# Acute Liver Failure
## The Path Towards no Mortality

Hatef Massoumi, M.D.
Clinical Director of Hepatology
Lenox Hill Hospital
Northwell Center for Liver Disease and Transplantation

# Disclaimers

- Speaker does not have any conflict of interest

# Case 1

- 23 yr F with no known PMH
- Jaundice developed over 2 weeks
- Alert and awake
- INR 2.2
- Mild abdominal discomfort
- She was taking acetaminophen on and off for headache
- Hb 6.2 g/dL, MCV 108 fL, RBC 1.84 Mil/uL
- TB 59 mg/dL, ALP 14 u/L, AST 195 uL, ALT 27 uL

# Definition

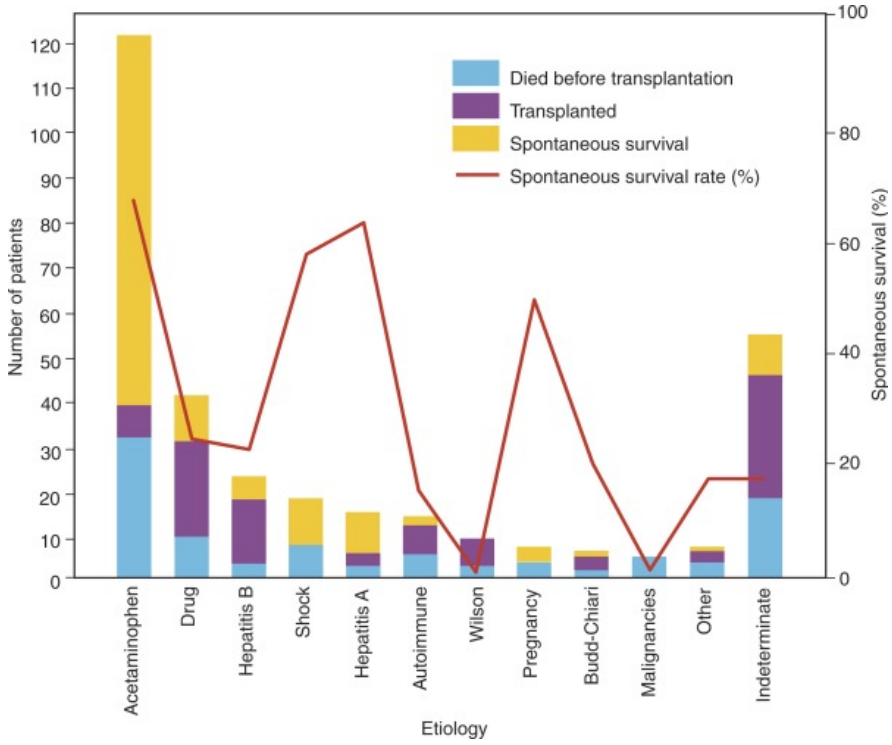
- Complex syndrome of acute liver injury with **INR>1.5** and any degree of encephalopathy in a patient **without preexisting liver disease**
- Exceptions for preexisting liver disease:
  - Wilson disease
  - Flare of hepatitis B
  - Autoimmune hepatitis
  - Budd Chiari Syndrome (EASL Guideline)

# Results of a Prospective Study of Acute Liver Failure at 17 Tertiary Care Centers in the United States

George Ostapowicz, MD; Robert J. Fontana, MD; Frank V. Schiødt, MD; Anne Larson, MD; Timothy J. Davern, MD; Steven H.B. Han, MD; Timothy M. McCashland, MD; A. Obaid Shakil, MD; J. Eileen Hay, MD; Linda Hynan, PhD; Jeffrey S. Crippin, MD; Andres T. Blei, MD; Grace Samuel, MS; Joan Reisch, PhD; William M. Lee, MD; and the U.S. Acute Liver Failure Study Group*

- 308 pts in 17 centers
- Median age 38 yrs
- 73% women
- 39% acetaminophen toxicity
- 13 % Idiosyncratic drug toxicity
- 17% undetermined
- 12% hepatitis B & A

52%




**Annals of Internal Medicine**

*2002;137:947-954*

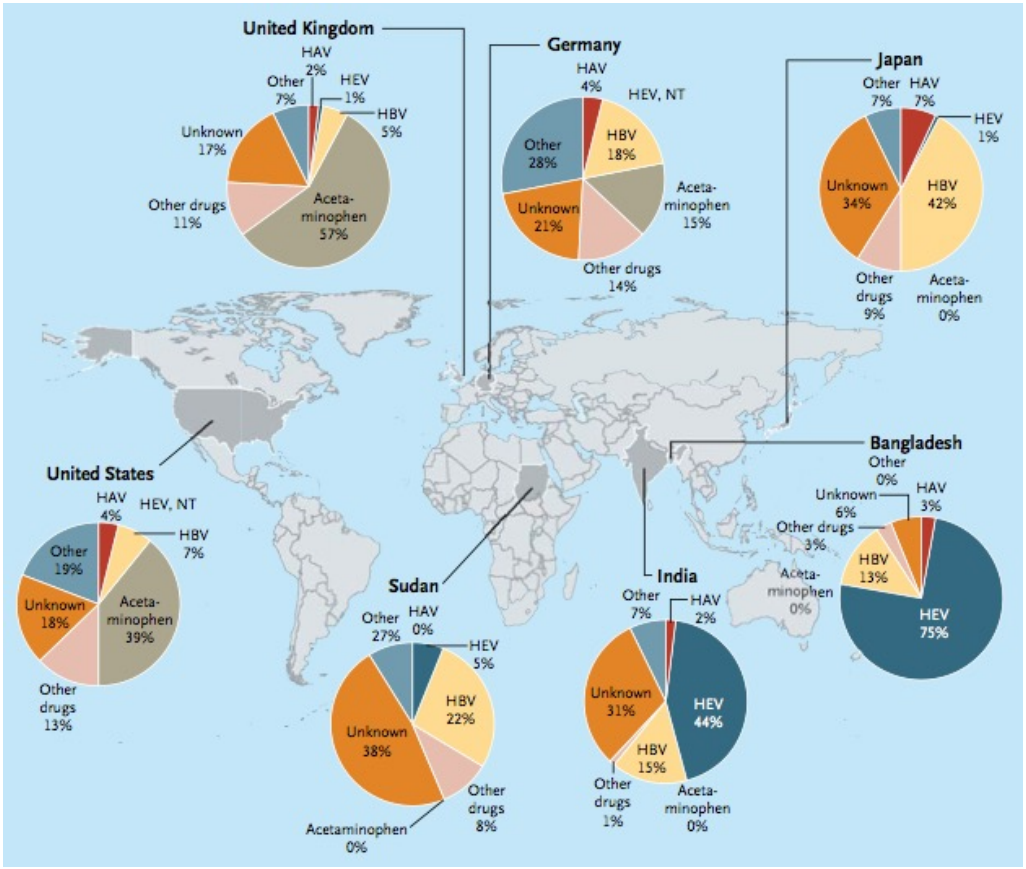
The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

CRITICAL CARE MEDICINE

# Acute Liver Failure

William Bernal, M.D., and Julia Wendon, M.B., Ch.B.



The NEW ENGLAND JOURNAL of MEDICINE

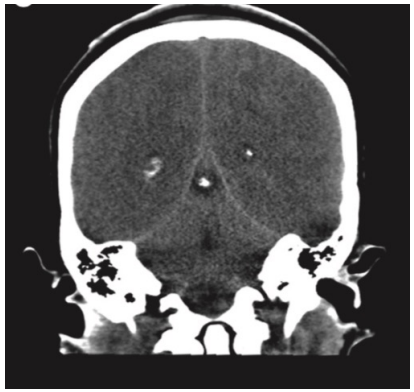
REVIEW ARTICLE

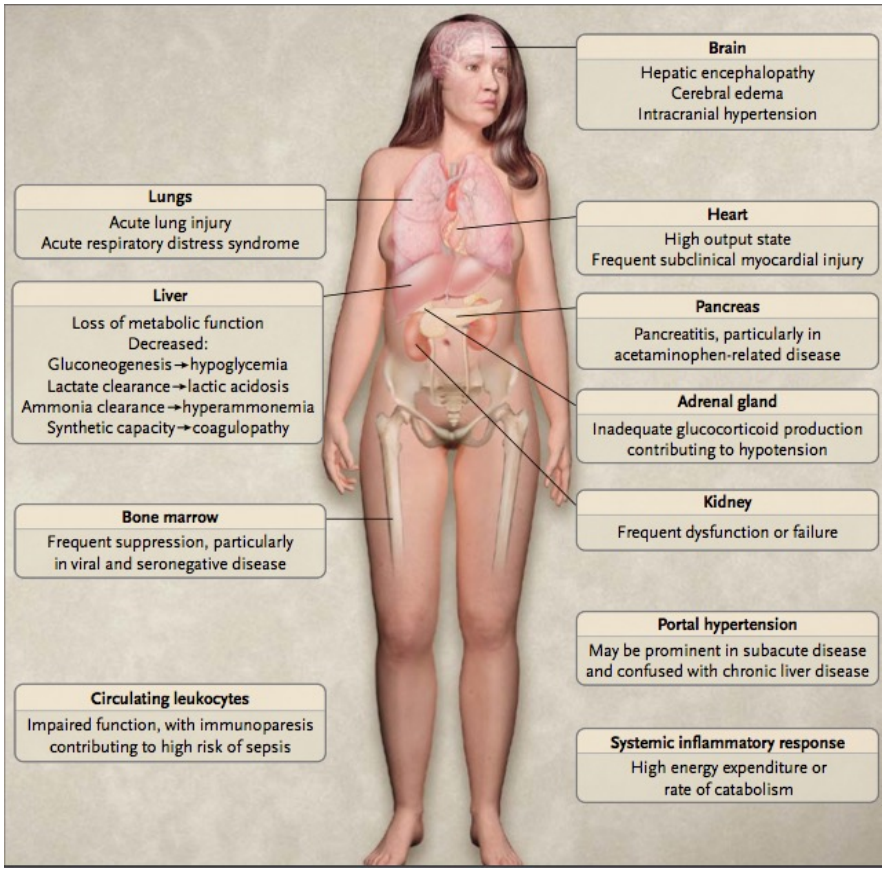
CRITICAL CARE MEDICINE

# Acute Liver Failure

William Bernal, M.D., and Julia Wendon, M.B., Ch.B.

