

# Pilot Study of a Neuroprotective Protocol for ALF

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# 21 y/o woman with ALF

(August 2001)

- 2wks PTA: gastroenteritis
- progressive jaundice, bruising
- acetaminophen for myalgias
- Transaminases 2000

# Hospital course

- Alert, dysarthric
- AST, ALT falling, PT 42, TB 26

→ Next morning: somnolent, sits up & yells, rhonchi

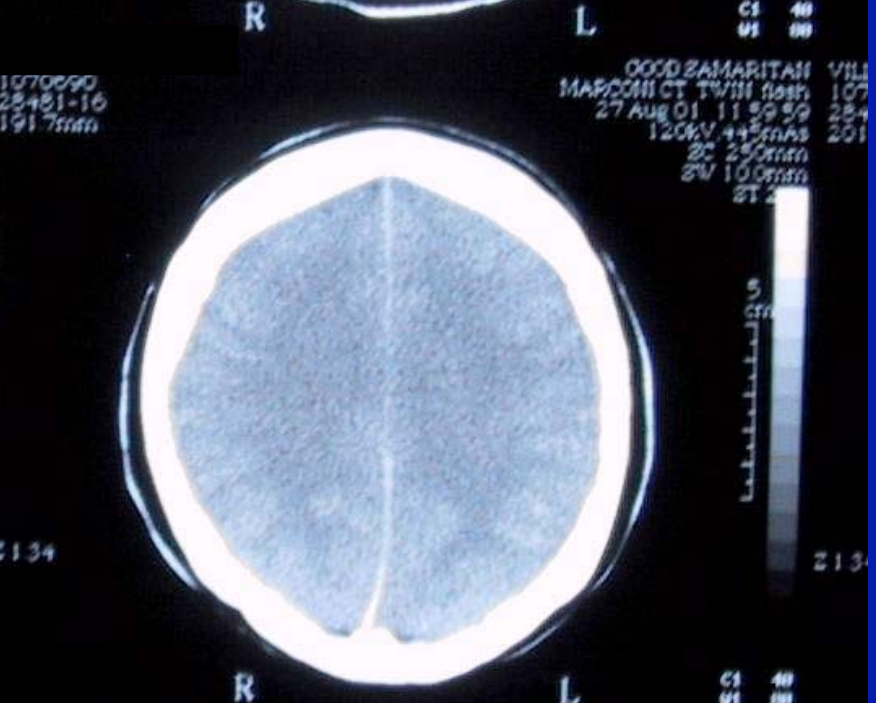
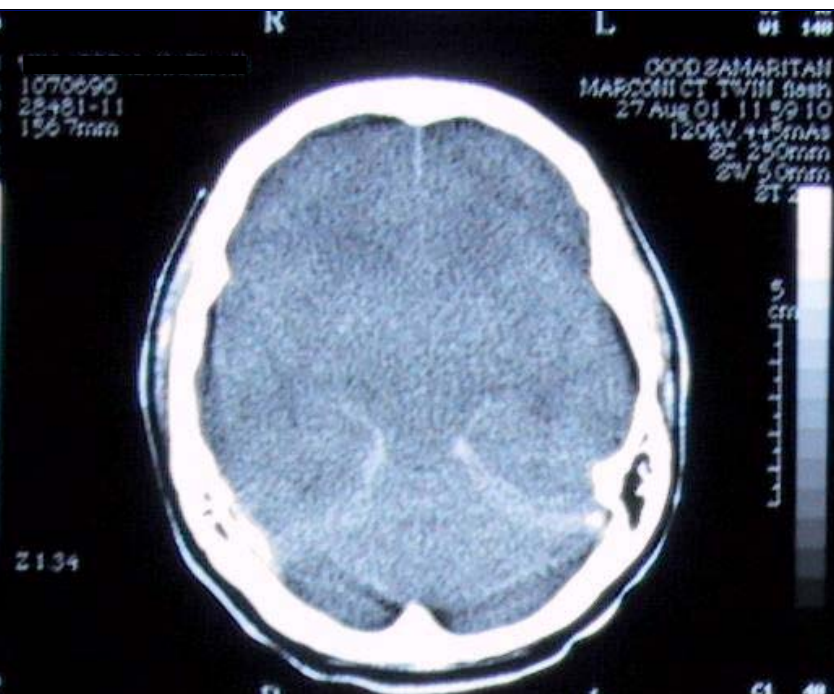
→ noon: Intubated, lines placed

