



Delayed Emergence in the Dental Office

Steve Yun, M.D.
Expert Consultant Dental Board of CA
Clinical Professor, Western U. of Health Sciences

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

1

Financial Conflict of Interest

- No relevant conflicts of interest

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

2

Case Presentation

50 y.o. male
• 5'9" and 265 lbs

- PMH: HTN, hypercholesterolemia, hypothyroidism, OSA on CPAP, PE/DVT 2009, Gastric sleeve 2011
- Meds: throxine, simvastatin, lisinopril-HCTZ
- ASA 2, MP 3



SAMBA 2023 Annual Meeting • May 18 - 20, 2023

3

June 2019

Full mouth extractions and implants

Start 7:50. Surgery end 14:06

Propofol 100-120 mcg/kg/min (300 ml total)
Midazolam 10 mg total
Fentanyl 200 mcg total

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

4

Patient slow to wake up

BS tested = 148

VSS other than hypoxia that responded to supplemental oxygen saturation
SpO2 94% on 3L O2 on room air, SpO2 92%

At 16:03 patient deemed OK to D/C home with wife (2 hours after end of surgery)

With assistance, patient able to get into wheelchair

Later that night, patient still very sleepy but following commands

Next morning, patient returned to office but was still very sleepy

Patient referred to urgent care for further evaluation

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

5

DELAYED EMERGENCE

By Shekhar Anandhasekaran, Capitan Anil Datta

DEFINITION

- Qualitative or quantitative oxygen desaturation in the ORP
- Check for residual muscular paralysis if patient is asleep, can't ambulate, and/or unable to communicate

CONSIDER

- Opioid reversal: start with naloxone 40 µg IV, repeat every 2 minutes, titrating up to 400 µg
- Benzodiazepine reversal: start with flumazenil 0.2 mg IV every 1 minute, max dose = 1 mg
- Sedation/analgesia covered (e.g. Fentanyl, Propofol, Nitrous Oxide, etc.)

CAUTION

- Monitor: Check Hypoxemia? Hypertension? Hypothermia?
- Complete Neuro exam, as able, for focal neurologic deficits (if isolated look for pupils, asymmetric movement, gagging, etc.) if abnormal exam or suspect stroke: obtain stat Head CT scan and consult neurology/neurosurgery
- Hypoglycemia: check glucose (glucometer)
- Lab: ABG plus electrolytes. Rule out CO2 narcosis from hypercapnia, Hypo- or Hypernatremia.
- Check for medication error or dosing error.

MANAGEMENT

- Correct any abnormalities in oxygenation, ventilation, laboratory values, or temperature.
- If residual neurologic abnormalities, monitor the patient in the ICU with neurological follow up, including serial exams. Repeat Head CT or MRI as needed.

END

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

6

Past Medical History

July 2016
Feb 2018

April 2019

Alcoholism, patients wants to detoxify

Alcoholism
Elevated liver enzymes
AST 274 (5-34 U/L)
ALT 133 (5-41 U/L)
Alk Phosphatase 70 (10-130 U/L)
Albumin 4.2 (3.5-5.5 g/dl)
Total Bilirubin 1.4 (0-1.5 mg/dl)

History of alcoholism noted but no further comment
no jaundice noted on physical exam
AST 65
ALT 25
Alk Phosphatase 80
Albumin 2.9
Total Bilirubin 4.0



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

13

At Urgent Care

Sluggish speech
Confused
Diminished motor skills

Wife denies binge drinking, patient states only has 2 glasses of wine a night

Patient AxOx3 but feels "foggy"

101/57 HR 80 RR 16 SpO2 100% RA

Gross scleral icterus

Labs: Alk Phos 81
ALT 23
AST 65
Total Bilirubin 5.5
Albumin 2.5

Transferred by EMS to local hospital



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

14

At Hospital

CT Head – negative

Labs: Ammonia 193 umol/L (11-32)
PT 27.9 seconds (9.4 – 12.5)
INR 2.5
Platelets 57

DX: hepatic encephalopathy
acute liver failure on chronic liver disease
alcoholic cirrhosis and hepatitis

Hospital Course: GI Bleed
Intubated
Passed away 3 days later

Autopsy: Esophageal varices
Advanced micronodular cirrhosis



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

15

Alcohol Use Disorder (AUD) in the United States

29.5 million people ages 12 and older had AUD in 2021.

Alcohol abuse, alcoholism, and alcohol use disorder (AUD) kill over 3 million people each year, accounting for up to 6% of global deaths.

Highlights

- There are **more than 380 deaths each day** in the US due to excessive alcohol use.
- 141K** 140,557 Americans die from the effects of alcohol in an average year.
- 10%** 1-in-10 Americans over the age of 12 have Alcohol Use Disorder.
- 60%** Over half of Americans increased their alcohol consumption during COVID-19 lockdowns.