## Causes of Death:
## cerebral edema (44%)
## sepsis (29%)



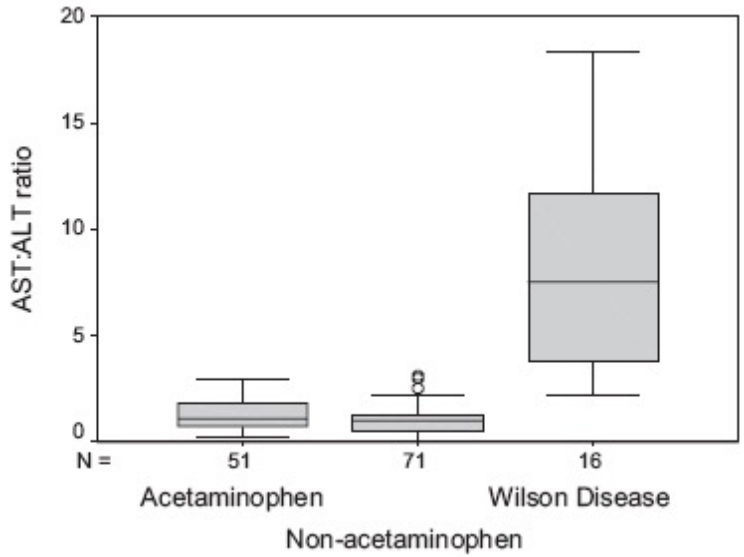


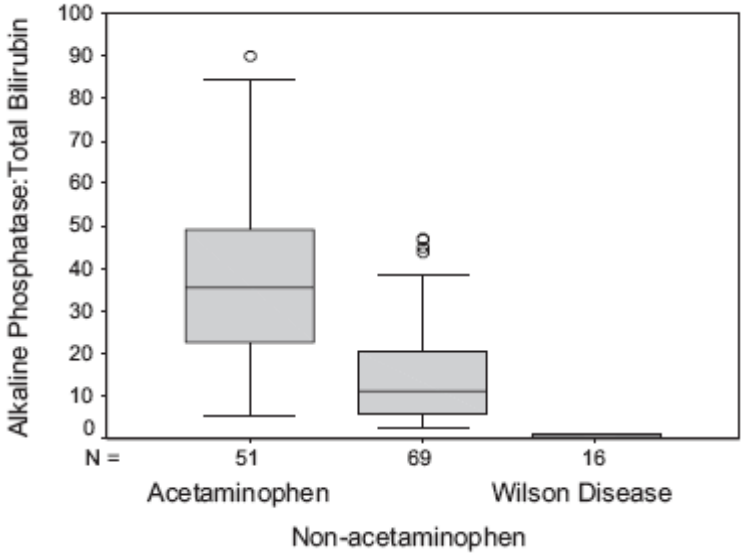
# Acetaminophen Toxicity

- Low or absent level does not rule it out
- **Very high AST & ALT (>3500) is highly suggestive**
- Early rise of serum **AFP** indicates good prognosis
- Fall of serum **PO4** indicates improving
- Very good/improved transplant free survival

# Screening for Wilson Disease in Acute Liver Failure: A Comparison of Currently Available Diagnostic Tests

Jessica D. Korman,[1] Irene Volenberg,[2] Jody Balko,[3] Joe Webster,[3] Frank V. Schiodt,[3] Robert H. Squires, Jr,[4] Robert J. Fontana,[5] William M. Lee,[3] Michael L. Schilsky[2] and the Pediatric and Adult Acute Liver Failure Study Groups




- AST/ALT > 2.2 ( 94% sensitivity & 86% specificity)
- TB/ALP> 4 (94% sensitivity & 96% specificity)
- Both criteria together (100% sensitive and specific)

(Hepatology 2008;48:1167-1174.)

# Case 1

- Hb 6.2 g/dL, MCV 108 fL, RBC 1.84 Mil/uL
- TB 59 mg/dL, ALP 14 u/L, AST 195 uL, ALT 27 uL
- *59÷14=4.2  195÷27=7.2*

Grade 3 HE on day 5
Circulatory failure requiring high dose pressors
Listed for OLT as Status 1A
Saved at the nick of the time

Forget about Ceruloplasmin

# Herpes Simplex Virus Hepatitis: An Analysis of the Published Literature and Institutional Cases

**John P. Norvell,[1] Andres T. Blei,[1] Borko D. Jovanovic,[2] and Josh Levitsky[1]**

*[1]Department of Internal Medicine, Division of Hepatology, Northwestern University Feinberg School of Medicine, Chicago, IL; [2]Department of Preventive Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL*

**TABLE 2. Demographics and Clinical Presentation of HSV Hepatitis**

| | Number (%) |
|---|---|
| Mean age (yr) | 34 ± 15 |
| Gender | |
| Male | 51/137 (38) |
| Female | 82/137 (62) |
| Immune status | |
| Immunocompetent | 33/137 (24) |
| Immunosuppressed, total | 73/137 (53) |
| Immunosuppressed, transplant | 41/137 (30) |
| Immunosuppressed, nontransplant | 32/137 (23) |
| Pregnant | 32/137 (23) |
| Fever | 98/100 (98) |
| Herpetic lesions (initial or during hospitalization) | |
| None | 69/123 (56) |
| Mucocutaneous | 33/123 (27) |
| Disseminated | 21/123 (17) |
| Mean peak ALT or AST (IU/L) | 4927 ± 4099 |
| Mean peak total bilirubin (mg/dL) | 6.0 ± 8.1 |

**TABLE 3. Diagnosis and Outcomes of HSV Hepatitis**

| | Number (%) |
|---|---|
| Method of initial diagnosis | |
| Autopsy | 79/137 (57.6) |
| Liver biopsy | 43/137 (31.4) |
| Explanted liver | 4/137 (2.9) |
| Clinical criteria | 11/137 (8.0) |

*Liver Transplantation 2007;13:1428-1434*

HEPATOLOGY

AASLD AMERICAN ASSOCIATION FOR THE STUDY OF LIVER DISEASES

HEPATOLOGY, VOL. 69, NO. 2, 2019

# Herpes Simplex Virus–Associated Acute Liver Failure Often Goes Unrecognized

Lanna Little,[1,2] Jody Rule ,[1] Lan Peng,[3] Michelle Gottfried,[4] William M. Lee,[1] and the Acute Liver Failure Study Group[1]

**TABLE 1. Characteristics of HSV-Related ALF Versus All Other Viruses and Versus All Other Nonviral ALF, With 95% Confidence Intervals of the Median in Parentheses**

| Etiology of ALF | Number of cases | Fever (%) | Malaise (%) | Rash (%) | Median AST (IU/L) | Median ALT (IU/L) | Alive at 21 days (%) | Received transplant (%) |
|---|---|---|---|---|---|---|---|---|
| Confirmed/probable HSV | 20 | 75 (50.9-91.3) | 85 (62.1-96.8) | 20 (5.7-43.7) | 7,791.5 (3,711-11,721) | 2,897.5 (1,419-5,436) | 40 (19.1-64.0) | 25 (8.7-49.1) |
| Hepatitis A, B, C, E, and other viruses | 209 | 36.1 (29.5-43.0) | 82.1 (76.2-87.1) | 8.3 (5.9-13.0) | 1,730 (1,306-2,327) | 2,377 (1,895-2,817) | 55.5 (48.5-62.4) | 37.0 (30.4-44.0) |
| All other nonviral etiologies | 2,132 | 19.0 (17.3-20.7) | 66.8 (64.7-68.8) | 6.9 (5.9-8.1) | 2,976.5 (2,714-3,208) | 2,533 (2,396-2,719) | 62.0 (59.9-64.1) | 20.8 (19.1-22.6) |

# Mushroom Poisoning
## Amanita Phalloides

- Severe GI symptoms
- Highly lethal
- No blood test for diagnosis
- PCN G or Silymarin (milk thistle)
- Needs aggressive hydration
- Beware of entero-hepatic circulation of toxin

**Holy Roman Emperor Charles VI**

**Claudius Caesar**

# Case 2

- 56 yr F, no chronic liver disease, in office with jaundice
- She started looking ”yellow” about 6 weeks ago
- Fatigue, nausea, poor appetite, dyspepsia & very tired
- She takes “3 tiny pills & a big one”, doesn’t recall the names
- She takes some “natural supplements”
- Plt 158000, Bili 19, AST 260, ALT 190, INR 2.5

# MCQ

## What is the most appropriate next action

a) Send a full set of labs
b) Obtain an urgent ultrasound
c) Refer to hepatology
d) All of the above
e) None of the above

