# ALBUMIN DIALYSIS USING MOLECULAR ADSORBENTS RECIRCULATING SYSTEM IN SEVERE LIVER FAILURE: PREDICTIVE FACTORS FOR CLINICAL OUTCOME – A SINGLE CENTER EXPERIENCE

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## Objectives:

- The Molecular Adsorbents Recirculating System (MARS) is an artificial liver support system that removes albumin-bound and water-soluble toxins that accumulate in liver failure, providing better conditions for liver recovery.
- We analyzed the prognostic factors for clinical outcome of patients with severe liver failure treated with MARS in the Clinic of Internal Medicine and Nephrology in order to improve the MARS procedure indication and the selection of patients for therapy.

## Methods:

- Between January 2001 and August 2013 we treated 46 liver failure patients, to whom we performed 85 MARS sessions.
- The etiology of severe liver failure was: acute liver failure (ALF, n=11), acute on chronic liver failure (AoCLF, n=25), post liver transplantation graft failure (PostLTx, n=8), and post-hepatectomy liver failure (n=2).
- The mean age of the patients was 41.6 ± 18.2 years (interval 3-66 years).
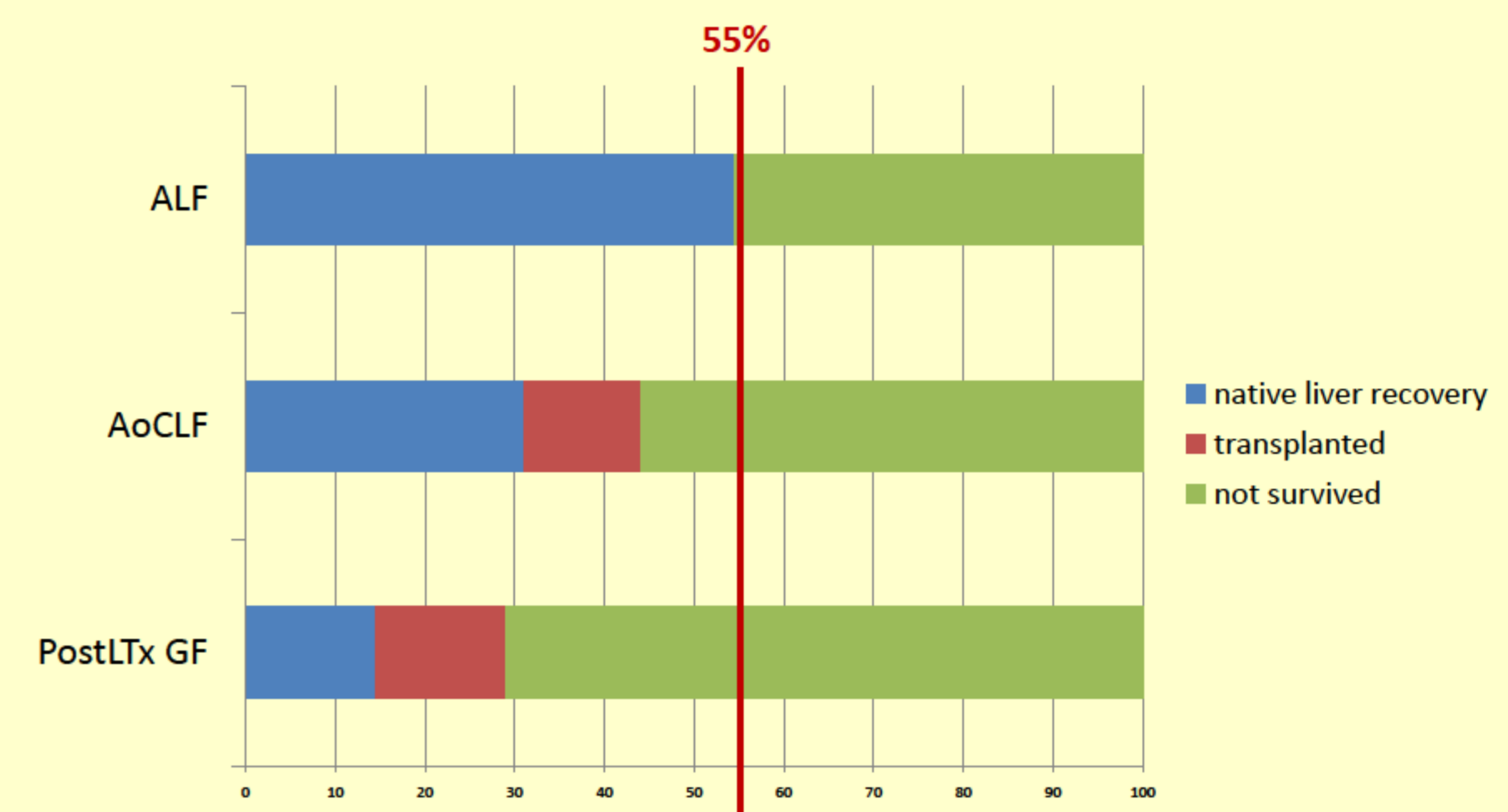


