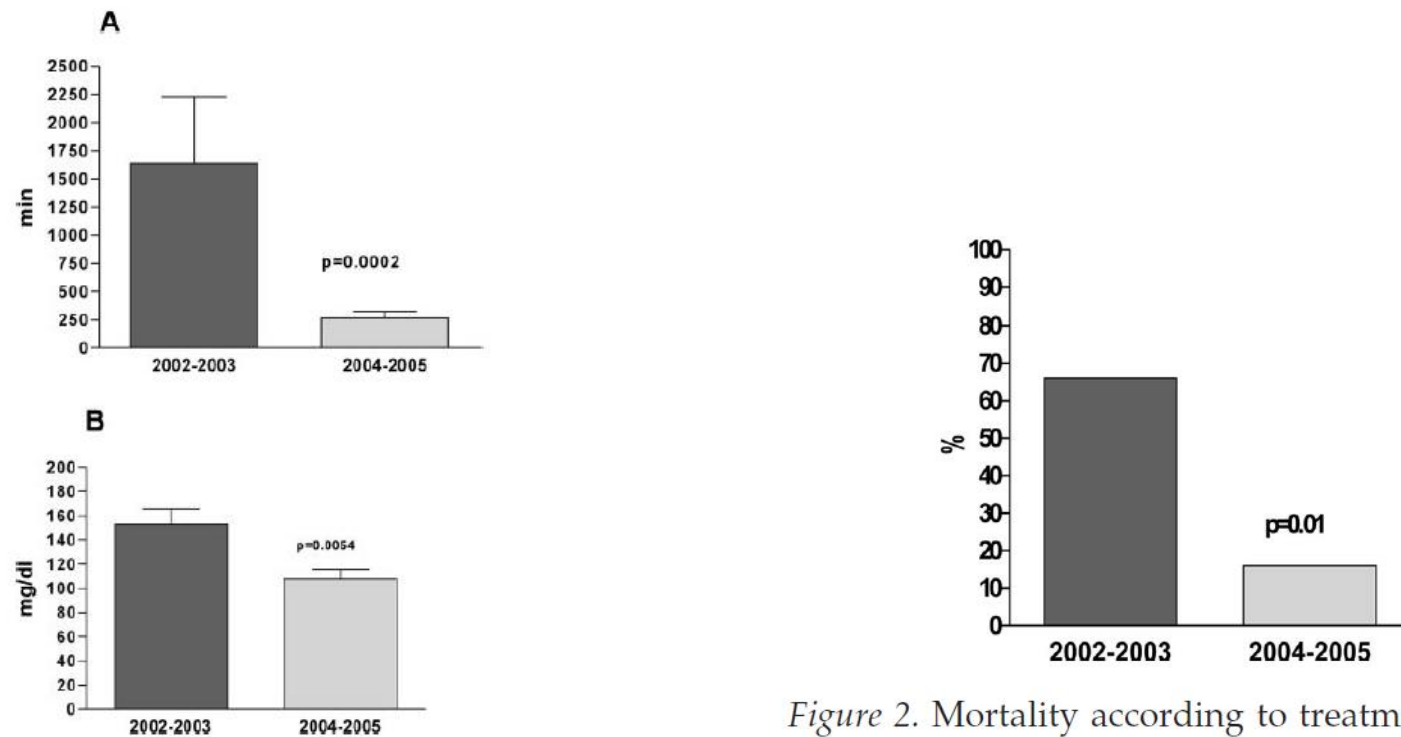


Figure 2. Mortality according to treatment group.



Timing of RRT Based on the Presence of Conventional Indications

Suvj T. Vaara, Matti Reinikainen,[†] Ron Wald,[‡] Sean M. Bagshaw,[§] Ville Pettilä,^{*||} and The FINNAKI Study Group*

Clin J Am Soc Nephrol 9: 1577–1585, 2014.



Timing of RRT Based on the Presence of Conventional Indications

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RRT Patient Groups According to Timing

We defined RRT initiated without any conventional indications as pre-emptive RRT and RRT initiated in the presence of any of the five indications as classic RRT. For additional analysis, we defined patients with classic RRT as either classic-urgent RRT (RRT initiated within 12 hours from manifestation of indications) or classic-delayed RRT (RRT >12 hours from indications).

Clin J Am Soc Nephrol 9: 1577–1585, 2014.



Indicações clássicas

- Presença de uremia
- Acidose refratária ao tratamento
- Hipercalemia refratária ao tratamento
- Congestão com aumento de FiO_2

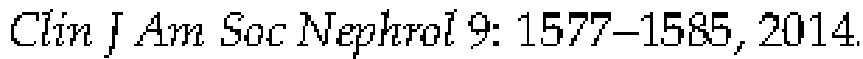


Table 3. Logistic regression models for 90-day mortality among all patients with RRT and among patients with classic RRT

Covariate	Univariate Odds Ratio (95% CI)	P Value	Multivariate Odds Ratio (95% CI)	P Value
All patients on RRT^a				
Age (5 yr)	1.18 (1.07 to 1.30)	0.001	1.20 (1.06 to 1.36)	0.01
Number of preexisting chronic illnesses ^b	1.03 (0.84 to 1.27)	0.77	0.94 (0.72 to 1.23)	0.66
Study site	—	0.15	—	0.90
Source of admission	—	0.18	—	0.54
SAPS II score without age points	1.07 (1.05 to 1.09)	<0.001	1.06 (1.04 to 1.09)	<0.001
Mechanical ventilation (ICU stay)	3.65 (1.82 to 7.32)	<0.001	2.93 (1.23 to 6.96)	0.02
Vasoactive drugs (ICU stay)	3.10 (1.29 to 7.41)	0.01	1.30 (0.41 to 4.12)	0.66
Severe sepsis until day 5	1.99 (1.18 to 3.37)	0.01	1.16 (0.61 to 2.24)	0.58
Time from ICU admission to RRT (h)	1.00 (0.99 to 1.01)	0.93	1.01 (0.98 to 1.02)	0.17
CRRT as initial modality	0.50 (0.26 to 0.95)	0.04	0.97 (0.42 to 2.21)	0.94
Classic RRT (versus pre-emptive RRT)	2.25 (1.31 to 3.86)	0.003	2.05 (1.03 to 4.09)	0.04
Patients on classic RRT				
Age (5 yr)	1.21 (1.03 to 1.41)	0.02	1.32 (1.09 to 1.62)	0.01
Study site	—	0.61	—	0.75
SAPS II score without age points	1.07 (1.04 to 1.10)	<0.001	1.08 (1.04 to 1.12)	<0.001
Mechanical ventilation (ICU stay)	6.36 (2.79 to 14.49)	<0.001	4.14 (1.57 to 12.39)	0.01
Vasoactive drugs (ICU stay)	2.30 (0.87 to 6.08)	0.09	0.42 (0.09 to 1.76)	0.40
Severe sepsis until day 5	1.85 (0.93 to 3.68)	0.08	1.19 (0.48 to 2.94)	0.71
CRRT as initial modality	0.47 (0.20 to 1.06)	0.07	0.96 (0.31 to 3.04)	0.95
Classic-delayed RRT (versus classic-urgent RRT)	3.37 (1.57 to 7.22)	0.002	3.85 (1.48 to 10.22)	0.01

Clin J Am Soc Nephrol 9: 1577–1585, 2014.