# Prognostic Factors: King's College Criteria

## Acetaminophen cases

- Arterial PH < 7.3 or
- Arterial lactate>3.5 at 4 hrs or
- Arterial lactate>3 at 12 hrs or
  - INR>6.5 &
  - Cr>3.4 &
  - Stage 3 or 4 encephalopathy

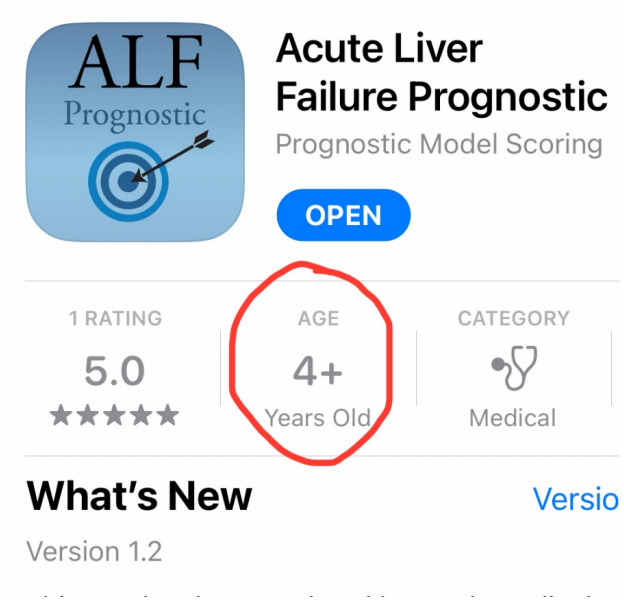
## Non-acetaminophen cases

- INR>6.5 or
- Any 3 of the followings:
  - Age<10 or >40 yrs
  - Duration of jaundice>7 d
  - Total Bili>17.5
  - INR>3.5
  - Etiology: idiosyncratic drug, halothane, idiopathic, non-A non-B hepatitis

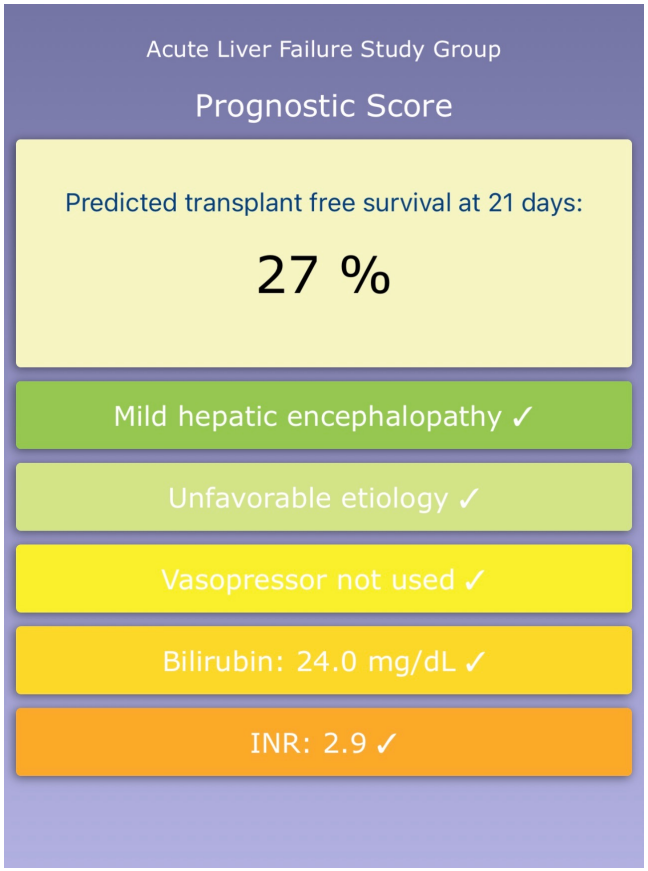
*Lancet 1993;342:273-5*

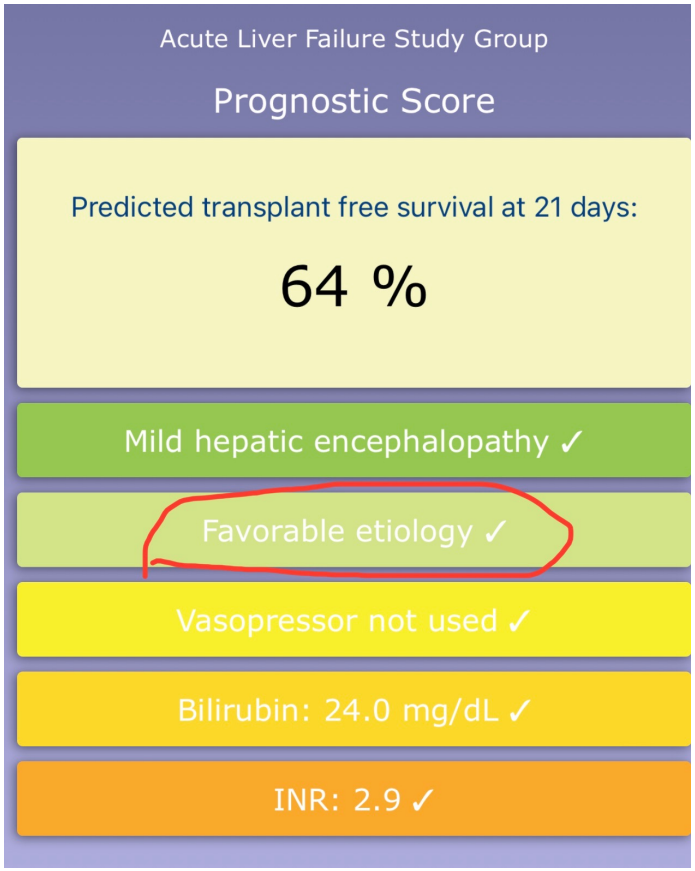
# Prognostic Factors

- APACHE II >15 (acetaminophen)
- MELD>33 (acetaminophen)
- CT scan liver volume <1000 ml (non-acetaminophen)
- Liver biopsy with > 70% necrosis (mixed)
- ALFSG Prognostic Factor (mixed)
- Clichy model based on Factor V (viral hepatitis)



# ALFSG Criteria



# Outcome Based on Days of Symptoms Prior to Occurrence of Encephalopathy

- Hyperacute (0-7 days)
  - Transplant free survival 30%
- Acute (7-28 days)
  - Transplant free survival 33%
- Subacute (>28 days)
  - Transplant free survival 14%

# Case 2

- Patient is admitted to hospital
- CT scan does not show cirrhosis, measured liver volume 1100 cc
- ANA 1/160, IgG 1.8 gr, negative viral hepatitis panel
- What medicine do you think is the culprit?
- Is liver biopsy helpful?

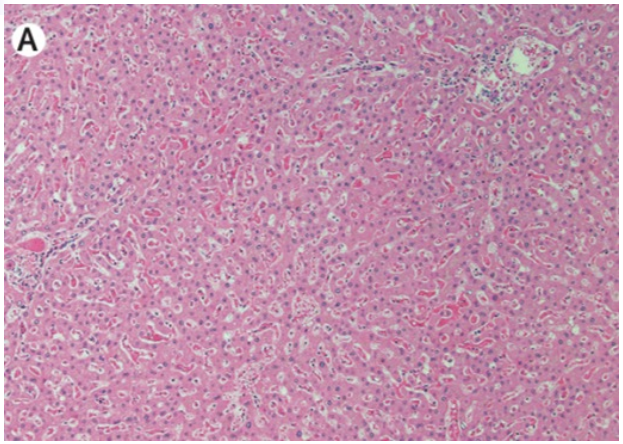
> Eur J Gastroenterol Hepatol. 2022 Jul 1;34(7):801-806. doi: 10.1097/MEG.0000000000002382. Epub 2022 Apr 29.

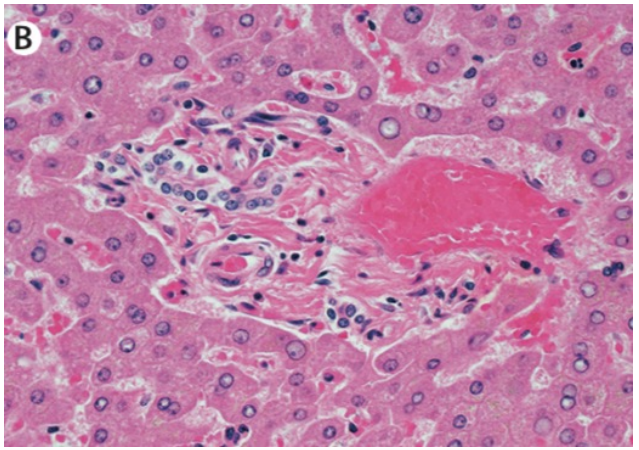
# Diagnostic value of a liver biopsy in patients with an acute liver failure or acute liver injury

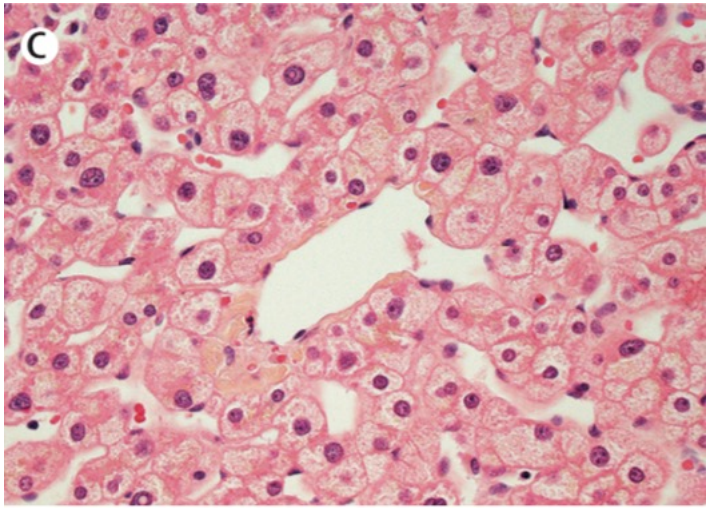
Peter Hunyady [1], Eva Herrmann [2], Joerg Bojunga [1], Mireen Friedrich-Rust [1], Anita Pathil [1], Stefan Zeuzem [1], Ulrike Mihm [1]

