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Hypoalbuminemia as an independent predictor of acute renal injury after orthotopic liver transplantation

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BACKGROUND

Albumin has been found to suffer important modifications regarding both its synthesis and degradation in critical patients. Already published studies are highly controversial regarding the impact of serum albumin during the immediate postoperative period in patients undergoing liver transplantation

We investigated the relationship between preoperative albumin levels and the development of acute kidney injury in the immediate postoperative period after orthotopic liver transplantation (OLT).

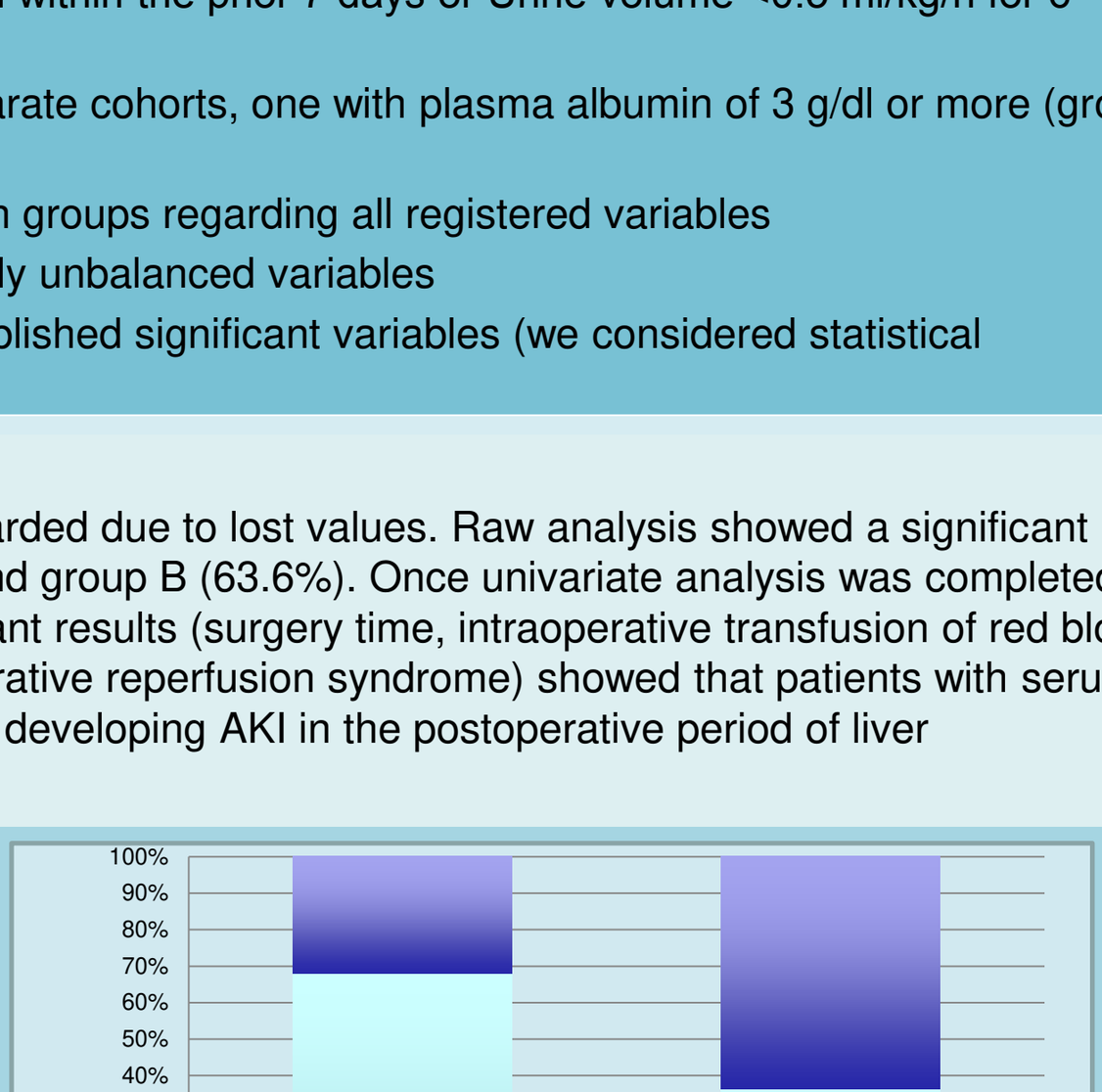
MATERIAL AND METHODS

- 166 patients undergoing OLT between January 2011and December 2015 were included in a retrospective study.
- We defined AKI according to KDIGO criteria (Increase in SCr by ≥0.3 mg/dl (26.5µmol/l) within 48 hours or increase in SCr to ≥1.5 times baseline, which is known or presumed to have occurred within the prior 7 days or Urine volume <0.5 ml/kg/h for 6 hours)
- We analyzed the incidence of acute kidney injury (AKI) in two separate cohorts, one with plasma albumin of 3 g/dl or more (group A), and the other with plasma albumin under 3 g/dl (group B).
- First, we carried out a raw analysis of the differences between both groups regarding all registered variables
- Next the sample underwent univariate analysis to identify potentially unbalanced variables
- Finally, we used binary logistic regression with the previously established significant variables (we considered statistical significance for $p<0.05$ and two-tailed tests).

RESULTS:

A total of 166 patients were considered, 3 of which were finally discarded due to lost values. Raw analysis showed a significant difference regarding the incidence of AKI between group A (32%) and group B (63.6%). Once univariate analysis was completed looking for confounding factors, logistic regression including significant results (surgery time, intraoperative transfusion of red blood cells (RBCs), diuretic treatment prior to transplantation and intraoperative reperfusion syndrome) showed that patients with serum albumin levels <3g/dl were at an increased risk (2.4 times higher) of developing AKI in the postoperative period of liver transplantation (OR 2.4; CI 1.1-4.9; p=0.023).