→ 5pm: in the OR for OLTx



# Post-op day#1

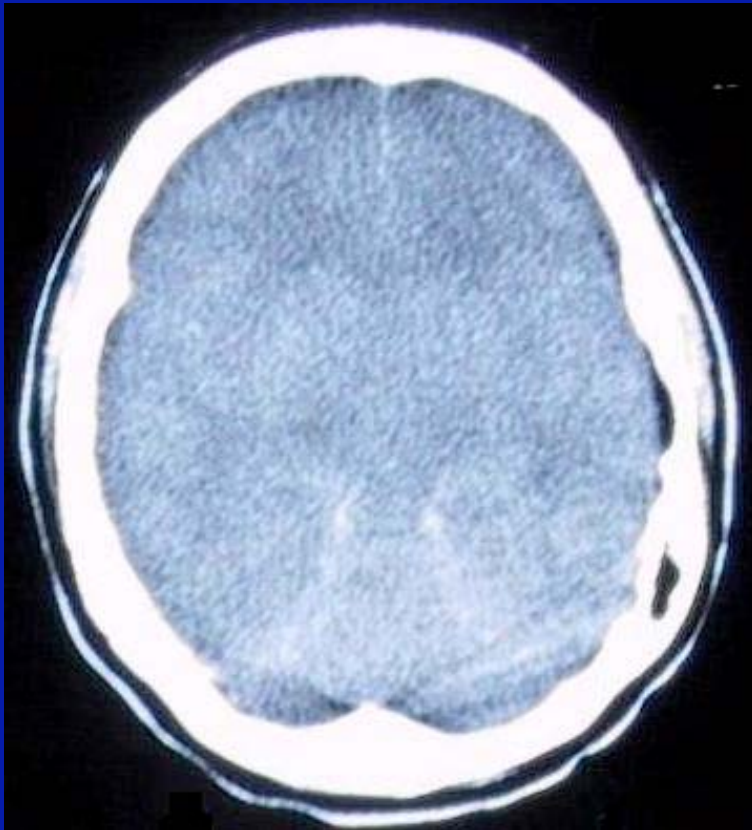
- 120/65 100 98<sup>6</sup> 8
- Comatose, neurostimulation 4/4
- Pupils 6mm, unreactive