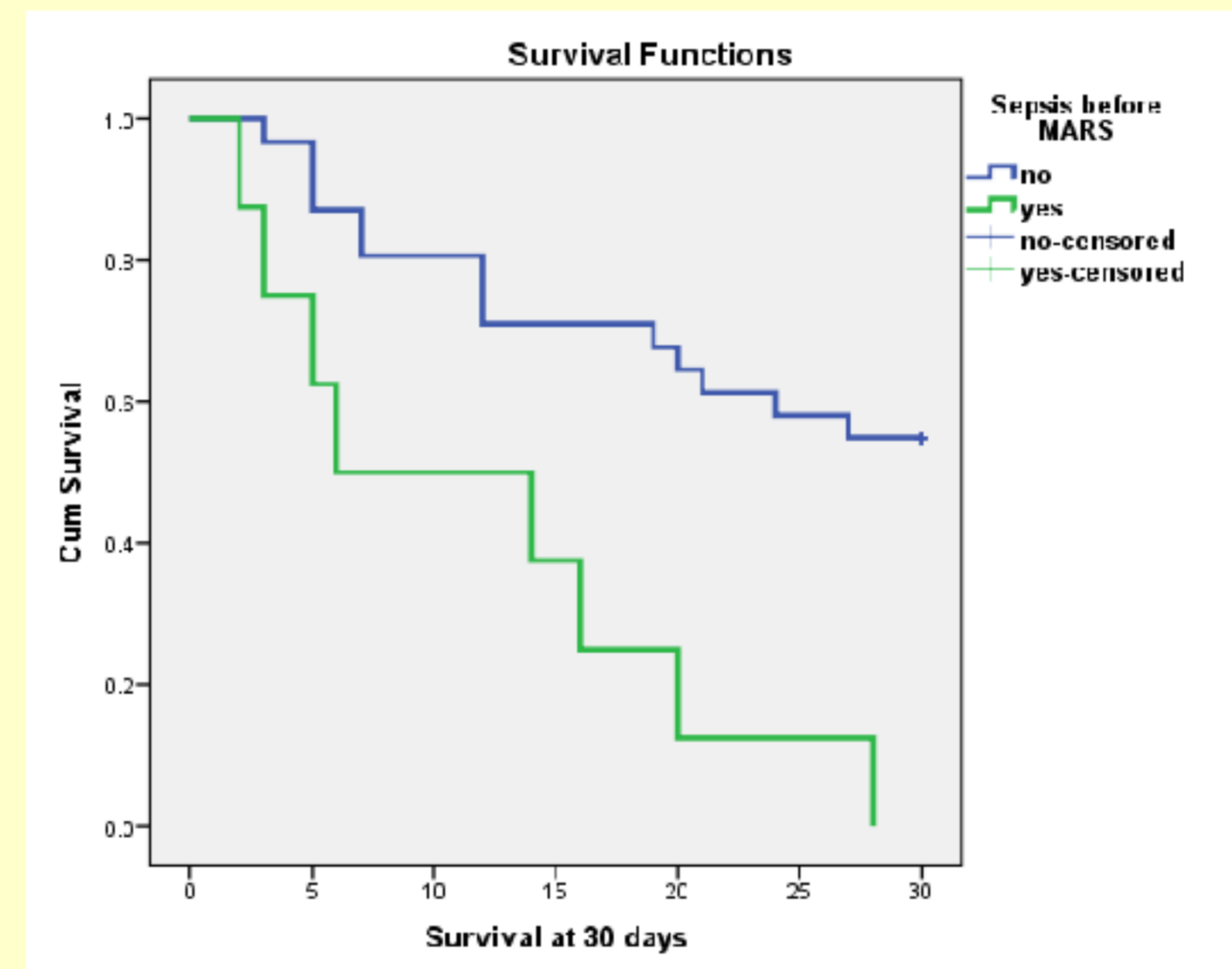| Biochemical parameter before MARS | ALF (n=11) | AoCLF (n=25) | Post LTx (n = 8) |
|---|---|---|---|
| Total bilirubin (mean)(mg/dl) | 19.6 ± 11.8 | 26.8 ± 8.2 | 23.2 ± 6.9 |
| INR | 3.0 ± 2.8 | 2.0 ± 0.6 | 3.6 ± 2.4 |
| Creatinine (mg/dl) | 1.3 ± 1.3 | 1.6 ± 1.7 | 1.7 ± 1.4 |
| Platelets (x10⁹/l) | 133.5 ± 76.7 | 110.6 ± 93.8 | 104.8 ± 92.5 |
| ALT (U/l) | 2002.3 ± 2141.9 | 109.0 ± 104.7 | 997.6 ± 1637.5 |