	Albumin ≥ 3 g/dl	Albumin < 3 g/dL	p
Marginal donor	59 (70.7%)	67 (75.3%)	0.5
RECIPIENT			
Sex			0.82
Male	58 (77.3%)	69 (75.8%)	
Female	17 (22.7%)	22 (24.2%)	
BMI (Kg/m^2)	26.2 ± 3.7	26.9 ± 5.2	0.41
Age (years)	56.8 ± 7.1	52.1 ± 9.1	0.01
MELD	13.6 ± 8.8	18.5 ± 7.0	0.02
Child			<0.001
A	38 (50.7%)	6 (6.6%)	
B	16 (21.3%)	30 (33.0%)	
C	21 (28.0%)	45 (49.5%)	
Not classifiable	0 (0.0%)	10 (11.0%)	
Ascitis	35 (46.7%)	66 (72.5%)	0.001
Arterial hypertension	21 (28.0%)	13 (14.3%)	0.03
Diabetes mellitus	13 (17.3%)	19 (20.9%)	0.56
Hepatorenal syndrome	11 (14.7%)	9 (9.9%)	0.35
Status prior to trasplant			0.07
Home	67 (89.3%)	69 (75.8%)	
Ward	5 (6.7%)	16 (17.6%)	
ICU	3 (4.0%)	6 (6.6%)	
Hepatitis C positive	45 (60.0%)	47 (51.6%)	0.28
Primary liver disease			<0.001
Cirrhosis	25 (33.3%)	50 (54.9%)	
HCC	48 (64.0%)	26 (28.6%)	
Acute failure	0 (0.0%)	8 (8.8%)	
Retrasplant	0 (0.0%)	3 (3.3%)	
Other	2 (2.7%)	4 (4.4%)	
Basal Serum Creatinin (mg/dL)	1.06 ± 0.46	0.97 ± 0.44	0.24
Diuretic therapy	39 (52%)	65 (71.4%)	0.01
SURGERY			
Red blood cells transfusion (Units)	1 (1-5)	4 (1.75-9.25)	<0.001
Length of surgery (minutes)	377.7 ± 84.8	420.0 ± 97.7	0.01
Length of anhepatic phase (minutes)	74.1 ± 32.5	64.4 ± 26.6	0.09
Reperfusion syndrome	13 (17.6%)	31 (34.4%)	0.02
Vasoactive drugs			0.09
0	15 (20.0%)	10 (11.1%)	
1	55 (73.3%)	66 (73.3%)	
≥ 2	5 (6.7%)	14 (15.6%)	
POSTOPERATIVE			
Reintervention	8 (10.7%)	14 (15.9%)	0.33
Retrasplantation	2 (2.7%)	1 (1.1%)	0.46
Primary graft nonfunction	1 (1.3%)	1 (1.1%)	>0.99
Hepatic artery thrombosis	1 (1.3%)	1 (1.1%)	>0.99



CONCLUSION:

In our sample, patients with hypoalbuminemia have an increased risk of developing AKI during the postoperative period following liver transplantation. Thus, the optimization of serum albumin levels could reduce the incidence of AKI.