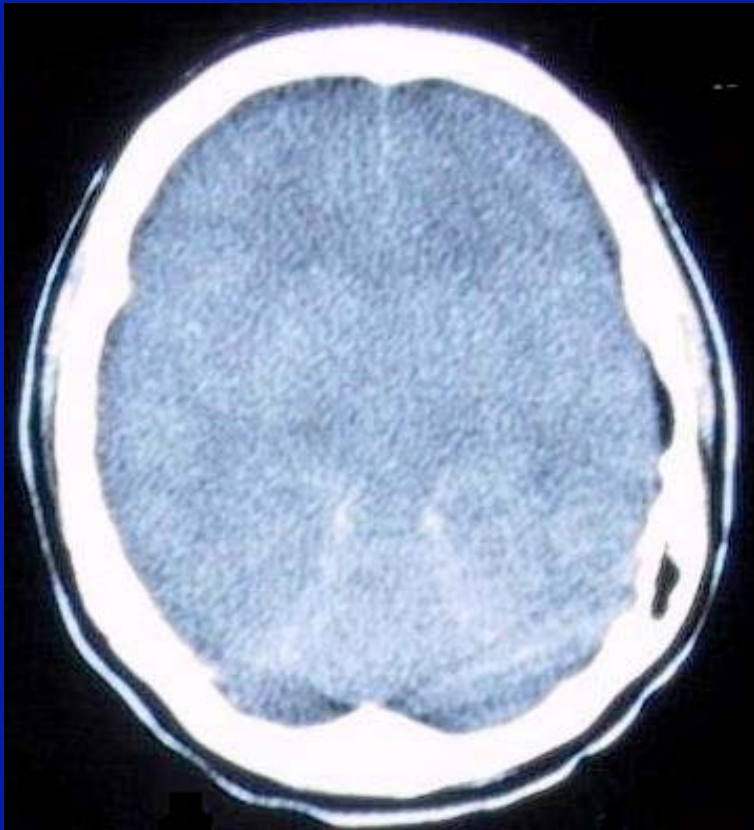
LT LAT

# Cerebral Edema



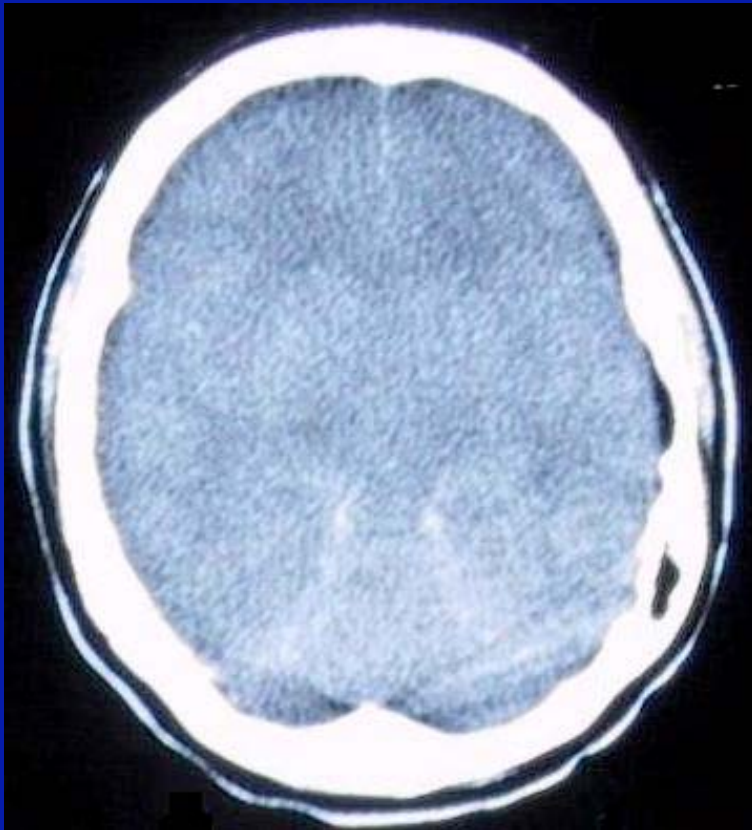
- mortality in FLF

# Cerebral Edema



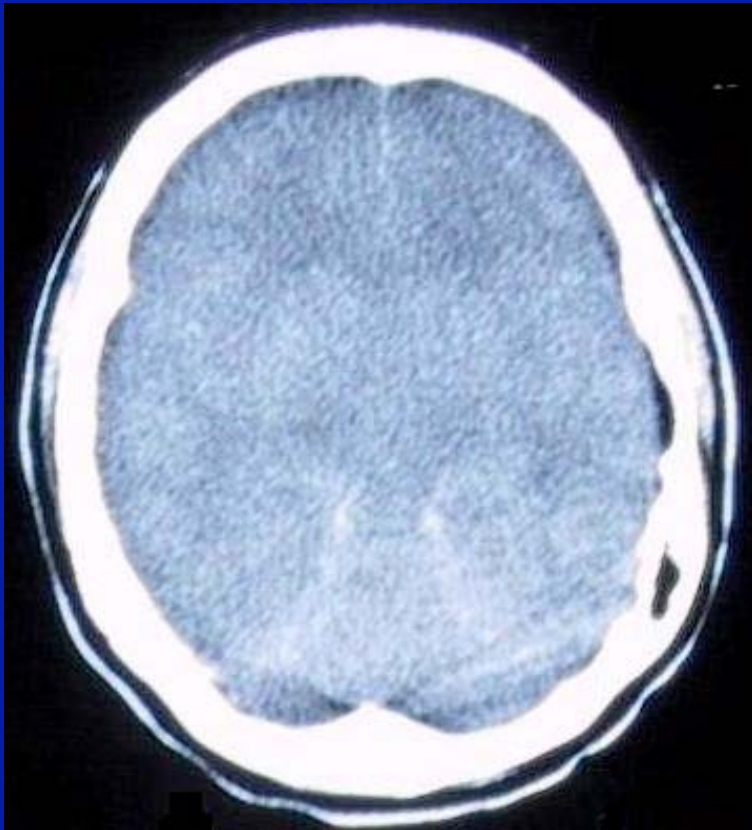
- mortality in FLF
- ICP > 20 mm Hg

# Cerebral Edema



- mortality in FLF
- ICP > 20 mm Hg
- cerebral perfusion ↓  
risk herniation ↑

# Cerebral Edema



- mortality in FLF
- ICP > 20 mm Hg
- cerebral perfusion ↓  
risk herniation ↑
- ? Possibly preventable  
treatable\*



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# Protocol development

- Codman microsensor probe
- Aggressive management of ICP and CPP
- Full-time attending coverage
- Prevention and preparation

# Neuroprotective protocol

- Keep CPP > 60 mm Hg
- Keep ICP < 20 mm Hg

Mannitol

Hyperventilation

Hypothermia

Pentobarbital



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# Results

- 22 patients mean age 32
  - Acetaminophen toxicity
  - Hepatitis A & B
  - Idiosyncratic drug reaction
  - Wilson's disease
- 64% in stage IV coma

# Primary hemostatic regimen

- Platelets 1.5 SD u → 156 K/mm<sup>3</sup>
- FFP 4 units → protime: 11.8 s
- VIIa 6.4 mg
- Cryoppt 6 units → fibrinogen: 176 mg/dL
- DDAVP 15 mcg

# Secondary hemostatic regimen

- Plts 0.7 SD u/day → 96 K/mm<sup>3</sup>  
S.D. 5.8  
range: 11 - 371
- FFP 3.8 u/day
- VIIa 1.4 mg/day → 16.4  
S.D. 3.9  
range: 9.7 – 39

# Safety of intraparenchymal monitors

- 22 patients
  - 2 small localized intracranial bleeds
  - 1 subdural hemorrhage → seizures
- Bleeding not related to coagulopathy