| Clinical parameter before MARS | ALF (n=11) | AoCLF (n=25) | Post LTx (n = 8) |
|---|---|---|---|
| HE grade | 1.9 ± 1.4 | 1.7 ± 0.8 | 1.5 ± 0.8 |
| HE grade ≥ II (n) | 6 | 14 | 6 |
| Mechanical ventilation (n) | 1 | 0 | 5 |
| MAP (mmHg) | 79.6 ± 8.5 | 78.5 ± 9.7 | 76.3 ± 10.8 |
| Inotropic support (n) | 1 | 0 | 3 |
| Renal dysfunction (n) | 4 | 11 | 4 |
| Hepatorenal Syndrome (n) | 2 | 7 | 0 |
| Sepsis (n) | 0 | 4 | 4 |

## Results:

### The 30 days survival of all MARS – treated patients was 55%.



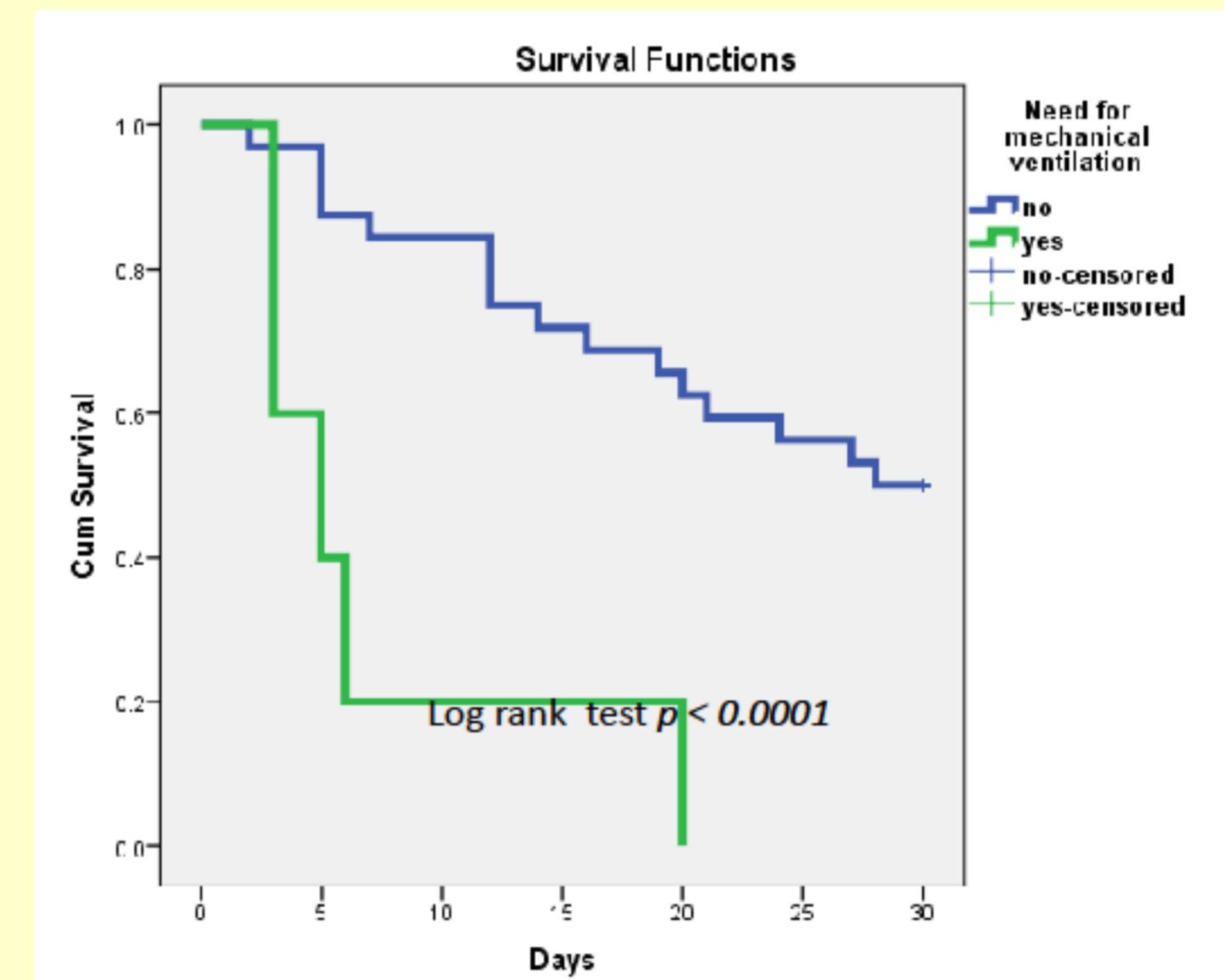Legend: native liver recovery, transplanted, not survived (ALF, AoCLF, PostLTx GF)