Characteristics of matched patients on pre-emptive RRT compared with matched patients who did not receive RRT

Characteristic	Pre-emptive RRT	Non-RRT	P Value	SMD
90-d mortality	18/67 (26.9)	33/67 (49.3)	0.01	-47.4

Clin J Am Soc Nephrol 9: 1577–1585, 2014.



Research

Open Access

Late initiation of renal replacement therapy is associated with worse outcomes in acute kidney injury after major abdominal surgery

Chih-Chung Shiao¹, Vin-Cent Wu², Wen-Yi Li³, Yu-Feng Lin², Fu-Chang Hu⁴, Guang-Huar Young⁵, Chin-Chi Kuo³, Tze-Wah Kao², Down-Ming Huang³, Yung-Ming Chen², Pi-Ru Tsai⁵, Shuei-Liong Lin², Nai-Kuan Chou⁵, Tzu-Hsin Lin⁵, Yu-Chang Yeh⁶, Chih-Hsien Wang⁵, Anne Chou⁶, Wen-Je Ko⁵, Kwan-Dun Wu² for the National Taiwan University Surgical Intensive Care Unit-Associated Renal Failure (NSARF) Study Group

Critical Care 2009, **13**:R171



Late initiation of renal replacement therapy is associated with worse outcomes in acute kidney injury after major abdominal surgery

- Pacientes cirúrgicos (abdome)
- IRA desenvolver após cirurgia
- Pacientes divididos em dois grupos: ED (early dialysis), LD (late dialysis) – RIFLE score

RIFLE classification [24] for acute kidney injury

	GFR criteria	Urine output criteria	
Risk	Increase plasma creatinine $\times 1.5$ or GFR decrease $> 25\%$	$< 0.5 \text{ ml/kg/h} \times 6 \text{ h}$	ED
Injury	Increase plasma creatinine $\times 2$ or GFR decrease $> 50\%$	$< 0.5 \text{ ml/kg/h} \times 12 \text{ h}$	
Failure	Increase plasma creatinine $\times 3$ or GFR decrease $> 75\%$, or serum creatinine $\geq 4 \text{ mg/dL}$ with an acute rise $> 0.5 \text{ mg/dL}$	$< 0.3 \text{ ml/kg/h} \times 24 \text{ h}$ or anuria $\times 12 \text{ h}$	LD
Loss	Persistent ARF = complete loss of kidney function $> 4 \text{ wk}$		
ESRD	End-stage renal disease ($> 3 \text{ month}$)		



Late initiation of renal replacement therapy is associated with worse outcomes in acute kidney injury after major abdominal surgery

- 98 pacientes (51 ED; 47 LD)
- Mortalidade na UTI: 54% total; 41% ED; 68% LD
- Mortalidade hospitalar: 58%; 43% ED; 74% LD



Late initiation of renal replacement therapy is associated with worse outcomes in acute kidney injury after major abdominal surgery

Independent predictors for in-hospital mortality using Cox proportional hazards model

Variables	Univariate			Multivariate (Backward stepwise likelihood ratio)		
	HR	95% CI	P	HR	95% CI	P
Old age (> 65 years) ^a	1.960	1.127-3.408	0.017	2.090	1.196-3.654	0.010
Cardiac failure ^b	4.084	2.003-8.928	< 0.001	4.620	2.216-9.632	< 0.001
Pre-RRT SOFA score ^c	1.138	1.054-1.228	0.001	1.152	1.065-1.247	< 0.001
CVVH ^d	1.940	1.123-3.352	0.018	----	----	----
Late dialysis ^e	1.852	1.081-3.170	0.025	1.846	1.071-3.182	0.027

The independent variables were selected for multivariate analysis if they had a $P \leq 0.1$ on univariate analysis.

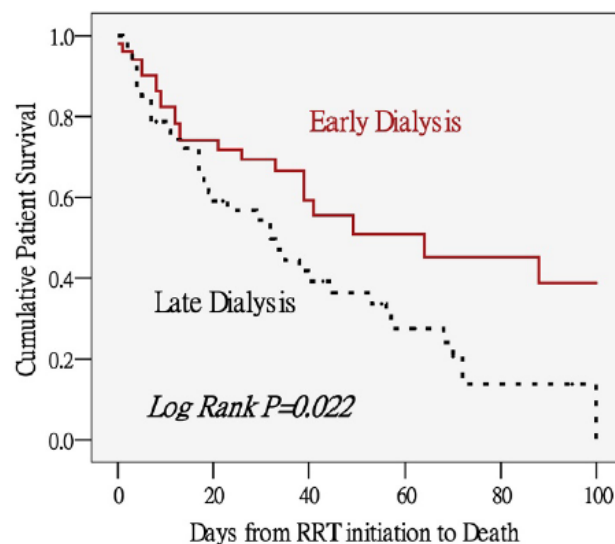
Data were gathered before RRT initiation. Duration in analysis is calculated from RRT initiation to end point (mortality or discharge).

^ahazard for patients > 65 years = 1.0; ^bhazard for patients without cardiac failure = 1.0; ^cevery increment of 1 point; ^dhazard for patients underwent intermittent hemodialysis = 1.0; ^eLate dialysis denotes initiation RRT in RIFLE-R and -F, hazard for patients in early dialysis group (start RRT in RIFLE-0 and -I) = 1.0.

APACHE II = Acute Physiology and Chronic Health Evaluation II; CVVH = continuous venovenous hemofiltration; HR = hazard ratio; 95% CI = 95% confidence interval; RRT = renal replacement therapy; SOFA = Sequential Organ Failure Assessment.



Late initiation of renal replacement therapy is associated with worse outcomes in acute kidney injury after major abdominal surgery



Cumulative patient survival between early and late dialysis groups defined by RIFLE classification. By Kaplan-Meier method. Brown solid line = early dialysis group (RIFLE-O and -I, n = 51); black dashed line = late dialysis group (RIFLE-R and -F, n = 47). RRT = renal replacement therapy.

