## OS009

### Dyserythropoiesis is underrecognized and contributes to severe anemia in liver cirrhosis

Chhagan Bihari[1], Sumit Garg[1], Shiv Kumar Sarin[2]. [1]*Institute of Liver and Biliary Sciences, Pathology and Hepatology, Delhi, India;* [2]*Institute of Liver and Biliary Sciences, Hepatology, Delhi, India*
Email: shivsarin@gmail.com

**Background and aims:** Moderate to severe anemia is one of the common complication in liver cirrhosis and is often multifactorial. Contribution of dyserythropoiesis (DE) in cirrhosis related anemia is often neglected and has not been studied. We aimed to investigate the prevalence, severity and mechanisms of dyserythropoiesis in cirrhosis patients.
**Method:** We studied the bone marrows (BM) of cirrhosis patients (n = 517), who underwent a BM aspiration/biopsy between Jan 2014–Dec 2018, for investigation of anemia, hypersplenism or other clinical indications. Cases of haematological or non-hematological neoplasias, chronic kidney disease, chronic or acute drug injury, acute and chronic hepatitis and granulomatous pathology were excluded. Morphological analysis of BM aspirate, biopsies, erythroid colony assessment were done. A >5% dyserythropoiesis in erythroid lineage was considered and categorized as mild: 5–10%; moderate: 10–15% and marked: >15%.
**Results:** A 68/517 (13.2%) cirrhosis patients had dyserythropoiesis and none from control group. Of them 44% had mild; 35.4% moderate and 20.6% marked dyserythropoiesis in the BM. Cirrhosis patients with DE had significantly lower hemoglobin than those without DE (7.6 ± 1.4 gm/dl vs 8.9 ± 1.9 gm/dl, p < 0.001), but comparable serum iron (83.7 ± 42 vs 90.2 ± 46.6 mcg/dl, p = 0.997); total iron binding capacity (243.2 ± 85.1 vs 231 ± 87.2 mcg/dl, p = 0.291); and transferrin saturation (50.9 ± 27.9 vs 55.6 ± 30.8 %, p = 0.206) and serum folate (16 ± 3.8 vs 15.8 ± 4.4 ng/ml) levels. The former however, had higher vitamin B12 (2339.2 ± 1406 vs 1842 ± 1411.9 pg/ml, p = 0.010) levels. Further, other confounding factors for anemia like lactate dehydrogenase (p = 0.494), reticulocyte count (p = 0.808), thyroid stimulating hormone (p = 0.208), hepcidin (p = 0.16), erythropoietin (p = 0.23), and spleen size (p = 0.310) were comparable. Grades of dyserythropoiesis were associated with Child's score (p = 0.003) with marked dyserythropoiesis being noted in Child C. Dyserythropoiesis was mainly associated with alcohol and non-alcoholic steatohepatitis (51/68, 75%) as compared to viral, autoimmune and other etiologies. BM examination showed fewer erythroid colonies (8 vs. 10.7, p < 0.001) and proerythroblasts (7 vs. 17.9, p < 0.001) in the erythroid colonies of patients with DE. The DE was significantly related with low GATA.1 (7.7 ± 4.3 vs 13.6 ± 7.8; p = 0.001) non-nuclear localization of HSP70 (p = 0.04) and excess erythroferrone (23.4 ± 7 vs 14.2 ± 5.2, p < 0.001) as compared to no-DE.
**Conclusion:** Approximately 13.2% patients with cirrhosis with severe anemia show dyserythropoiesis. Standard hematological and iron studies fail to identify it and bone marrow examination is merited. Alternations in the erythroid colonies, HSP70 localization and diminished GATA.1 in BM are associated with dyserythropoiesis.