- In 12/15 pts with presumptive AIH, bx was suggestive of DILI

# Liver Biopsy

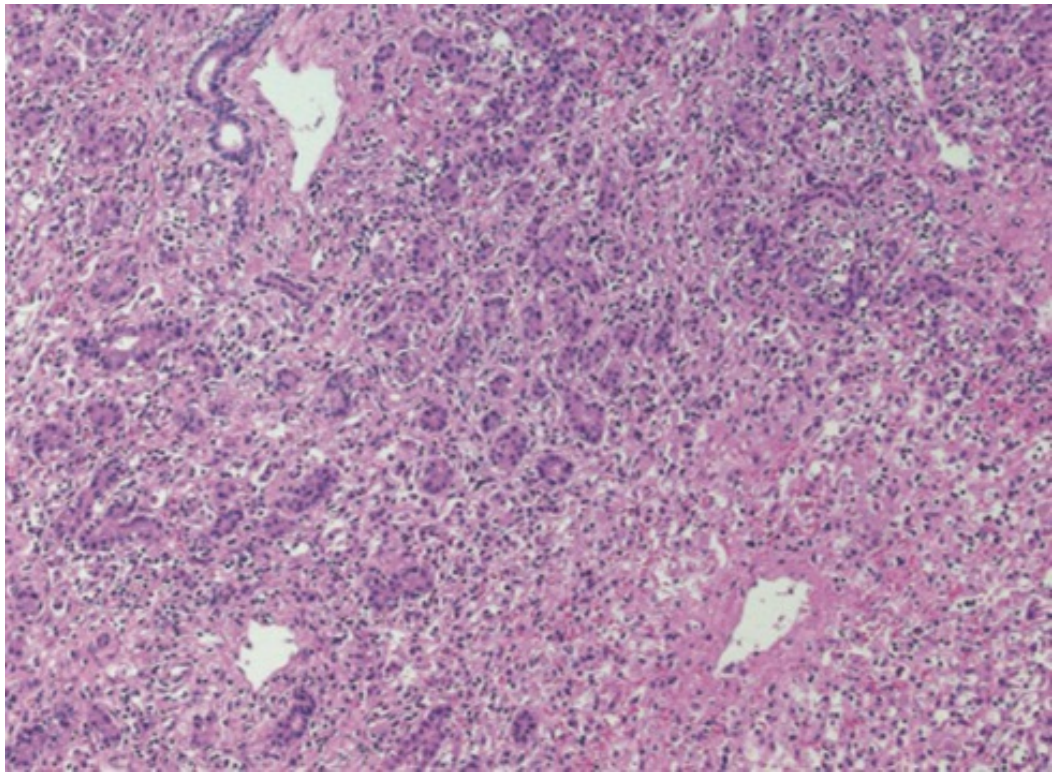


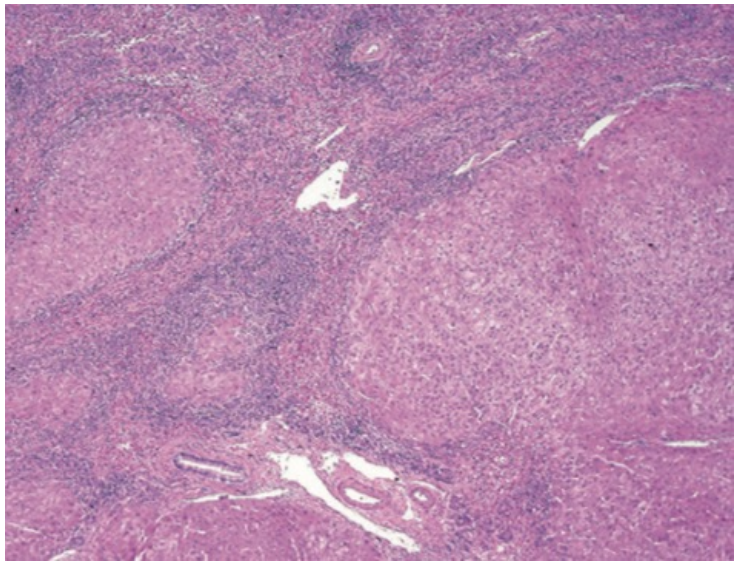



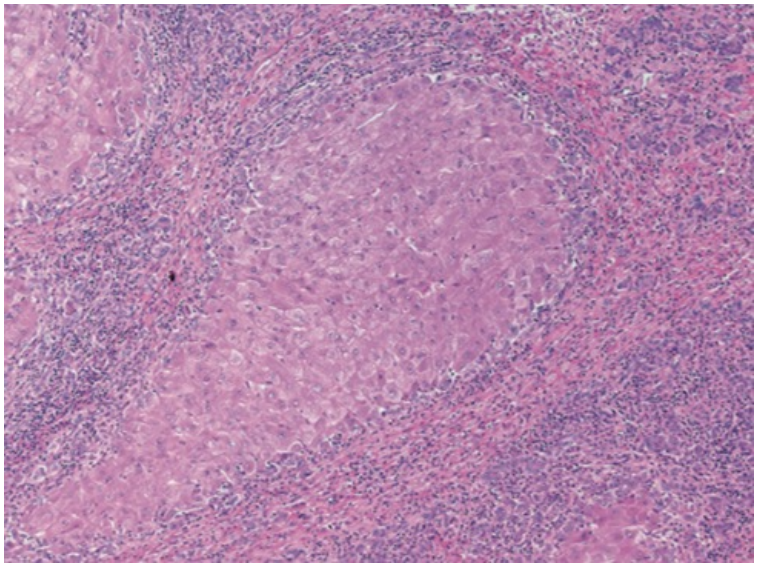
# Liver Biopsy

- Where is the liver?
- Massive Necrosis
- INH toxicity
- Bad outcome



# Liver Biopsy





- Is she cirrhotic? Is this a true ALF?
- Nitrofurantoin toxicity with intermittent use over 6 months

*Lancet 2019, 394:869-81*

# Relationship Between Daily Dose of Oral Medications and Idiosyncratic Drug-Induced Liver Injury: Search for Signals

Craig Lammert,[1] Stefan Einarsson,[2] Chandan Saha,[3] Anna Niklasson,[2] Einar Bjornsson,[2] and Naga Chalasani[3]

**Table 3. Association Between Daily Doses of Oral Prescription Medications and Hepatic Adverse Events**

| Number of Compounds Reported To Have Caused | ≤10 mg (n = 54) | 10–50 mg (n = 83) | ≥50 mg (n = 93) | *P*-Value |
|---|---|---|---|---|
| ALT > 3 × ULN (n, %) | 10 (19) | 22 (27) | 29 (31) | 0.10 |
| Jaundice (n, %) | 18 (33) | 33 (40) | 42 (45) | 0.16 |
| Liver Failure (n, %) | 9 (17) | 10 (12) | 30 (32) | 0.009 |
| Death (n, %) | 6 (11) | 9 (11) | 26 (28) | 0.004 |
| Transplant (n, %) | 0 (0) | 2 (2) | 12 (13) | <0.001 |
| **Prescriptions (median in 2005)** | 4,746,500 | 4,938,000 | 3,733,000 | 0.3 |

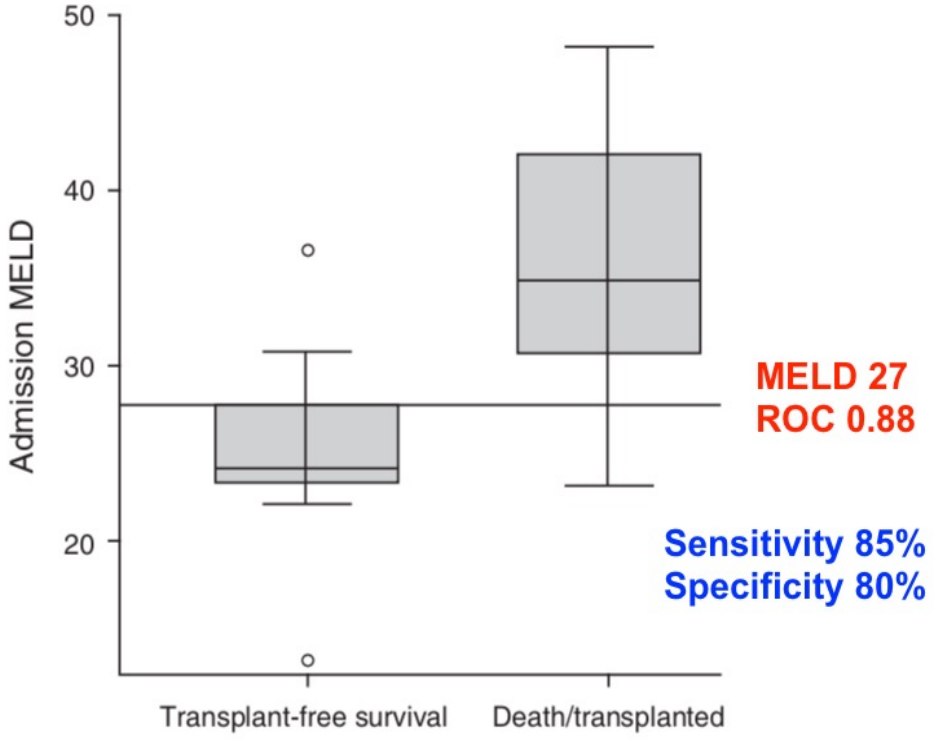
CME

# Clinical Features and Outcomes of Complementary and Alternative Medicine Induced Acute Liver Failure and Injury

Luke Hillman, MD[1], Michelle Gottfried, MS[2], Maureen Whitsett, MD[1], Jorge Rakela, MD[3], Michael Schilsky, MD[4], William M. Lee, MD[5] and Daniel Ganger, MD[6]