Critical Care 2009, **13**:R171



Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of Early vs Delayed Initiation of Renal Replacement Therapy on Mortality in Critically Ill Patients With Acute Kidney Injury

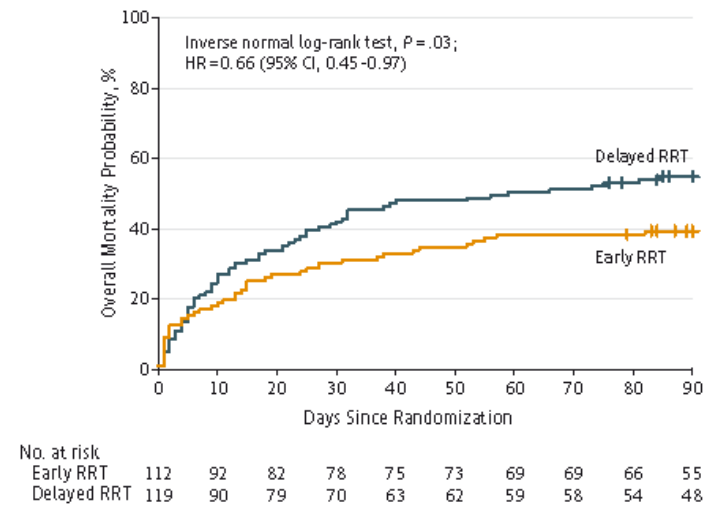
The ELAIN Randomized Clinical Trial

JAMA. 2016, 315(20):2190-9

- **Early RRT:** iniciava a CVVH dentro de 8 horas do diagnóstico de KDIGO 2
- **Delayed RRT:** iniciava a CVVH dentro de 12 horas do diagnóstico de KDIGO 3 ou se $K > 6$ mEq/L, ou alguma outra emergência

JAMA. 2016, 315(20):2190-9

Figure 2. Mortality Probability Within 90 Days After Study Enrollment for Patients Receiving Early and Delayed Initiation of Renal Replacement Therapy (RRT)



KDIGO indicates Kidney Disease: Improving Global Outcomes. In the delayed group, 18 patients received RRT without reaching KDIGO stage 3 (these patients had an absolute indication). The median (quartile 1 [Q1], quartile 3 [Q3]) duration of follow-up was 90 days (Q1, Q3: 90, 90) in the early group and 90 days (Q1, Q3: 90, 90) in the delayed group. The vertical ticks indicate censored cases.



ORIGINAL ARTICLE

Initiation Strategies for Renal-Replacement Therapy in the Intensive Care Unit

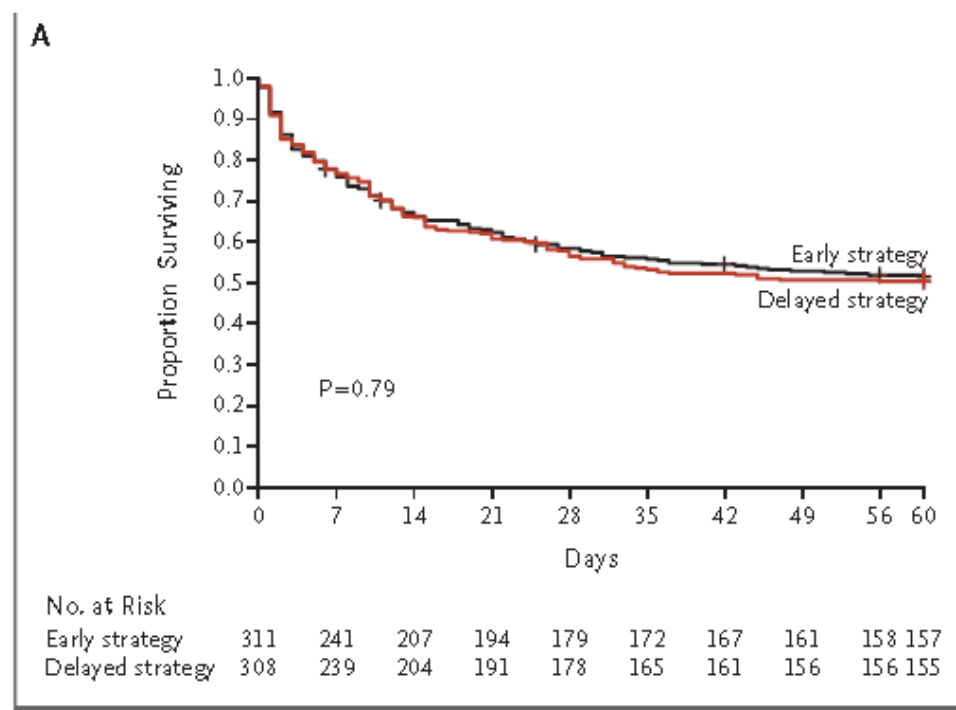
Stéphane Gaudry, M.D., David Hajage, M.D., Frédérique Schortgen, M.D.,
Laurent Martin-Lefevre, M.D., Bertrand Pons, M.D., Eric Boulet, M.D.,
Alexandre Boyer, M.D., Guillaume Chevrel, M.D., Nicolas Lerolle, M.D., Ph.D.,
Dorothée Carpentier, M.D., Nicolas de Prost, M.D., Ph.D.,
Alexandre Lautrette, M.D., Anne Bretagnol, M.D., Julien Mayaux, M.D.,
Saad Nseir, M.D., Ph.D., Bruno Megarbane, M.D., Ph.D., Marina Thirion, M.D.,
Jean-Marie Forel, M.D., Julien Maizel, M.D., Ph.D., Hodane Yonis, M.D.,
Philippe Markowicz, M.D., Guillaume Thiery, M.D., Florence Tubach, M.D., Ph.D.,
Jean-Damien Ricard, M.D., Ph.D., and Didier Dreyfuss, M.D.,
for the AKIKI Study Group*

N Engl J Med 2016;375:122-33.



early-strategy group: iniciava dentro de 6 horas após o diagnóstico de estágio 3

the delayed-strategy group: iniciava se oliguria ou anuria por mais de 72 horas depois da randomização

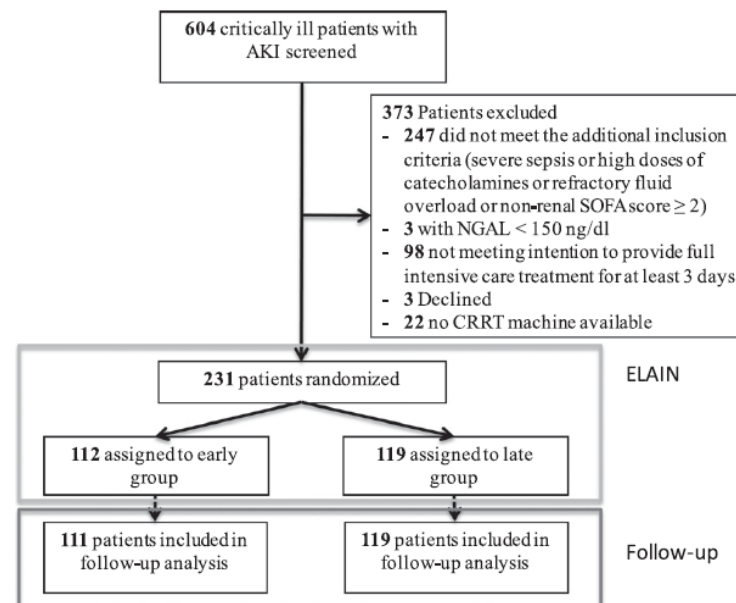




A maior mortalidade 61.8% foi vista nos pacientes que receberam a terapia dialítica tardiamente

A mortalidade de 48.5% foi vista nos pacientes que receberam a terapia dialítica mais precocemente.

