



Alcohol, substance misuse and the heart

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‘alcohol is the cause and solution to many of life’s problems’

Homer




Alcohol and the Heart

- Alcoholic cardiomyopathy
- Hypertension
- Cardiac dysrhythmias
- Sudden death
- Alcohol and coronary artery disease

Alcohol and Cardiac Muscle Disease

Effects of acute consumption:

- Cardio-depressant
 - Present after only a few units of EtOH
 - Reversible
- May exacerbate symptoms in patients with pre-existing cardiac disease



Alcohol and Cardiac Muscle Disease

Chronic consumption

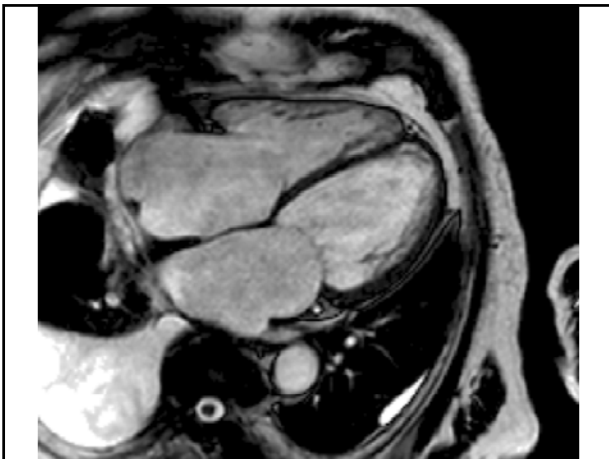
- May cause alcoholic cardiomyopathy
 - Most common cause of dilated CM in Western World
- 1 in 3 chronic EtOH abusers have asymptomatic dysfunction



Case 1

- Mrs LW 56yr old
- 3/52 SOBOE, NYHA III
- Pedal oedema, orthopnoea, PND
- No risk factors for CAD
- ¾ bottle vodka per day for >5yrs

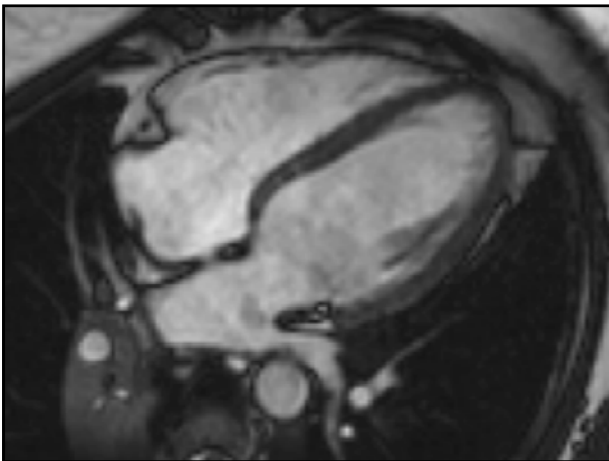
- Clinical examination – HR 130 irreg. irreg., oedema to knees, JVP 8cm, bibasal creps
- ECG – AF with rapid ventricular response
- Bloods – normal but raised γ GT and MCV



Treatment

- Rate control – digoxin
- Frusemide, ACE-I
- Alcohol detoxification in hospital
- Anticoagulation
- β -blocker

- July 2004 – NYHA I. Off EtOH.



Alcoholic Heart Muscle Disease

- 3.8% of all DCM
 - Stages Asymptomatic
 - Symptomatic
- Males > Females
- Age 30-60 years
- At risk if:
 - > 90g/day for >5 years
 - Equivalent of >7-8 units/day

How much is bad?

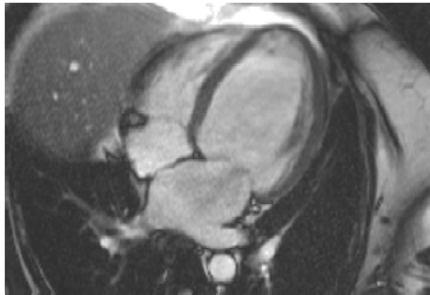
- J or U shaped curve

Alcohol consumption

Diagnosis

- No immunohistochemical or immunological diagnostic markers
- Confirmed on accurate/reliable history
- Biopsy unhelpful
- Diagnosis of exclusion
- Need to exclude other causes:
 - Ischaemic, haemochromatosis, autoimmune, infective, infiltrative, postpartum, metabolic, toxic.