- Use of CAM and incidence of CAM induced severe liver injury is on the rise
- Indistinguishable characteristics from the prescription meds
- More pts needed transplant with CAM
- Lower transplant free survival

*Am J Gastro 2016*



# Case 2

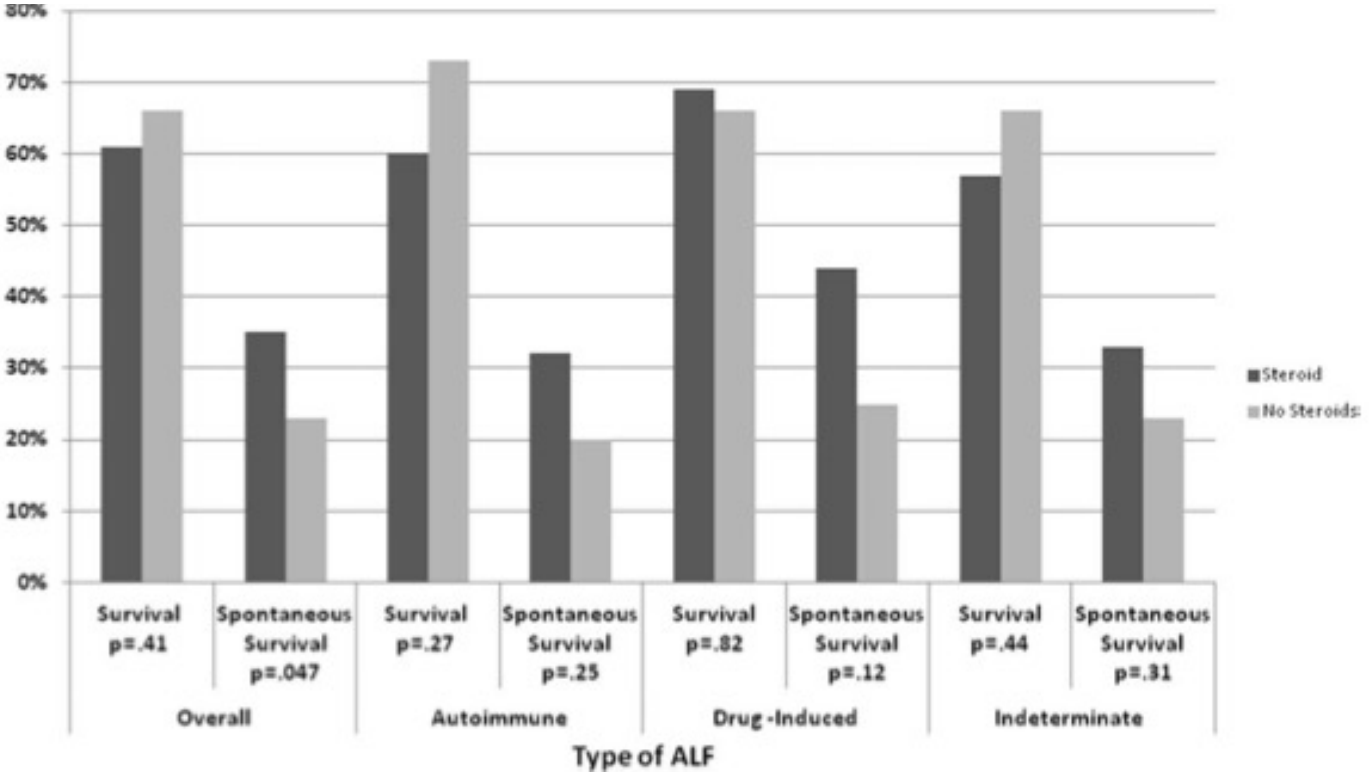
- Transvenous liver biopsy is done
- 50% hepatocyte drop out
- Mild inflammatory changes mostly PMNs, some plasma cells
- Steroids?
- NAC?

HEPATOLOGY
Official Journal of the American Association for the Study of Liver Diseases
AASLD



# Steroid Use in Acute Liver Failure

Jamuna Karkhanis,[1] Elizabeth C. Verna,[1] Matthew S. Chang,[1] R. Todd Stravitz,[2] Michael Schilsky,[3] William M. Lee,[4] and Robert S. Brown, Jr.,[1] for the Acute Liver Failure Study Group



# NAC in Non-acetaminophen ALF

- 173 pts from ALF study randomized to receive 72 hrs of IV NAC
- Primary endpoint: overall survival (OS)
- Secondary endpoint: spontaneous (transplant free) survival (SS)
- No difference in OS (57/81 vs 61/92)
- No difference in SS (32/81 vs 25/92)
- SS significantly better with NAC among HE I-II (30/58 vs 17/56)

Gastroenterology. 2009 Sep;137(3):856-64

# Case 2

- Day 5 of hospitalization
- Normal lactate, INR 2.9, Plt 98000, TB 28, normal Cr
- Liver volume on CT scan is now 900 cc
- No change in mental status
- List for liver transplant (OLT) with MELD?
- Wait & see if she gets better and avoid OLT?
- List for OLT as status 1A (highest adult priority)

Clinical Gastroenterology and Hepatology 2016;14:613–620

Drop in Plt count was associated with poor outcome, independent of INR

# Thrombocytopenia Is Associated With Multi-organ System Failure in Patients With Acute Liver Failure

R. Todd Stravitz,* Caitlyn Ellerbe,‡ Valerie Durkalski,‡ Adrian Reuben,§ Ton Lisman,‖ William M. Lee,¶ and the Acute Liver Failure Study Group

Hepatology International (2022) 16:1116–1126
https://doi.org/10.1007/s12072-022-10302-1

Plt count performed as good as MELD and better than KCC

ORIGINAL ARTICLE

Is low Plt due to an undiagnosed chronic liver disease?

# Low platelets: a new and simple prognostic marker for patients with hepatitis E virus-related acute liver failure

# Day 7

- INR 3.9, Plt count 48000, TB 28, Cr 1.2 (from 0.6)
- On low dose pressor, listed for OLT
- Vomited “some bloody materials”
- Next step
  - Transfuse FFP
  - Transfuse PLT
  - Arrange for EGD
  - Monitor CBC, start PPI and non of the above

HEPATOLOGY

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HEPATOLOGY, VOL. 67, NO. 5, 2018

LIVER FAILURE/CIRRHOSIS/PORTAL HYPERTENSION

# Bleeding Complications in Acute Liver Failure

- 1770 pts, 183 (11%) bled, 173 spontaneous, 22 post procedure
- 84% of spontaneous bleeding was from UGI source
- Most common cause of UGI bleeding was gastric erosion
- UGI bleeding patients rarely needed blood transfusion
- Bleeding from central line or dialysis catheter were rare
- Intracranial bleeding in 20 pts, half of them due to ICP catheter

Published in final edited form as:
*J Hepatol*. 2012 January ; 56(1): 129–136. doi:10.1016/j.jhep.2011.04.020.

# Minimal Effects of Acute Liver Injury/Acute Liver Failure on Hemostasis as Assessed by Thromboelastography

**R. Todd Stravitz**[†], **Ton Lisman**[‡], **Velimir A. Luketic**[†], **Richard K. Sterling**[†], **Puneet Puri**[†], **Michael Fuchs**[†], **Ashraf Ibrahim**[§], **William M. Lee**[¶], and **Arun J. Sanyal**[†]

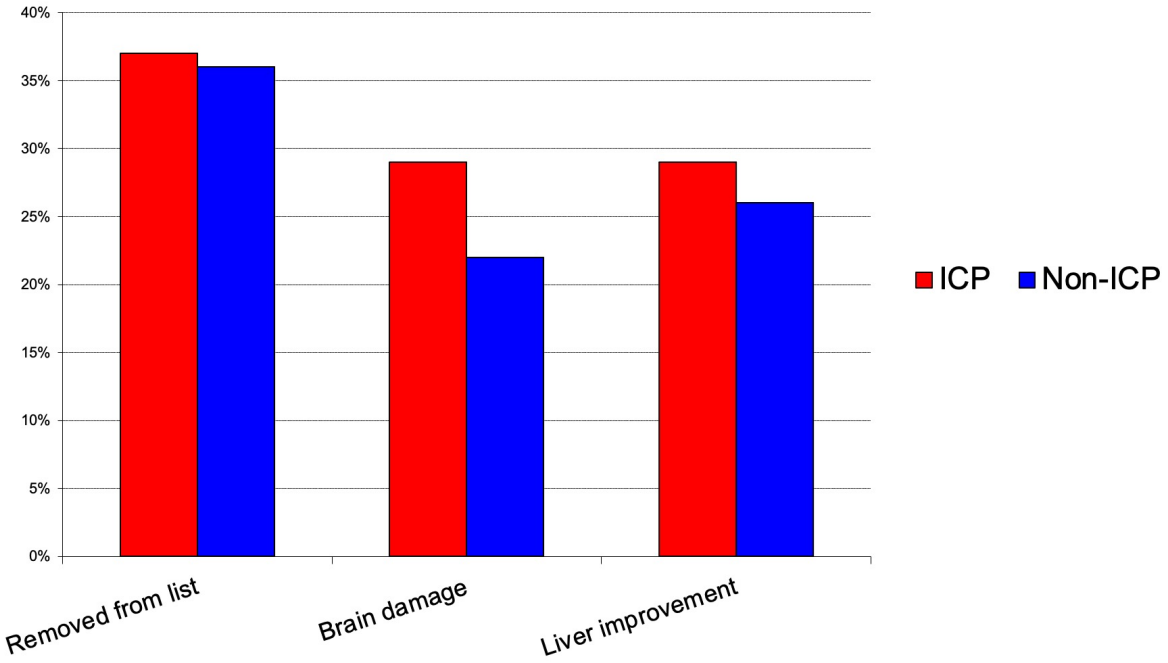
- ALF pts receive 13.7±15 u FFP in 7 d
- Spontaneous bleeding is rare (5%)
- It is difficult to correct the INR
- Portal HTN bleeding is rare (other than in BCS)