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

16

Alcohol Kills More People Than Opioids in the U.S.

Alcohol use results in **88,000** deaths in the U.S. per year. That is more than ALL the drug overdoses in the U.S. in 2016.

Alcoholism Rates Are Soaring

Over the past decade, drinking rates in the U.S. have increased by **11%**

Between 2001 and 2015 alcoholism rates raised:

- 83% for men
- 66% for women
- 50% for 18-24



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

17

Causes of Alcohol-Related Deaths

95.2K Total Deaths

- Liver Disease 31.08%
- Alcohol Poisoning 14.85%
- Heart Disease 9.18%
- Suicide 10.44%
- Other Chronic Causes 8.05%
- Car Crashes 7.45%
- Homicide 7.86%
- Other Acute Causes 5.72%
- Neurological Disease 5.37%

National Center for Drug Abuse Statistics 2023



www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

18

TABLE
Summary of DSM-5 diagnostic features for alcohol use disorder^{5,6}

Two of the following symptoms/behaviors must be present for at least 1 year, and be co-occurring with significant distress or impairment:

- More alcohol is consumed than intended or is consumed over a longer period of time than intended.
- Efforts to cut back or control drinking have not succeeded.
- Excessive time is spent obtaining, using, or recovering from alcohol.
- Alcohol cravings and urges persist.
- Use of alcohol has impaired follow-through on education, employment, or home obligations.
- Interpersonal problems have been caused or intensified by use of alcohol.
- Alcohol use has led to a reduction in or cessation of recreational, social, and employment activities.
- Use of alcohol has occurred in situations where it is dangerous.
- Alcohol use has continued despite knowledge of the problems it is causing.
- Tolerance to alcohol is evident—i.e., drinking the same amount has little effect, or heavier use occurs to maximize alcohol's effects.
- Withdrawal is evident—i.e., physiologic signs (tremors, nausea) occur or closely related drugs (eg, benzodiazepines) are taken to avoid withdrawal.

DSM-5, Diagnostic and Statistical Manual of Mental Disorders 5.
 * Adapted from the DSM-5, American Psychiatric Association (2013).

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

19

Table 3. Brief Self-Report Screening Tests for Risk Drinking

Test	Positive Result	Test Characteristics
Single item ^{1,2} How many times in the past year have you had five (for women) or more drinks in a day?	≥3 times	82% sensitivity, 99% specificity for unhealthy use
Alcohol Use Disorders Identification Test-Consumption Questions (AUDIT-C) ³		
Question 1: How often did you have a drink containing alcohol in the past year? Never: 0 points Monthly or less: 1 point Two to four times per month: 2 points Two to four times per week: 3 points Four or more times per week: 4 points	For women, ≥3 points; for men, ≥4 points; a score of 3 or 2 suggests alcohol dependence	73% sensitivity, 91% specificity for alcohol use disorder (AUD); sensitivity: 89% specific for alcohol dependence
Question 2: How many drinks did you have on a typical day when you were drinking in the past year? One or two: 0 points Three or four: 1 point Five or six: 2 points Seven to nine: 3 points Ten or more: 4 points		
Question 3: How often did you have six or more drinks (four or more for women) on one occasion in the past year? Never: 0 points Less than monthly: 1 point Monthly: 2 points Weekly: 3 points Daily or almost daily: 4 points		
Quantity, Frequency, maximum⁴		
Question 1: On average, how many days per week do you drink alcohol?	For men, ≥4 drinks per week or 14 per occasion; for women, ≥3 drinks per week or 14 per occasion	81% sensitivity, 84% specificity for alcohol use disorder in the past year
Question 2: On an average day when you drink, how many drinks do you have?		
Question 3: What is the maximum number of drinks you had on any given occasion during the past month?		

Friedmann PD, N Engl J Med 2013;368:365-373.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

20

ALCOHOLISM SCREENING
"CAGE"

DESCRIPTION	QUESTION
C ONCERN by the person that there is a problem	Have you ever felt that you should CUT down on your drinking?
A PPARENT to others that there is a problem	Have you ever become ANNNOYED by criticisms of your drinking?
G RAVE consequences	Have you ever felt GUILTY about your drinking?
E VIDENCE of dependence or tolerance	Have you ever had a morning EYE OPENER to get rid of a hangover?

LEARN MORE: [Visit SAMBA's resources](#)
 CAGE questionnaire is widely used and an extensively validated method of screening for alcoholism. Two "yes" responses indicate that the possibility of alcoholism should be investigated further.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

21

Test	Comment
AST	Increased two- to sevenfold, <400 IU/L, greater than ALT
ALT	Increased two- to sevenfold, <400 IU/L
AST/ALT	Usually >1
GGTP	Not specific to alcohol, easily inducible, elevated in all forms of fatty liver
Bilirubin	May be markedly increased in alcoholic hepatitis despite modest elevation in alkaline phosphatase

Abbreviations: ALT, alanine aminotransferase; AST, aspartate aminotransferase; GGTP, γ-glutamyl transpeptidase.