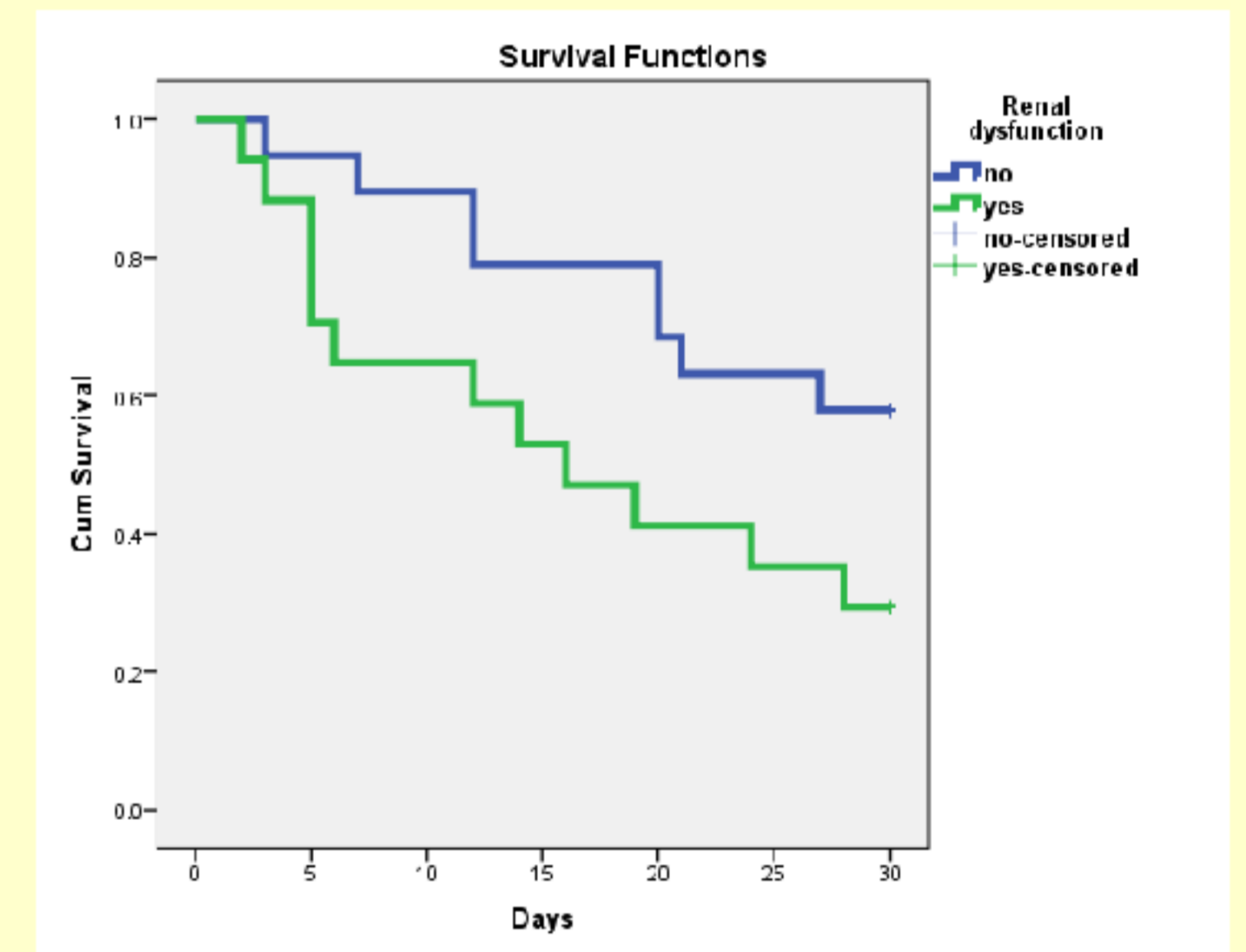**Impact of the presence of sepsis before MARS on patients' 30 days survival**