# Case 2

- After some discussions between some members of the team, decision was made to do an EGD *(they missed the ALF talk)*
- A combination of midazolam, fentanyl and succinylcholine for intubation
- EGD showed few superficial erosions, no active bleeding
- Next day, she doesn't wake up
- CT scan shows mild brain edema
- How to manage this? Has she already herniated?
- Should be use intracranial pressure monitor?

# Complications and Use of Intracranial Pressure Monitoring in Patients With Acute Liver Failure and Severe Encephalopathy

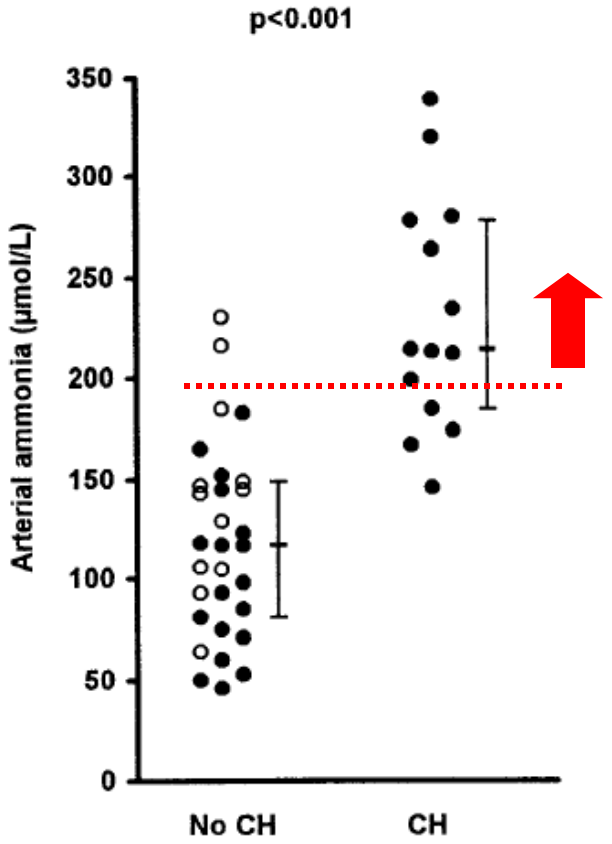
*Javier Vaquero,[1] Robert J. Fontana,[2] Anne M. Larson,[3] Nathan M.T. Bass,[4] Timothy J. Davern,[4] A. Obaid Shakil,[5] Steven Han,[6] M. Edwyn Harrison,[7] Todd R. Stravitz,[8] Santiago Muñoz,[9] Robert Brown,[10] William M. Lee,[11] and Andres T. Blei[1]*




***Liver Transplantation 2005;12:1581-1589***

# Increased Intracranial Pressure

- 165 pts with ALF & severe HE
- Ammonia level >100 on day 1 was associated with risk of HE & ICH
- Level<75 has almost no risk of ICH
- Levels > 200 suggest herniation
- Adding MELD increases the specificity
- Role of lactulose: small increase in survival time




Hepatology 2007,46:1844-1852

J Hepatology 2002;36:33A

# Treatment of Elevated ICP

- Mannitol
  - Improves survival
  - Serum osmolality below 320
- **H**ypertonic saline, Na 145-155
  Keep MAP > 75
- **H**yperventilation
  Debatable role (may acutely but transiently lower ICP)
- Barbiturate
  Maybe useful in refractory cases (be aware of hypotension)
- Corticosteroids
  - No use
- **H**ypothermia

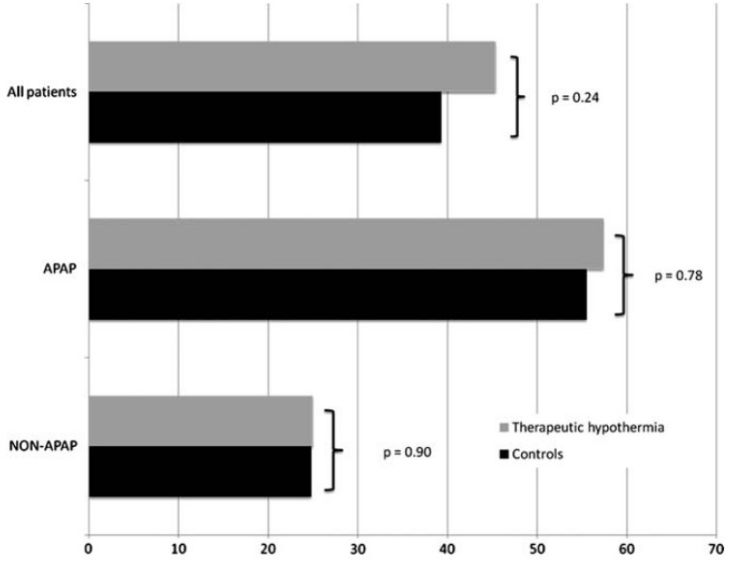
LIVER TRANSPLANTATION 21:4–12, 2015

ORIGINAL ARTICLE

# Therapeutic Hypothermia in Acute Liver Failure: A Multicenter Retrospective Cohort Analysis

Constantine J. Karvellas,[1,2] R. Todd Stravitz,[3] Holly Battenhouse,[4] William M. Lee,[5] and Michael L. Schilsky,[6] for the US Acute Liver Failure Study Group

- No improvement in overall or transplant free survival



# MCQ

- Is there a liver support machine?
- Does it work
  1. Yes
  2. No
  3. Maybe

# Current Evidence for Extracorporeal Liver Support Systems in Acute Liver Failure and Acute-on-Chronic Liver Failure

Constantine J. Karvellas, MD, SM, FRCPC[a,b,*],
Ram M. Subramanian, MD[c,d]

**Table 2**
**Evidence for bioartificial extracorporeal liver support in acute liver failure/acute-on-chronic liver failure**

| Study | N | Device | Cell Type | Survival |
|---|---|---|---|---|
| ACLF | | | | |
| VTI-208 2015 | 203 | ELAD | Human (cultured C3A) | No (90 d 59 vs 62%; $P = .74$) |
| ALF | | | | |
| Ellis et al,[29] 1996 | 24 | ELAD | Human (Cultured C3A) | No difference in survival |
| Demetriou et al,[30] 2004 | 171 | HepatAssist | Porcine (Cryopreserved) | No (30 d 71% vs 62%; $P = .26$) |

Research Article

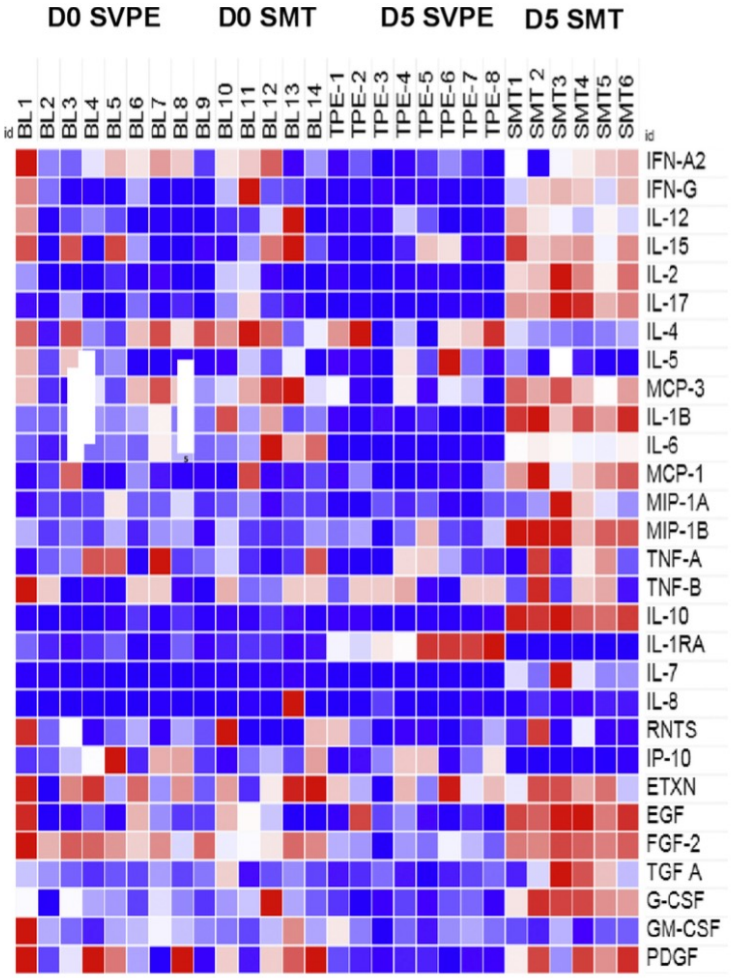
CrossMark

EASL JOURNAL OF HEPATOLOGY

# High-volume plasma exchange in patients with acute liver failure: An open randomised controlled trial

- High volume plasma exchange for ALF
- Prospective multi-center European RCT, 90 pts in each arm
- Randomized to 10 lit plasma exchange daily x 3 days
- Transplant outcome was similar in both arms
- Transplant free survival 58.7 (PE group) vs 47.8% (p=0.0083)