Long-Term Clinical Outcomes after Early Initiation of RRT in Critically Ill Patients with AKI



Long-Term Clinical Outcomes after Early Initiation of RRT in Critically Ill Patients with AKI

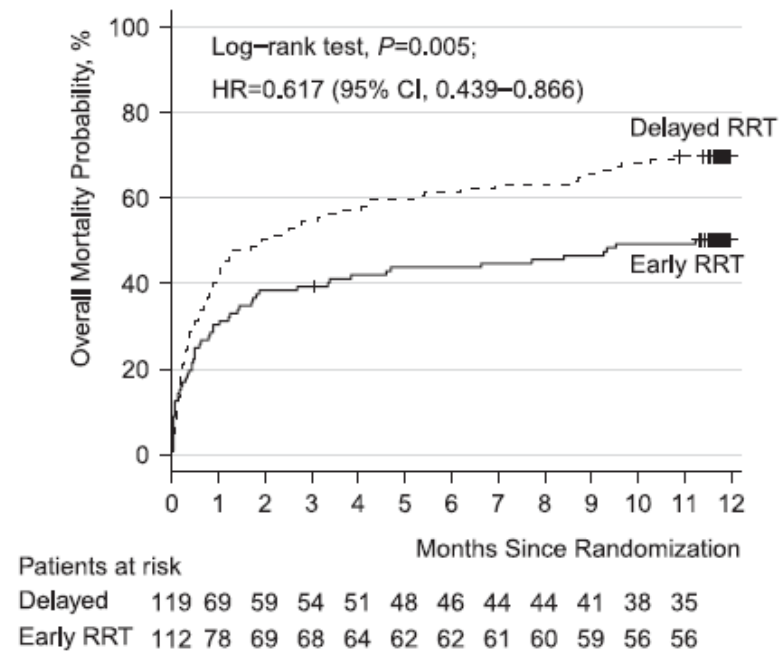
Table 1. Outcomes of patients by treatment group

Outcome Parameter	Early, n=112	Delayed, n=119	P Value	Absolute Difference Early – Delayed [95% CI], %	OR, Early Versus Delayed [95% CI]
Primary outcome					
MAKE 1 yr, ^a no./no. total (%)	72/111 (64.9)	106/119 (89.1)	<0.001	24.2 [-34.7 to 13.7]	0.23 [0.11 to 0.45]
Secondary outcomes					
1-yr all-cause mortality, no. (%)	56/111 (50.2)	83/119 (69.8)	<0.01	19.6 [-32.0 to 7.2]	0.62 [0.44 to 0.87]
Requirement of RRT 1 yr, no./no. total (%)	4/55 (7.3)	4/36 (11.1)	0.71	3.8 [-16.2 to 8.5]	0.62 [0.15 to 2.69]
PRD 1 yr, ^b no./no. total (%)	16/55 (29.1)	23/36 (63.9)	0.001	34.8 [-54.6 to 15.0]	0.23 [0.09 to 0.57]

^aMAKE is defined as mortality at 1 yr, RRT at 1 yr, and PRD defined as 25% decline in eGFR.

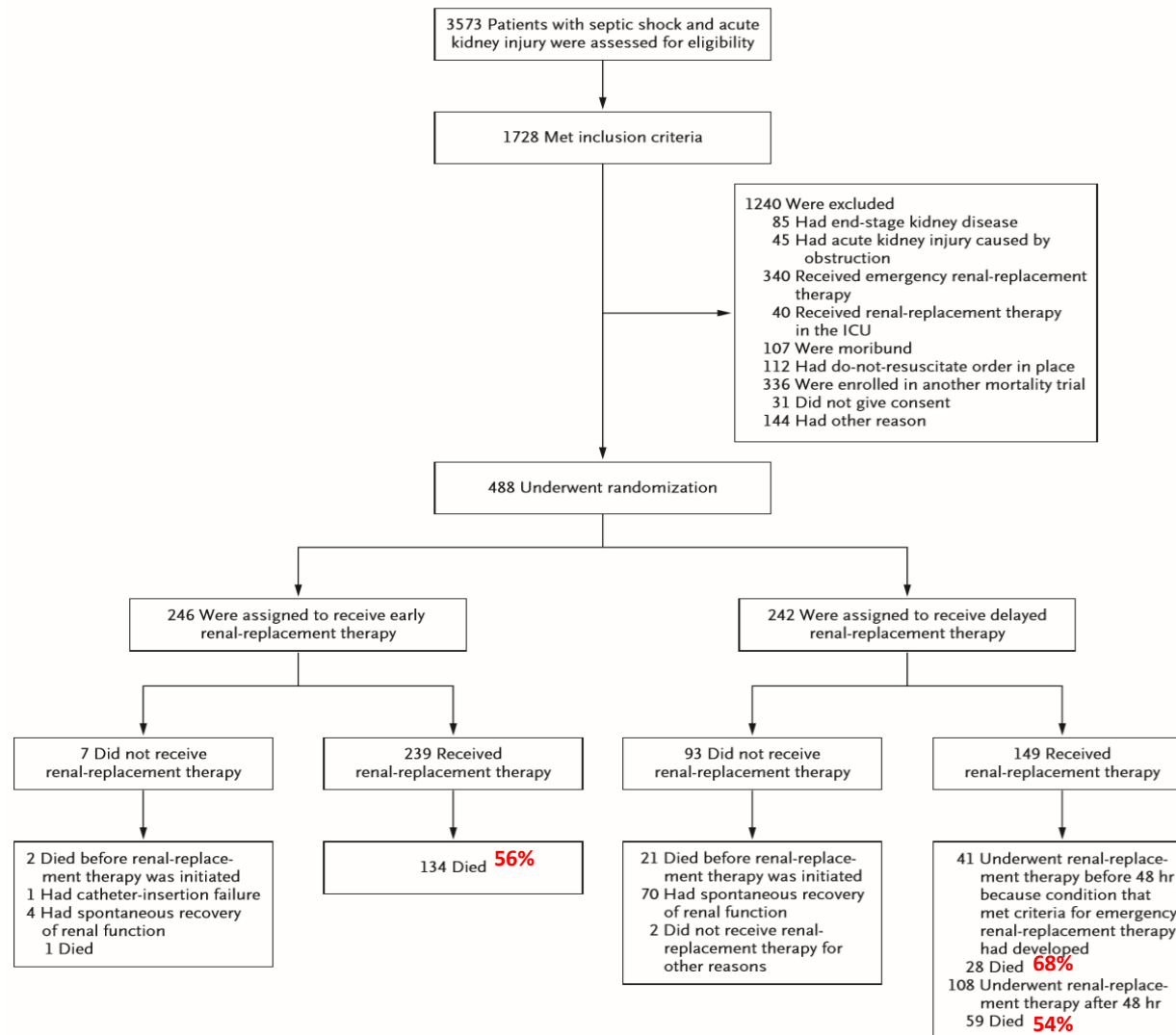
^bPRD defined as 25% decline in eGFR.