# Intracranial hypertension

- 21/22 had ICH            9 @ O.P.
- 82 discrete episodes were treated.  
    Mean ICP: 33 +/- 13 mmHg  
    Median duration: 60 mins
- 36% were precipitated

# ICH management

<u>Therapy</u>	<u>N</u>	
Hypothermia	71	32.6° C.
Mannitol	53	56 g
Pentobarb	43	740 mg
CPP	36	CPP 69 mmHg
Hyperventilation	24	pCO <sub>2</sub> 30 mmHg



# ICH Results

- 78 (95%) of episodes resolved
- 10 patients with ICH survived with good neurological outcomes
- No deaths from isolated cerebral edema\*

# Clinical outcomes

- 18 OLT candidates
  - 12/18 (67%) survived\* all stage 3-4
  - 11/18 (61%) with good neuro outcome
  - 11/17 with ICH survived
  - 10/17 with good neuro outcome

88% 30-day post OLT survival

- 4 non-candidates: all died



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# Conclusions

- Almost all grade 3 – 4 patients have ICH
- Intraparenchymal monitors safe
- Almost all ICH episodes treatable with aggressive protocol\*

# 18 yr old girl with MSOF

(May 2005)

- 10 days PTA: RUQ pain, dizziness, dark urine/light stool, 102°
  - jaundice,
    - splenomegaly, ascites
    - transaminases to 4000

# Hospital course

- Transaminases ↓, bili 32, PT 36

Anuria

→ hypoglycemia

→ coma

- Neuroprotective protocol



# Hospital course

- FFP, platelets, cryoppt, DDAVP, VIIa, Epsilon aminocaproic acid
- ICP peak 50  
Mannitol, cis atracurium, cooling  
Pentobarbital, 3% saline

# Hospital course

- 17 ICH episodes (ICP up to 55)
- 2 prolonged episodes of CPP < 50
- 4 days of “brain death”
- Offer + brain perfusion → OLTx