# Standard-Volume Plasma Exchange Improves Outcomes in Patients With Acute Liver Failure: A Randomized Controlled Trial



HEPATOLOGY

AASLD
AMERICAN ASSOCIATION FOR THE STUDY OF LIVER DISEASES

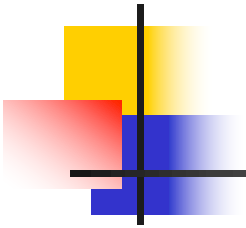
HEPATOLOGY, VOL. 67, NO. 2, 2018

# Continuous Renal Replacement Therapy Is Associated With Reduced Serum Ammonia Levels and Mortality in Acute Liver Failure

CRRT but not IRRT

Filipe S. Cardoso,[1] Michelle Gottfried,[2] Shannan Tujios,[3] Jody C. Olson,[4] and Constantine J. Karvellas [5]

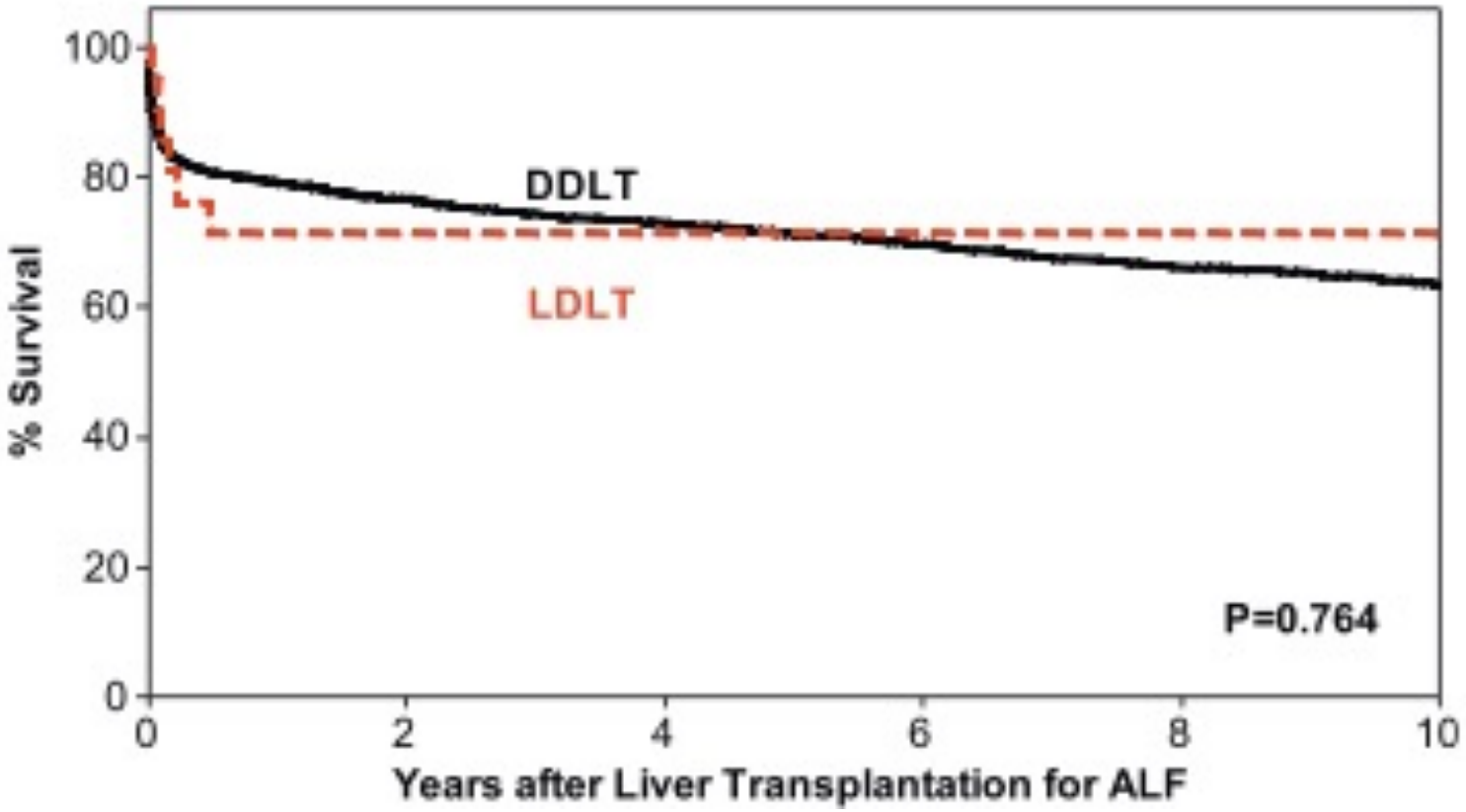
For the US Acute Liver Failure Study Group

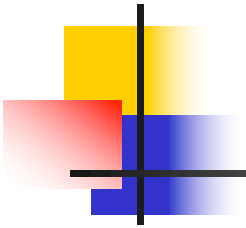


- Patient is waiting for transplant
- We are running out of time
- Family and friends offer living donation
  - Yes
  - No
  - What will be the outcome?

# Outcome of Living vs Deceased Donor

Transplant Proceedings, 2014;46:219-224





- An organ becomes available for transplant
- Family asks if she can receive a transplant but keep her own liver in case of improvement?

Liver Transplantation

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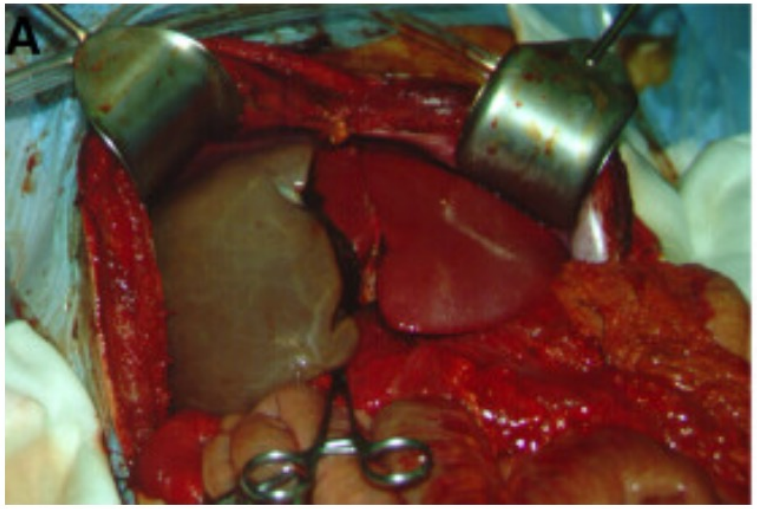
REVIEW ARTICLE

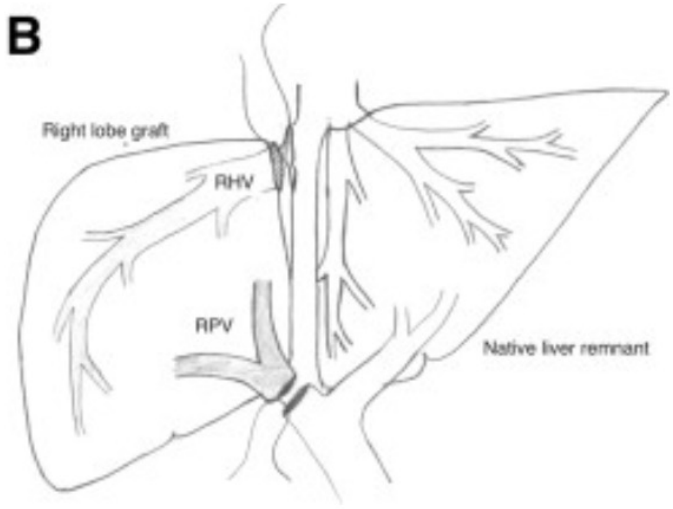


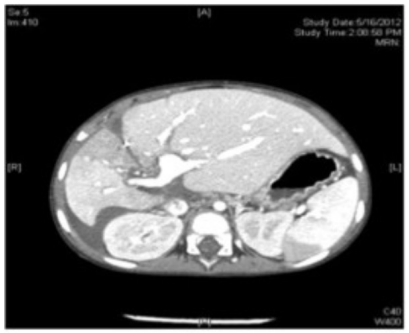
# Current Status of Auxiliary Partial Orthotopic Liver Transplantation for Acute Liver Failure

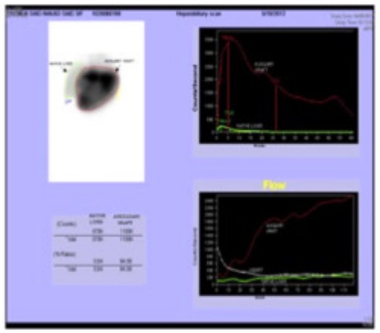
Mohamed Rela,[1-3] Ilankumaran Kaliamoorthy,[2] and Mettu Srinivas Reddy[2,3]