Long-Term Clinical Outcomes after Early Initiation of RRT in Critically Ill Patients with AKI

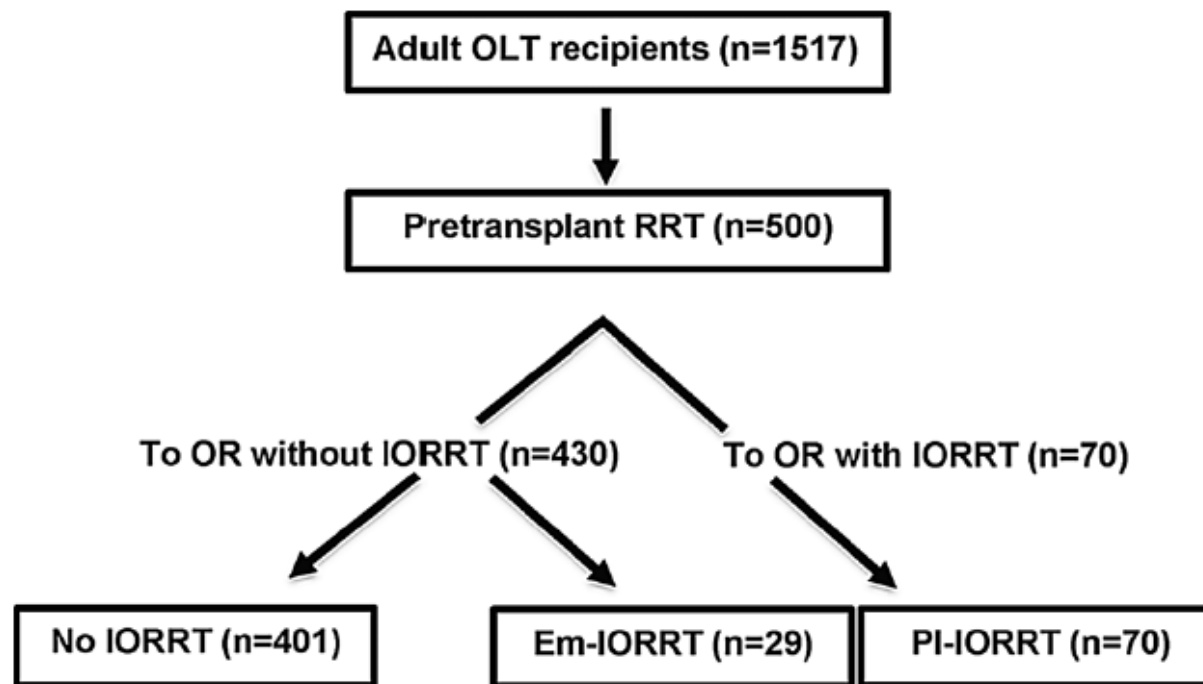


Timing of Renal-Replacement Therapy in Patients with Acute Kidney Injury and Sepsis

- Inclusão: sepse, com IRA com critérios do RIFLE: oliguria débito urinário menor que 0.3ml/kg/h por 24 h ou anúria por mais que 12h ou creatinina maior que 3 vezes o basal, ou maior que 4mg/dL
- Diálise em 12h (early) ou em 48h (delay)



Diálise intra-operatório



Diálise intra-operatório

Table 4: Comparison of intraoperative complications and postoperative outcomes

Variables	No-IORRT (n = 401)	Em-IORRT (n = 29)	p-Value	No-IORRT (n = 401)	PI-IORRT (n = 70)	p-Value	Em-IORRT (n = 29)	PI-IORRT (n = 70)	p-Value
Intraoperative									
Postreperfusion syndrome (%)	20	38	0.027	20	17	0.524	38	17	0.026
Arrhythmia (%)	23	43	0.021	23	19	0.380	43	19	0.012
Coagulopathy (%)	8	54	<0.001	8	21	<0.001	54	21	<0.001
Any complication (%)	39	76	<0.001	39	41	0.753	76	41	0.002
Multiple complications (%)	10	38	<0.001	10	11	0.771	38	11	0.002
Worst base deficit	-8.3	-10.3	0.002	-8.3	-8.6	0.431	-10.3	-8.6	0.042
Highest potassium (mmol/L)	5.2	6.1	0.001	5.2	5	0.705	6.1	5	<0.001
Postoperative									
Opening AST (U/L)	1040	1741	0.005	1040	1226	0.270	1741	1226	0.139
Opening ALT (U/L)	550	904	0.014	550	578	0.759	904	578	0.066
ICU LOS (days)	19	34	0.003	19	36	0.001	34	36	0.901
Total LOS (days)	42	49	0.059	42	70	0.001	59	70	0.496
30-day graft loss (%)	10	28	0.004	10	16	0.177	28	16	0.219
30-day mortality (%)	7	10	0.517	7	9	0.562	10	9	0.791
Retransplantation (%)	10	24	0.099	10	13	0.626	24	13	0.169

ALT, alanine aminotransferase; AST, aspartate aminotransferase; Em-IORRT emergent intraoperative renal replacement therapy; ICU, intensive care unit; LOS, length of stay; No-IORRT, not receiving IORRT; PI-IORRT, planned IORRT.

Diálise no intra-operatório

TABLE 3. A Summary of Preoperative Factors Contributing to the Decision To Initiate Intraoperative Continuous Renal Replacement Therapy (n = 41)

Preoperative Factor	n (%)
Illness severity	
MELD score > 30	32 (78)
Vasopressor dependent	20 (48.7)
Probable need for transfusion	
Hemoglobin < 80 g/L	5 (12.1)
Platelets < 50×10^9 cells/mL	29 (71.4)
INR > 2.0	23 (56.1)
Acute kidney injury	41 (100)
Receiving RRT	26 (63.4)
Hyperkalemia (K^+ > 5.0 mmol/L)	5 (12.1)
Dysnatremia (Na^+ > 150 or < 130 mmol/L)	9 (22)
Lactic acidosis (> 4.0 mmol/L)	7 (17)

Abbreviations: INR, international normalized ratio; MELD, Model for End-Stage Liver Disease; RRT, renal replacement therapy.

Liver Transpl 15:73-78, 2009.



Diálise intra-operatório

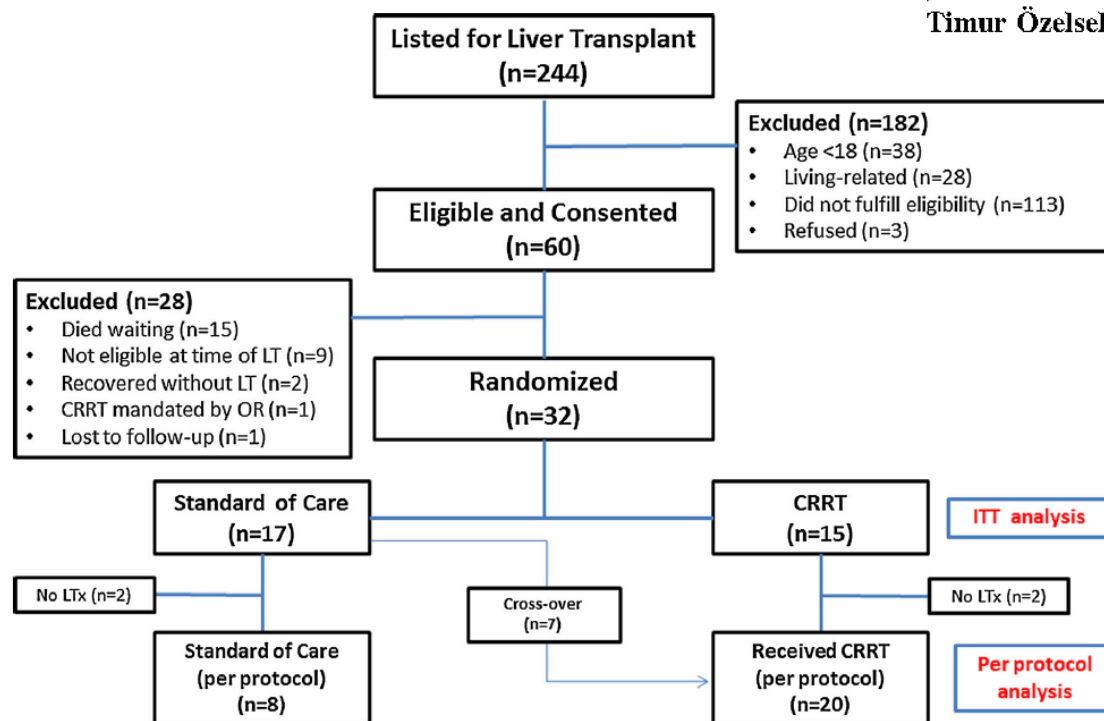
A CRRT como tratamento coadjuvante durante o pós-operatório é eficaz no controle do balanço hídrico, dos distúrbios eletrolíticos e ácido-base.