**Impact of hepatic encephalopathy grade before MARS on patients' 30 days survival**
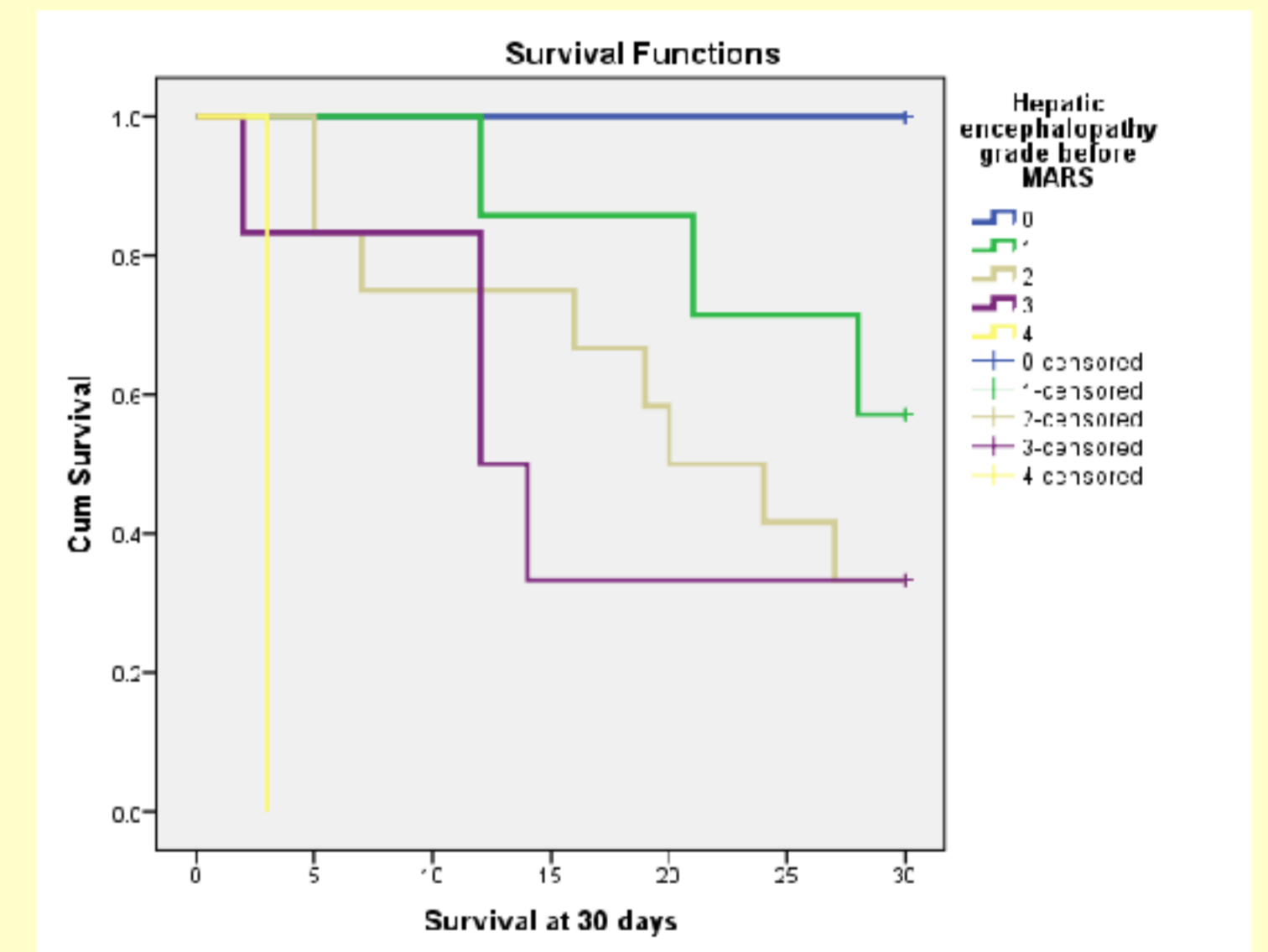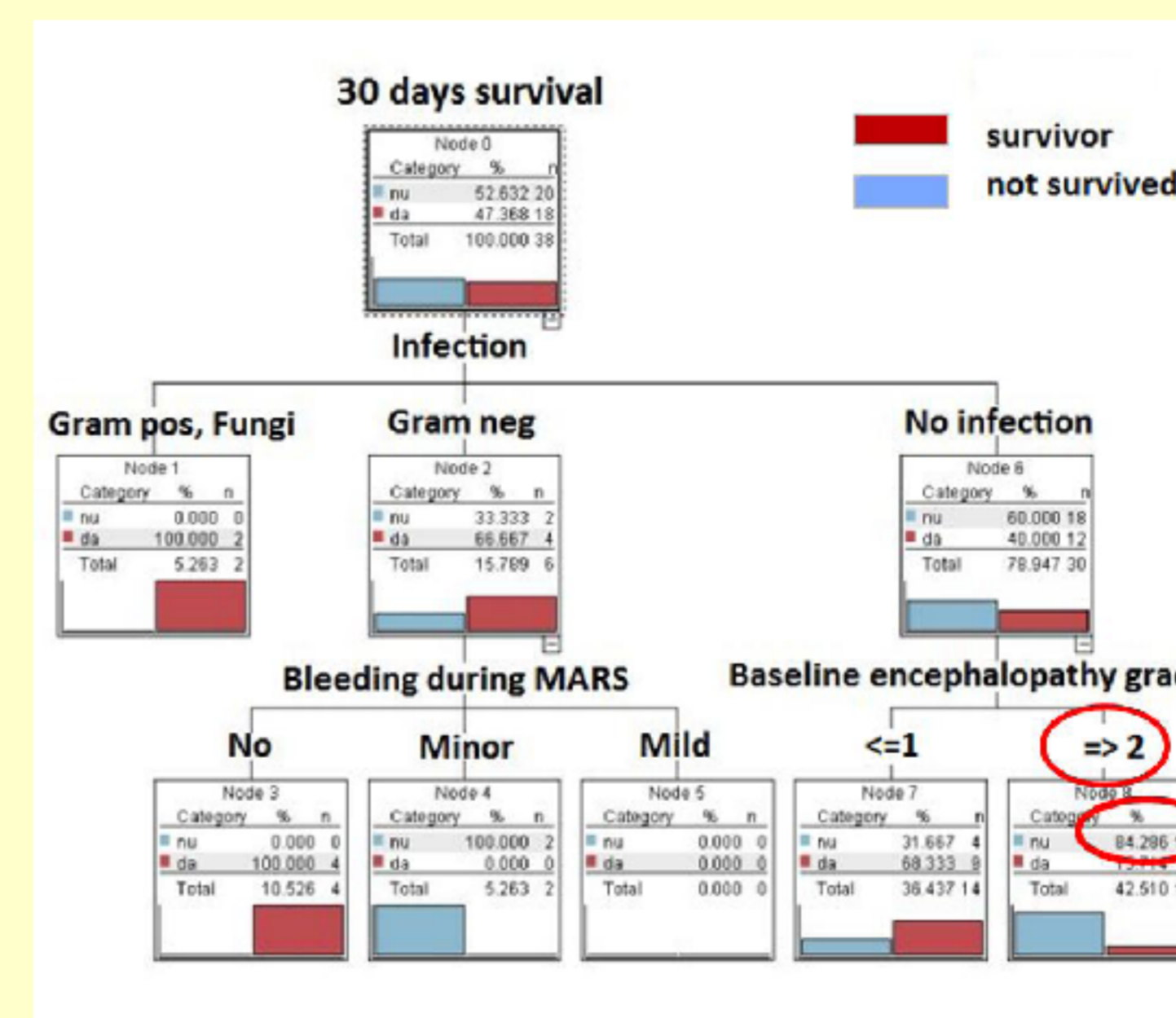