Maillard & Sorrell ClinLiver 2015

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

22

Fibrosis-4 (FIB-4) Calculator

The Fibrosis-4 score helps to estimate the amount of scarring in the liver. Enter the required values to calculate the FIB-4 value. It will appear in the oval on the far right (highlighted in yellow).

Age (years) X AST Level (IU/L) / Platelet Count (10⁹/L) X ALT (IU/L) = FIB-4

Age 50
 AST 65
 ALT 26
 Plt 57

FIB-4 = 11.18

Interpretation:
 Using a lower cutoff value of 1.45, a FIB-4 score <1.45 had a negative predictive value of 90% for advanced fibrosis (shak fibrosis score 4-6 which includes early bridging fibrosis to cirrhosis). In contrast, a FIB-4 >3.25 would have a 97% specificity and a positive predictive value of 65% for advanced fibrosis. In the patient cohort in which this formula was first validated, at least 70% patients had values <1.45 or >3.25. Authors argued that these individuals could potentially have avoided liver biopsy with an overall accuracy of 86%.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

23

Acute-on-chronic liver failure in the VA population (2004-2014)

72,316 patients with first admission for decompensated cirrhosis

26.39% ACLF

73.61% No ACLF

28- and 90-day mortality rate (%)

Group	28-day mortality (%)	90-day mortality (%)
No ACLF	10.41	21.33
All grade ACLF	25.52	40.02
ACLF 1	16.87	30.43
ACLF 2	26.77	41.6
ACLF 3	52.28	68.54

(*) Compared to no ACLF for all comparison, Chi-square tests, p < 0.01.

- Early recognition of ACLF is key for early triage and expedited liver transplant evaluation
- The North American consortium of end-stage liver disease (NACSELD) is a simple tool to identify these Patients but is less sensitive than the CLIF-consortium definition

Rubens-Hernandez et al. Prevalence and short-term mortality of acute-on-chronic liver failure: A national cohort study from the USA. Journal of Hepatology, Volume 70, Issue 4, 2019.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

25

JAPT Alimentary Pharmacology and Therapeutics

25 studies
1372 patients
Non-severe defined by PT, bilirubin, creatinine

Systematic review with meta-analysis: high mortality in patients with non-severe alcoholic hepatitis

28-day mortality = 6%
1-year mortality = 13%

SEVERE alcoholic hepatitis: 28-day mortality of 20%

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

26

SOCIETY FOR SAMBA ANESTHESIA

Figure. An explanatory model for increased postoperative mortality in patients with cirrhosis. The underlying changes in physiology that occur in cirrhosis are shown as contributing to surgical complications in the perioperative setting. Surgery may precipitate acute deterioration in liver function leading to hepatic decompensations such as hepatic encephalopathy and ascites. Common surgical complications such as infection and bleeding are more likely and more severe with advanced liver disease. The surgical complications listed can be life-threatening and contribute to significant morbidity and mortality. ACS indicates acute coronary syndrome; DVT, deep vein thrombosis; PE, pulmonary embolism.

Kaltenback and Tapper. Anesthesia Analgesia. Nov 2022

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

27

SOCIETY FOR SAMBA ANESTHESIA

Editorial: moderate alcoholic hepatitis—hiding in plain sight

SEVERE alcoholic hepatitis: 28-day mortality of 20%

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

28

SOCIETY FOR SAMBA ANESTHESIA

Clinical Features of Acute Liver Failure

Bernal W, Wendon J. N Engl J Med 2013;369:2525-2534.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

29

SOCIETY FOR SAMBA ANESTHESIA

Putative Mechanisms Underlying Hepatic Encephalopathy and Brain Edema.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

30

SOCIETY FOR SAMBA ANESTHESIA

CT Findings in Fulminant Hepatic Failure

Wijlicks EF. N Engl J Med 2016;375:1660-1670.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

31

What's the Confusion? Cirrhosis and Hepatic Encephalopathy

EMORY UNIVERSITY | Veeramachaneni H MD^{1,2}, Flynn M MD^{1,3} | EMORY HEALTHCARE

EMORY UNIVERSITY, Division of Digestive Diseases¹, Division of Transplant Hepatology³

Why does cirrhosis cause confusion? Ammonia!!!