Liver Transpl 15:73-78, 2009.

Intraoperative continuous renal replacement therapy during liver transplantation: a pilot randomized-controlled trial (INCEPTION)

Constantine J. Karvellas, MD, SM · Samantha Taylor, BScN, MPH · David Bigam, MD · Norman M. Kneteman, MD, MS · A. M. James Shapiro, MD, PhD · Adam Romanovsky, MD · R. T. Noel Gibney, MD · Derek R. Townsend, MD · Glenda Meeberg, MN · Timur Özelsel, MD · Edward Bishop, MD · Sean M. Bagshaw, MD, MSc

University of Alberta, Canada



Critérios de inclusão:

1. Transplante
2. MELD > 25
3. Estar no mínimo em RISK pelos critérios de RIFLE

Interrompido por falta de verba

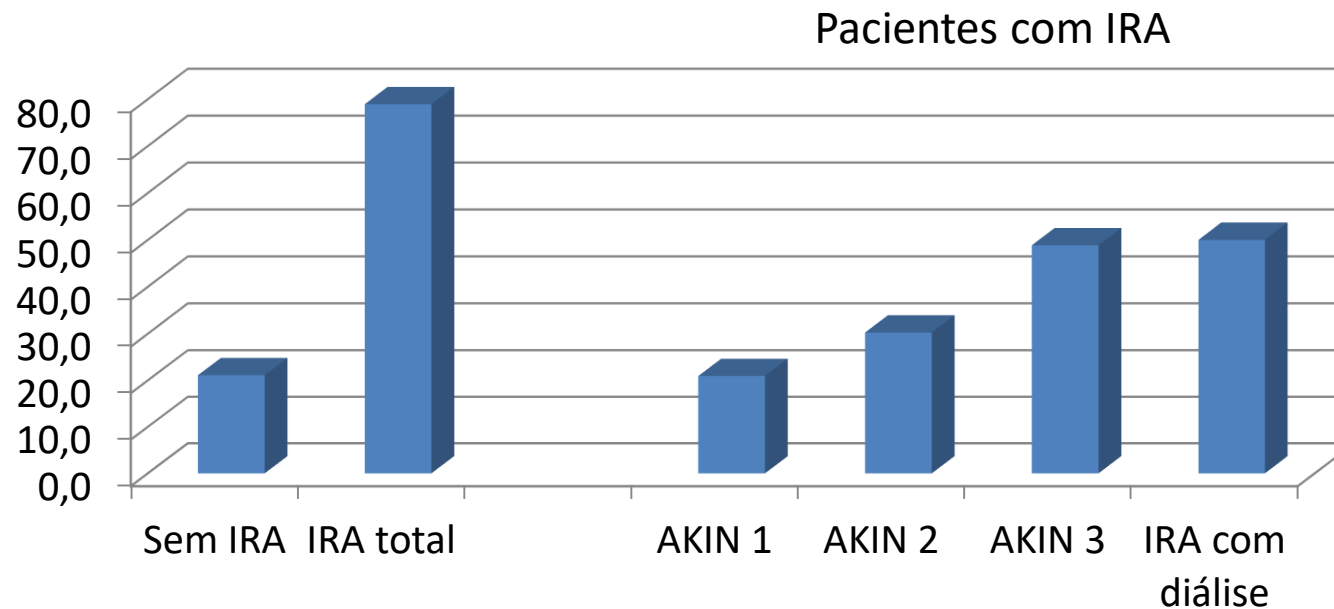
Can J Anesth/J Can Anesth (2019) 66:1151–1161



Intraoperative continuous renal replacement therapy during liver transplantation: a pilot randomized-controlled trial (INCEPTION)

In this pilot trial of high-acuity LT patients, IoCRRT was feasible and safe with no significant difference in complications or adverse effects between the groups. Despite high severity of illness, one-year survival was good (92%). These data can inform the design of a larger trial to further define the role of IoCRRT during LT.