**The need for mechanical ventilation significantly influenced the patients' 30 days survival**



Log rank test p< 0.0001

**Impact of the presence of renal dysfunction before MARS on patients' 30 days survival**



**SPSS® Modeler 14.2 - Target: patient' 30 days survival**



### Stepwise logistic regression analysis

| | B | SE | Wald | df | p value | R |
|---|---|---|---|---|---|---|
| Baseline hepatic encephalopathy grade | -0.99 | 0.42 | 5.3 | 1 | 0.02 | 0.37 |

**The profile of the patient with a very low 30 days survival rate:**

*Baseline Hepatic Encephalopathy Grade ≥ II*

## Conclusions:

- In our experience, MARS therapy is a promising treatment for acute liver failure patients, allowing their own liver to recover.
- In AoCLF patients, MARS therapy provide temporary support and could be used as bridging method until liver transplantation is achieved.
- The most important predictor of survival was the grade of hepatic encephalopathy ≥ II.
- Thus, the start of the therapy when the patient meets the criteria for the MARS treatment is essential for the clinical success.
- MARS treatment is a costly procedure which can only be applied to a carefully selected patients, following the identified criteria.

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M) Dialysis. M1) Extracorporeal dialysis: techniques and adequacy.

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Poster presented at:

DOI: 10.3252/pso.eu.51era.2014

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