## OS010

### Effect of recruitement and selection policies on the volume of outcome of patients transplanted with ACLF-3

Baptiste Michard[1], Thierry Artzner[1], Pietro Addeo[1], Philippe Bachellier[1], Camille Besch[1], Vincent Castelain[1], Raphael Clere-Jehl[1], Mathilde Deridder[1], Max Guillot[1], Jean-Étienne Herbrecht[1], Ralf Janssen-Langenstein[1], Maleka Schenck[1], Francis Schneider[1], François Faitot[1]. [1]*Hopitaux Universitaires de Strasbourg*
Email: baptiste.michard@chru-strasbourg.fr

**Background and aims:** Liver transplantation (LT) for critically ill cirrhotic patients is a debated issue, which raises complex medical, surgical and ethical challenges. In particular, it is crucial to achieve high post-LT survival in order to justify allocating livers to these patients, especially given the current organ shortage. To date, there is no granular data concerning the 3-year post-LT outcome of ACLF-3 patients.
**Method:** This study describes the three-year post-LT survival of a single center granular cohort of patients with ACLF-3 at the time of LT and compares it to the post-LT survival of all the patients who were transplanted without ACLF-3 in the same center between 2007 and 2018. Over this period of time, two policies were gradually implemented in this center: (i) developing a network of peripheral centers that transferred critically ill cirrhotic patients for LT assessment and (ii) increasing use of the transplantation for ACLF-3 model (TAM) score criteria to identify the optimal transplantability window.
**Results:** A total of 828 first time single LTs were performed over the study period. 91 patients had ACLF-3 at the time of LT. The overall three-year survival of ACLF-3 patients was 66% vs 82% (p < 0.001) for the rest of the cohort. Over the study period, both the number of

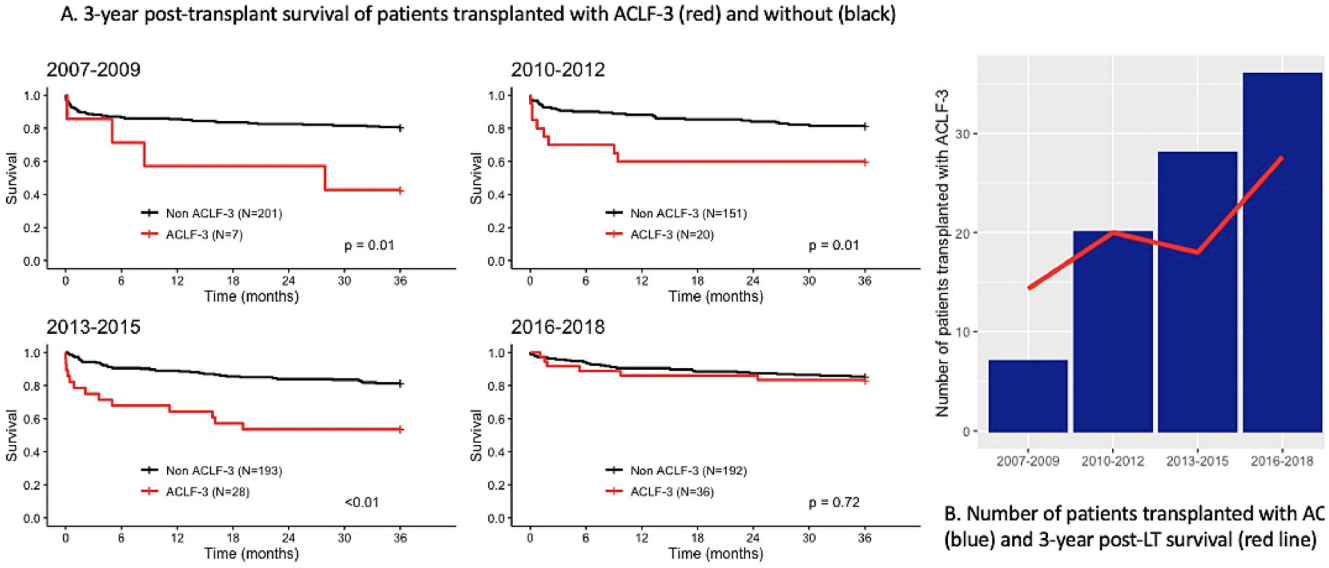


Figure: (abstract: OS010)