Incidência de IRA: Avaliação de 139 pacientes cirróticos



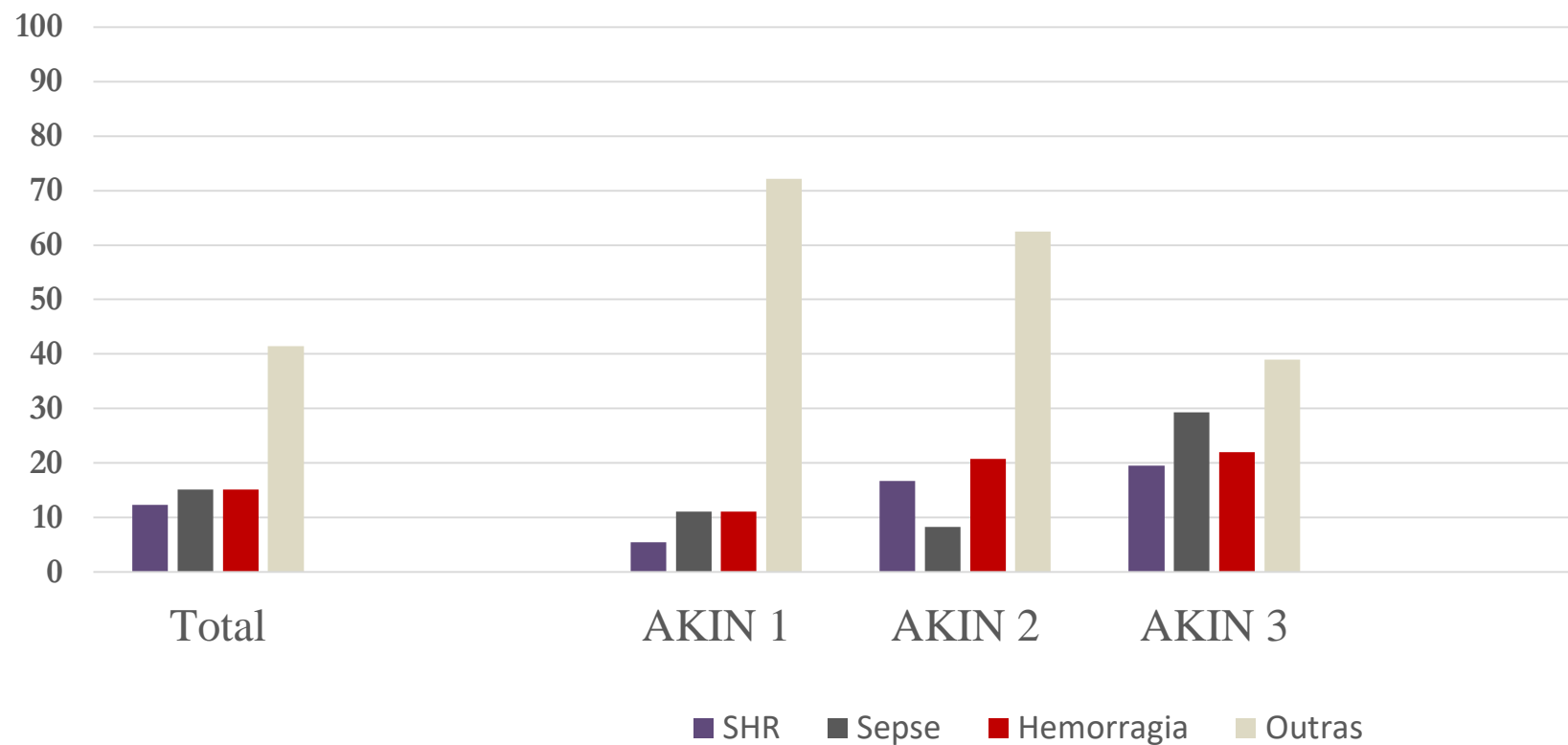
Incidência IRA

Sem IRA 21,1%
 IRA total 78,9%

Dados grupo IRA/fígado –
 HCFMUSP
 ASN 2016

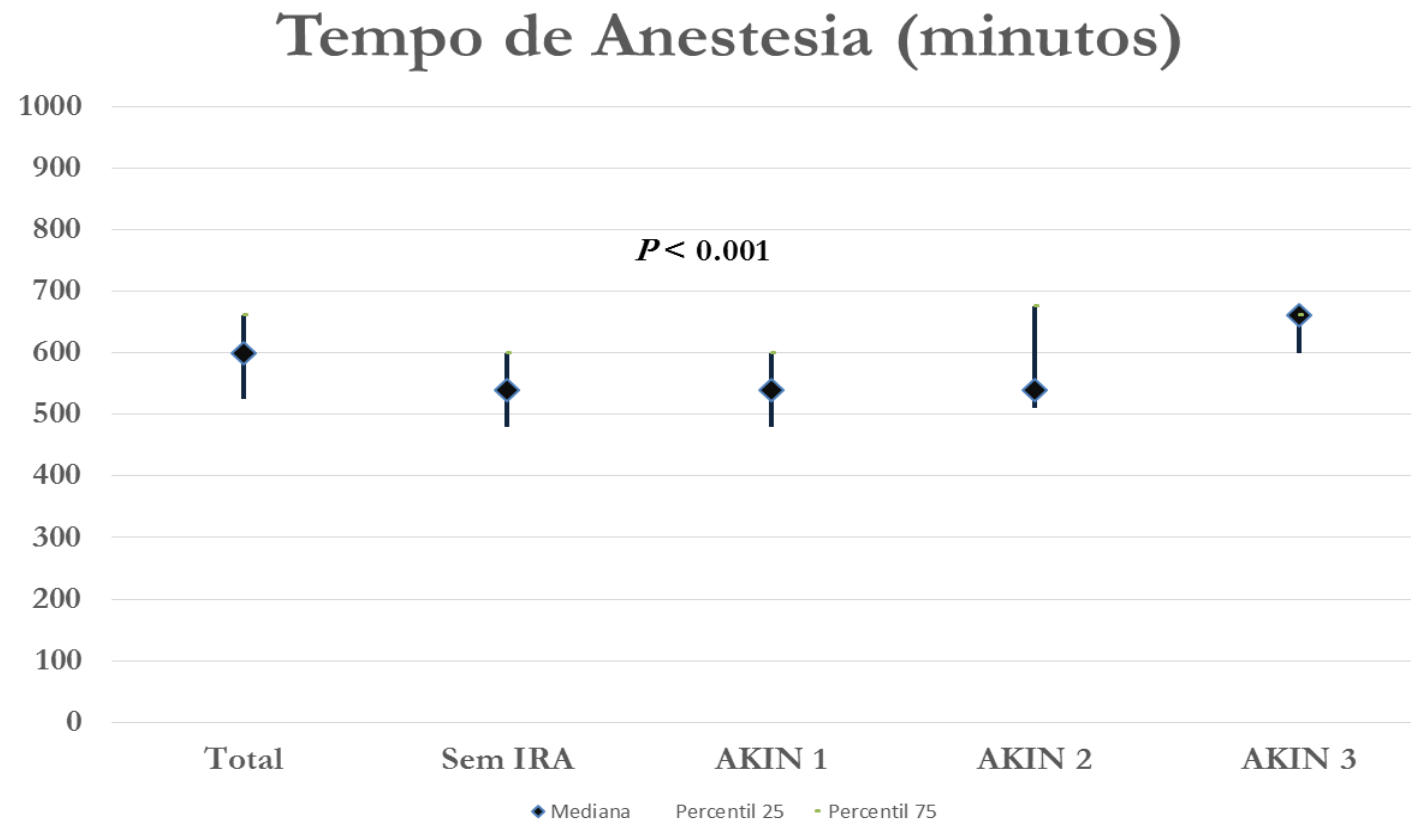
AKIN 1	20,9%	Pacientes com IRA
AKIN 2	30,2%	
AKIN 3	48,8%	
IRA com diálise	50,0%	

Causas da IRA (%)