- Your liver is responsible for filtering out toxins and wastes from your blood
- A cirrhotic or scarred liver is unable to perform this filtering function
- Build up of ammonia (NH₃), a toxin, in the blood leads to increased confusion

What to look for? Grades of Hepatic Encephalopathy

Grade 1	Grade 2	Grade 3	Grade 4
Mild confusion Irritability Change in behavior Disordered sleep	Disorientation Extreme fatigue Personality changes	Incoherent speech Slurred but intelligible Aggressive behavior Seizures	Coma Not responsive

How to improve this? Prevention & Treatment

- Take lactulose up to 4 times per day to ensure 3-4 large bowel movements (ammonia removed via stool)
- Take Rifaximin pills as prescribed by your physician
- Do not take new medications without checking with your physician
- If have symptoms of Grade 3 or 4 encephalopathy, seek emergency care immediately

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

32

Precipitating Factors for Hepatic Encephalopathy

SOCIETY FOR SAMBA LIVER TRANSPLANTATION

- Gastrointestinal bleeding
- Infection (including spontaneous bacterial peritonitis and urinary tract infections)
- Hypokalemia and/or metabolic alkalosis
- Renal failure
- Hypovolemia
- Hypoxia and Hypercapnia
- Sedatives or tranquilizers
- Hypoglycemia
- Constipation
- Rarely, hepatocellular carcinoma and/or vascular occlusion (hepatic vein or portal vein thrombosis)

Hepatic encephalopathy, Khungur V, Poordad F. Clin Liver Dis. 2012;16(2):301.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

33

Management of the Patient with AUD

SOCIETY FOR SAMBA LIVER TRANSPLANTATION

- At least 4-6 weeks of abstinence supposedly improves morbidity and mortality, but longer period of abstinence is better for surgical outcomes?

Tonnesen H, Kehlet H. Preoperative alcoholism and postoperative morbidity. Br J Surg. 1999 Jul;86(7):869-874

- Scientific evidence is weak to support any clinical recommendations

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

34

Effect of glucocorticoid therapy of severe alcoholic hepatitis on short-term survival: the result of a meta-analysis of individual data from three studies.

SOCIETY FOR SAMBA LIVER TRANSPLANTATION

Days	Prednisolone (%)	Placebo (%)
0	100	100
7	~95	~90
14	~85	~75
21	84.6	65.1
28	84.6	48.8

$p = .001$

Adapted from P Mathurin et al. J Hepatol 36:480, 2002, with permission from Elsevier Science.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

35

Alcohol Withdrawal Timeline

SOCIETY FOR SAMBA LIVER TRANSPLANTATION

- Anxiety, insomnia, nausea, & abdominal pain
- High blood pressure, increased body temp...
- Hallucinations, fever, seizures, & agitation

www.americanaddictioncenters.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

37

Alcohol Withdrawal: Medication Comparison

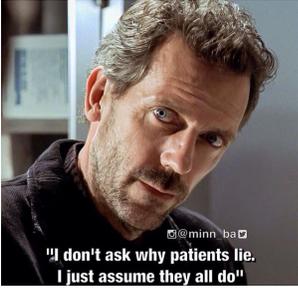
SOCIETY FOR SAMBA LIVER TRANSPLANTATION

Medication	Onset	Time to Peak	Half Life	Equivalent Dose	Caution
Lorazepam	IX: 5-30 min IX: 30-90 min IX: 30-60 min IX: 30-60 min	IX: 15-30 min IX: 1-2 hours IX: 1-2 hours	10-20 hours *Range of renal dysfunction	1mg	an active metabolite avoid propranolol, glycol vehicles for inhalation -can give on any unit
Chlordiazepoxide (po)	40 min	2 hours	6-25 hours *20-40 hr if cardiac	10-12.5mg	active metabolites -can give on any unit
Diazepam	IX: 1-5 min IX: 1 hour *onset onset	IX: 1-1 minute IX: 1-1.5 hours	20-30 hours *Range of values, liver disease, or obesity	5-10mg	active metabolites -do not give on any unit IV or oral route change and in restricted use in case liver
Midazolam (po)	1-1 min *onset onset	5-10 min	2-3 hours	2mg	active metabolites restricted to use in the ED & ICU and kidney disease
Phenobarbital	IX: 7 min IX: 20-60 min	IX: 30 min IX: 1-6 hours	60-100 hours	-	do not use in advanced liver or renal disease, contraindicated in elderly or hypotensive patients some MANY drug interactions restricted to ED and ICU use only

Question? Ask GI Pharmacist 6-9332, Consider Toxicology (449-4132) for complicated withdrawals.
Approved by Dr. Smolin & Dr. Rappaport / July 2021.

SAMBA 2023 Annual Meeting • May 18 - 20, 2023

38



Steve Yun, M.D.

yunsteve@gmail.com

www.DentalAnesthesiaMD.com

Follow on IG, LinkedIn, FB:
@drsteveyun

SOCIETY FOR SAMBA DENTAL ANESTHESIA
www.SAMBAhq.org

SAMBA 2023 Annual Meeting • May 18 - 20, 2023 @samba_hq

39