patients transplanted with ACLF-3 and their 3-year post-LT survival increased over time: 2007–2009: 7 patients, 43% survival; 2010–2012: 20 patients, 60% survival; 2013–2015: 28 patients, 54% survival; 2016–2018: 36 patients, 83% survival (no significant difference in survival between the ACLF-3 and the non ACLF-3 group in the last period). This increase in the number of patients transplanted and in their post-LT three-year survival was not observed in the general population of patients transplanted without ACLF-3 (cf. Figure). A total of 12 ACLF-3 patients were transplanted with TAM scores>2. However, in the last period (2016–2018), in which both the number of patients transplanted with ACLF-3 and the post-LT survival were the highest, no patient was transplanted with a TAM score>2.

**Conclusion:** This study, which originates from the largest single center cohort of patients transplanted with ACLF-3, illustrates how gradually building a network of peripheral centers to refer critically ill cirrhotic patients to an expert ICU and LT center can lead to a dramatic increase in the number of patients transplanted with ACLF-3. It also shows that there is a learning curve when transplanting patients with ACLF-3 and that the implementation of the TAM score to help identify the optimal transplantability window at the time of organ proposal contributes to optimizing post-LT outcomes. The combination of these strategies can help centers increase the number of patients transplanted with ACLF-3 while reaching post-LT outcomes for these patients that are similar to those of non ACLF-3 patients.

## OS011

### Real-world evidence on long-term albumin treatment in patients with decompensated liver cirrhosis in Italy

Wim Laleman[1], Jonel Trebicka[2], Alastair O'Brien[3], Paolo Caraceni[4], Sandra Santos[5], Tatiana Vilchez[6], Kyle Rodney[7], Sofia Schweiger[8], Paolo Angeli[9]. *[1]University Hospitals Leuven, Department of Gastroenterology and Hepatology, Section of Liver and Biliopancreatic Disorders, Leuven, Belgium; [2]Goethe University Hospital Frankfurt, Translational Hepatology Department of Internal Medicine, Frankfurt, Germany; [3]University College London, Institute for Liver and Digestive Health, London, United Kingdom; [4]University of Bologna, Department of Medical and Surgical Science, Bologna, Italy; [5]CSL Behring, Lisbon, Portugal; [6]CSL Behring, Barcelona, Spain; [7]Adivo Associates LLC, California, United States; [8]Adivo Associates LLC, Buenos Aires, Argentina; [9]University of Padova, Department of Medicine, Unit of Internal Medicine and Hepatology, Padova, Italy*
Email: paolo.angeli54@gmail.com

**Background and aims:** Human albumin plays an important role in the management of patients with decompensated liver cirrhosis. Guidelines recommend short-term albumin in specific acute conditions, but clinical trial data have also shown benefits of long-term albumin (LTA) treatment. This study aimed to analyse real-world data on LTA treatment in patients with cirrhosis across Italy.
**Method:** Data from an independent audit platform was collected on patients with cirrhosis and ascites who received non-LTA, defined as standard medical treatment with diuretics and albumin only for acute indications, or LTA, with infusions at weekly intervals for ≥6 months. Audits were performed between 2018 and 2020, using institutional data and callbacks with healthcare professionals in Italy from 43 locations (hospitals, pharmacies and health units). Retrospective analysis was conducted on patient demographics, treatment dose and regimen, complication rates and hospitalisation outcomes.
**Results:** Data were captured for 6660 patients (non-LTA: 4305; LTA: 2355). Main etiologies of cirrhosis were alcoholic (33%), viral (29%) non-alcoholic steatohepatitis (30%) and other (7%). In LTA patients, the mean (range) treatment duration was 14 (6–36) months and initial dose was 87 (10–280) g/week, followed by 37 (10–60) g/week. The need for paracentesis (3.1 vs 6.2 per patient per year) and the incidence of refractory ascites (0.57 vs 0.71 per patient per year) were lower in LTA than in non-LTA patients. A lower incidence (episodes per patient per year) of other major complications was also reported in LTA patients: spontaneous bacterial peritonitis (0.19 vs 0.09), hepatorenal syndrome (0.28 vs 0.16) and hepatic encephalopathy (0.40 vs 0.31). Hospitalisations were 2.40 and 2.85 per patient per year in LTA and non-LTA groups, respectively. Differences were maintained when comparing patients within age groups (≤39, 40–59, ≥60 years).
**Conclusion:** These real-word data captured through an audit methodology indicate that Italian hepatologists consider LTA a valuable approach for the medical management of decompensated cirrhosis, as LTA is currently prescribed in a vast proportion of patients with ascites. Although the present study does not allow the comparison of the two groups, the lower incidence of paracentesis and complications observed in patients receiving LTA is consistent with the benefits documented by the ANSWER trial. Considering this, the cost-effectiveness of LTA and potential for reducing the economic burden upon healthcare systems should be assessed.