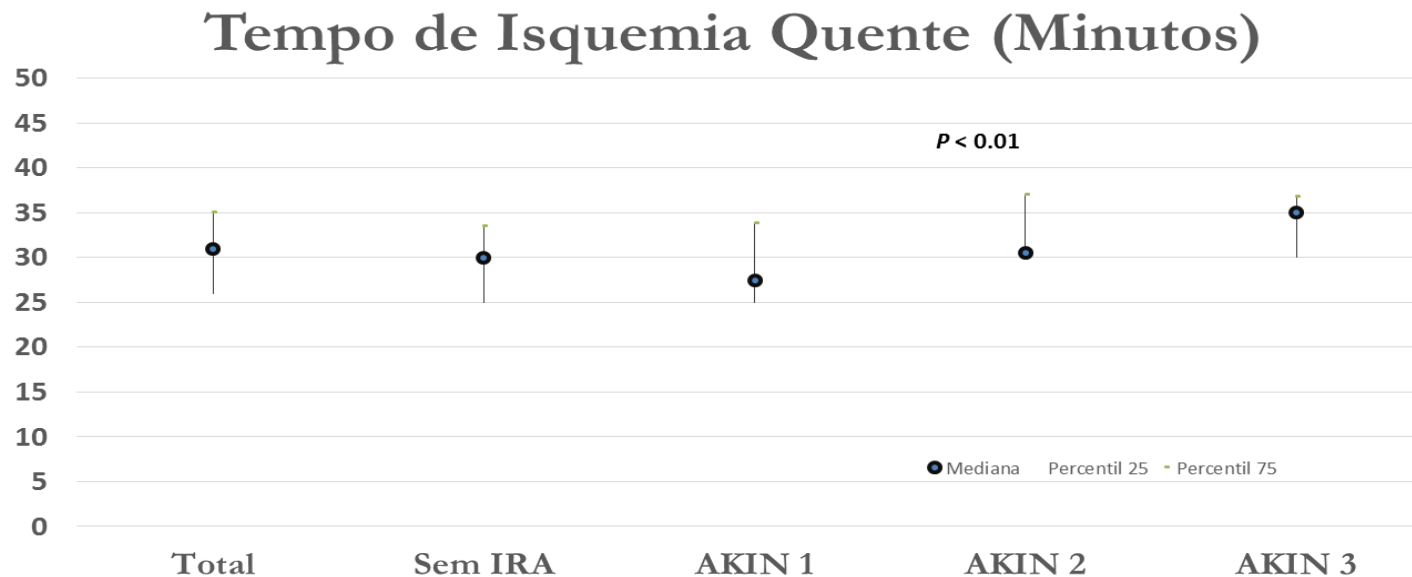
**Dados grupo IRA/fígado –
HCFMUSP
ASN 2016**

Fatores de risco para IRA nos pacientes cirróticos no peri-operatório de TX hepático



Dados grupo IRA/fígado –
HCFMUSP
ASN 2016

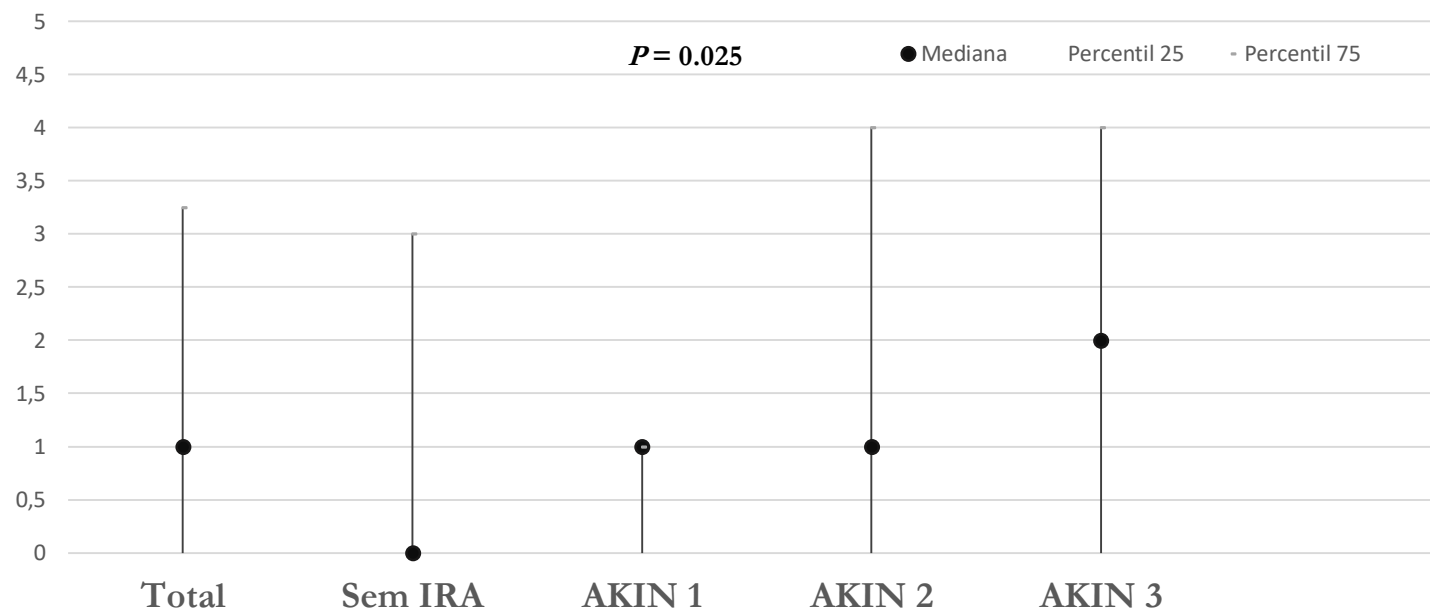
Fatores de risco para IRA nos pacientes cirróticos no peri-operatório de TX hepático



Dados grupo IRA/fígado –
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ASN 2016

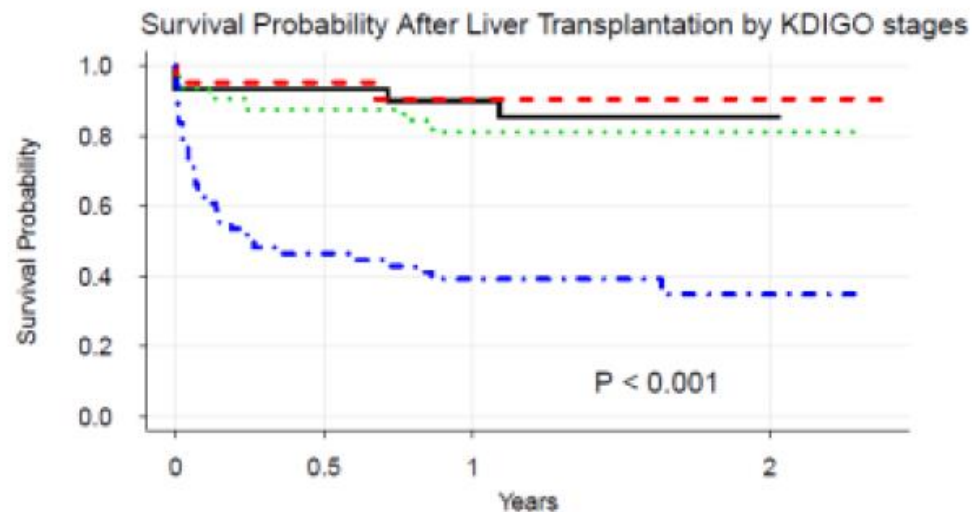
Fatores de risco para IRA nos pacientes cirróticos no peri-operatório de TX hepático

Necessidade de transfusão
(sangue e plasma) durante TX



Dados grupo IRA/fígado –
HCFMUSP
ASN 2016

AKI and Long-Term Mortality after Orthotopic Liver Transplantation



NO AKI	—	30	28	21	1
KDIGO 1	- - -	21	20	15	6
KDIGO 2	...	32	28	22	6
KDIGO 3	- . - .	56	26	18	1

Risco 7X

139 pacientes

Dados grupo IRA/fígado –
 HCFMUSP
 ASN 2016



Mensagens para serem levadas

- ✓ Os pacientes cirróticos são extremamente graves;
- ✓ A indicação de diálise deve ser bem mais “liberal”;
- ✓ O método deve levar em conta as condições hemodinâmicas, eletrolíticas e ácido-base