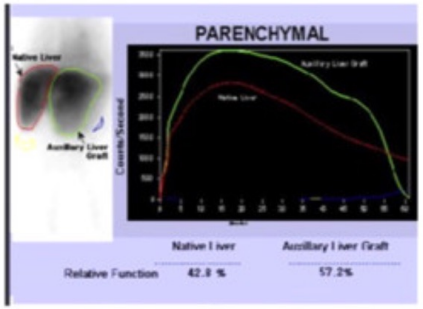
[1]Institute of Liver Studies, King's College Hospital, London, United Kingdom; [2]Institute of Liver Disease and Transplantation, Global Hospital, Chennai, India; [3]National Foundation for Liver Research, Chennai, India

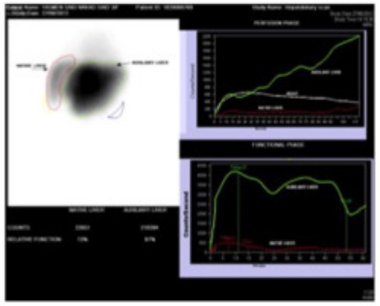


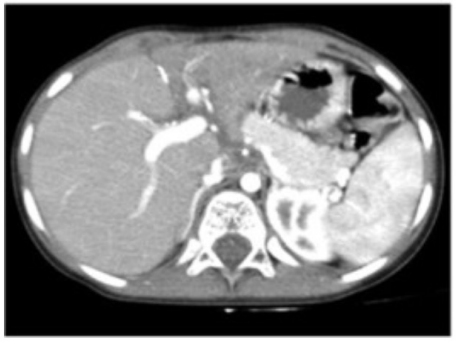



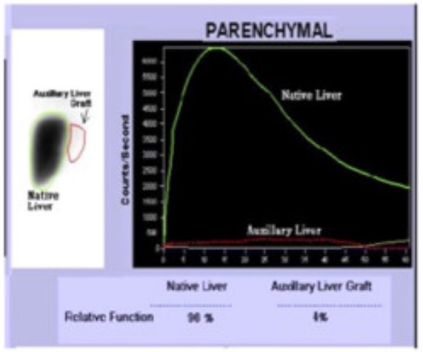





PARENCHYMAL
Native Liver
Auxiliary Liver Graft
Native Liver
Auxiliary Liver Graft
Relative Function
42.8 %
57.2%






PARENCHYMAL
Auxiliary Liver Graft
Native Liver
Native Liver
Auxiliary Liver
Native Liver
Auxiliary Liver Graft
Relative Function
98 %
4%

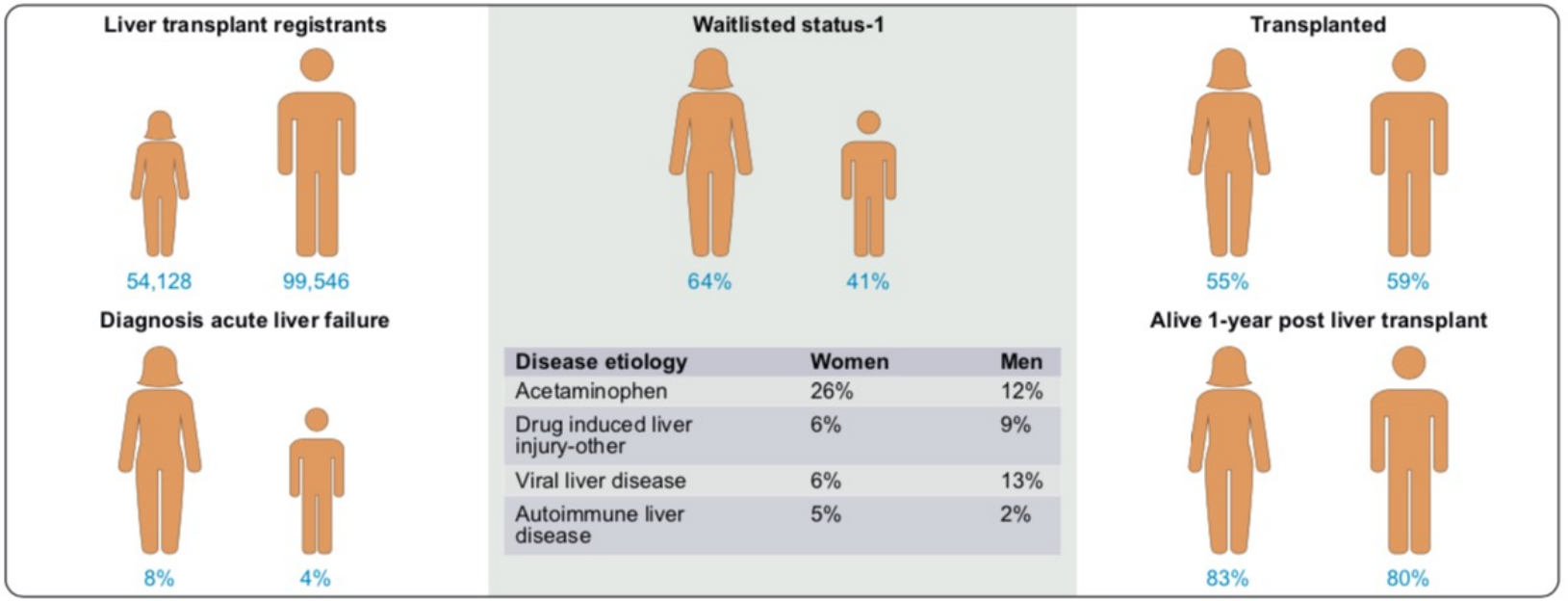
Research article JHEP|Reports

# Sex disparities in waitlisting and liver transplant for acute liver failure

Lauren D. Nephew,[1,*] Zahra Zia,[2] Marwan Ghabril,[1] Eric Orman,[1] Craig Lammert,[1] Chandrashekhar Kubal,[3] Naga Chalasani[1]

[1]*Division of Gastroenterology/Hepatology, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, USA;* [2]*Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, USA;* [3]*Department of Surgery, Indiana University School of Medicine, Indianapolis, IN, USA*

JHEP Reports **2021.** https://doi.org/10.1016/j.jhepr.2020.100200




| Disease etiology | Women | Men |
|---|---|---|
| Acetaminophen | 26% | 12% |
| Drug induced liver injury-other | 6% | 9% |
| Viral liver disease | 6% | 13% |
| Autoimmune liver disease | 5% | 2% |

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*Hepatology*. 2020 October ; 72(4): 1366–1377. doi:10.1002/hep.31144.


**16% required OLT, 11% died**

## Acute Liver Failure (ALF) in Pregnancy: How Much Is Pregnancy-Related?

**Nearly half of the cases are not related to pregnancy**


**Lisa C. Casey[1], Robert J. Fontana[2], Ariel Aday[1], David B. Nelson[3], Jody A. Rule[1], Michelle Gottfried[4], Minh Tran[5], William M. Lee[1] Acute Liver Failure Study Group**

Published in final edited form as:
*Clin Gastroenterol Hepatol*. 2014 November ; 12(11): 1942–1949.e1. doi:10.1016/j.cgh.2014.03.011.

# Effects of Antimicrobial Prophylaxis and Blood Stream Infections in Patients with Acute Liver Failure: a Retrospective Cohort Study

**Constantine J. Karvellas, MD SM[1], Jorge Cavazos, MD[2], Holly Battenhouse, MSc[3], Valerie Durkalski, PhD[3], Jody Balko, PhD[2], Corron Sanders, PhD[2], William M. Lee, MD[2], and For the US Acute Liver Failure Study Group**

- 1551 pts with ALF, 600 received antibiotics
- No difference in 21 days mortality
- Liver transplantation happened more often in antibiotic group

Review

JOURNAL OF HEPATOLOGY

# Acute liver failure: A curable disease by 2024?

William Bernal[1,*], William M. Lee[2], Julia Wendon[1], Fin Stolze Larsen[3], Roger Williams[4]

[1]*Liver Intensive Therapy Unit, Institute of Liver Studies, Kings College Hospital, Denmark Hill, London SE5 9RS, United Kingdom;* [2]*Division of Digestive and Liver Diseases, University of Texas Southwestern Medical Center, 5323 Harry Hines Boulevard, Dallas, TX 75390-8887, USA;* [3]*Department of Hepatology, Rigshospitalet, 2100 Copenhagen, Denmark;* [4]*Institute of Hepatology London, Foundation for Liver Research, 69-75 Chenies Mews, London WC1 6HX, United Kingdom*

# Conclusion

- 50% of cases due to DILI. Acetaminophen has better outcome than other meds. ALFSG app
- Duration>28 days associated with worse outcome
- Unleash your best tool @ MELD 27 in sub-fulminant cases
- High TB, low ALP, AST> 2.2 × ALT ~ WD=Death
- AIH? Liver Bx, role of steroids?
- Anicteric hepatitis + fever: HSV: Empiric TX
- Acute gastroenteritis: Mushroom: PCN, silymarin, list for OLT

# Conclusion

- NAC it no matter what
- Cause of death: brain edema and infection
- Ammonia >200 is bad, <75 is good
- Drop in PLT is a bad sign
- CVVH but no IRRT can improve survival
- Plasmapheresis as a bridge to transplant (esp Wilson)
- Low risk of bleeding, mostly UGI, mostly gastric erosion
- No one should die from it