## OS012

### Impact of cirrhotic cardiomyopathy and severity of liver cirrhosis on the development of acute kidney injury

Simona Bota[1], Marcel Razpotnik[1], Philipp Wimmer[2], Michael Hackl[2], Gerald Lesnik[3], Hannes Alber[2], Markus Peck-Radosavljevic[1].
*[1]Klinikum Klagenfurt am Wörthersee, Department of Internal Medicine and Gastroenterology (IMuG) and Emergency Medicine (ZAE), Klagenfurt, Austria; [2]Klinikum Klagenfurt am Wörthersee, Department of Internal Medicine and Cardiology (IMuK), Klagenfurt, Austria; [3]Klinikum Klagenfurt am Wörthersee, Institut for diagnostic and interventional Radiology, Klagenfurt, Austria*
Email: bota_simona1982@yahoo.com

**Background and aim:** New criteria of cirrhotic cardiomyopathy (CCM) were published from a multidisciplinary consortium (Izzy et al. Hepatology 2019 Nov 11. doi: 10.1002/hep.31034) and define systolic dysfunction of the left ventricle as ejection fraction (EF) ≤50% and/or global longitudinal strain (GLS) <–18%, while the diastolic dysfunction is diagnosed when three of the following conditions are present: average E/e' >14, peak tricuspid regurgitation velocity >2.8 m/s, septal e'<7 cm/s, left atrial volume index >34 ml/m$^2$.
Our **aim** was to assess the influence of CCM, severity and etiology of liver cirrhosis on the development of acute kidney injury.
**Method:** Our prospective study included consecutive patients with liver cirrhosis without structural heart disease, arterial hypertension, HCC outside Milan criteria, portal vein thrombosis, presence of TIPS and with optimal acoustic echocardiography window. The patients were evaluated between 12/2018–11/2021 in our in- and out-patient Department. Conventional and speckle-tracking echocardiography (Vendor GE, EchoPAC PC software) were performed by a single investigator (EACVI TTE certified).
Acute kidney injury (AKIN) was defined according to the International Ascites Club as increase to serum creatinine of 0.3 mg/dL in <48 h or 50% increase in serum creatinine from baseline value within ≤3months.
The follow-up was performed until the patient was last seen or death.
**Results:** 412 cirrhotic patients were evaluated during the study period and 133 fulfilled the inclusion criteria and were included in the final analysis. The mean age of patients was 57.1 ± 10.2 years (60.1% males), 70.1% with alcoholic etiology and 48.1% with Child-Pugh A liver cirrhosis.
The median follow-up was 21 (0.5–36) months. Acute kidney injury was diagnosed in 26/133 (19.5%) of patients, while CCM (systolic and/or diastolic dysfunction) was present on 15% of patients.
The presence of acute kidney injury was correlated in univariate analysis with presence of CCM, Child-Pugh score, MELD score, alcoholic etiology of liver cirrhosis and prothrombin time (Table).
In multivariate logistic regression analysis only CCM and alcoholic etiology remained significantly associated with AKIN: CCM -OR = 13.6