Characteristics



LV is dilated, decreased wall thickness

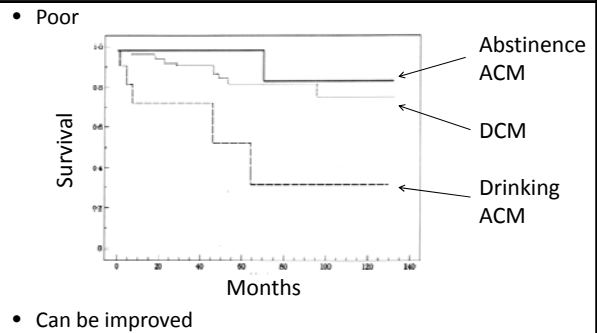
Echocardiography

- Four-chamber dilatation
- Globally decreased ventricular function
- Mitral and tricuspid regurgitation
- Pulmonary hypertension
- Evidence of diastolic dysfunction
- Intracardiac thrombi (atrial or ventricular)
- LV hypertrophy

Pathophysiology

- Histological and cellular changes
- Direct
 - Myocyte necrosis, interstitial fibrosis
 - Intracellular organelle dysfunction
 - Directly inhibits:
 - mitochondrial oxidative phosphorylation
 - Fatty acid oxidation
 - Contractile proteins
 - Calcium homeostasis
- Indirect
 - Activation of sympathetic NS
 - RAS
 - Natriuretic peptides
 - Cytokines

Prognosis



Abstinence the answer?

- 55 ACM men, drank 100 g/day for at least 10 years
- At one year
 - Abstained – all improved EF (13%)
 - 20-60g/day – improved EF (12%)
 - >80g/day – all deteriorated
- Sustained at 4 years
- Significant mortality in heavy drinking group (10 out of 16)

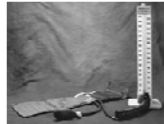
Nicolás et al. Ann Int Med 2002

Alcoholic cardiomyopathy Conclusion

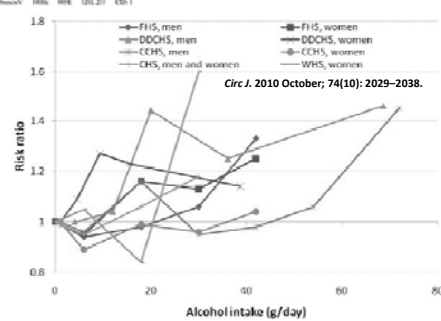
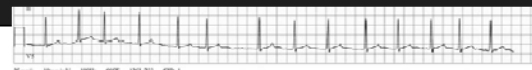
- An important problem
- A careful alcohol history is important
- Diagnosis of exclusion
- Significant morbidity and mortality
- Dramatic improvement with abstinence or reduction in alcohol consumption

Alcohol and Hypertension

- Alcohol abuse is the most common cause of **reversible** hypertension
- INTERSALT study (Marmot et al 1994) – 7 units/day raises systolic BP 5mmHg
- Little evidence regarding binge drinking



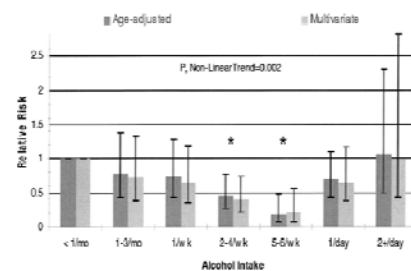
Alcohol and Atrial Fibrillation



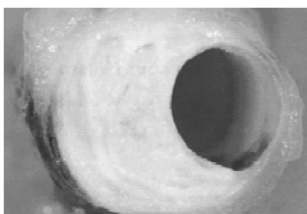
Holiday heart syndrome

- Acute cardiac rhythm disturbance associated with heavy ethanol consumption in a person without other clinical evidence of heart disease
- Effects of binge drinking
 - Pro-arrhythmogenic
 - Atrial fibrillation/flutter
 - Ventricular tachycardias
- Exacerbated by background of heavy long term alcohol consumption

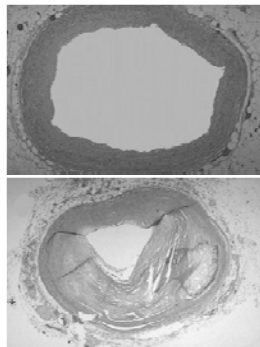
Alcohol and Sudden Death



Coronary Disease



Dyslipidaemia
Hypertension




Protective Effects of Alcohol

- Moderate alcohol consumption protects against CAD, stroke and atherosclerosis - EPIC Study
- Provides primary and secondary protection
- Raises HDL levels
- Improves fibrinolytic capacity
- Reduces platelet aggregation
- However, alcohol per se has not been confirmed to be the *cause* of lowered risk
- Moderate alcohol consumption associated with better diet and exercise



Role of Beverage Choice

- Red wine - conflicting lab and epidemiological studies
- Large scale prospective trials have not shown a benefit of wine over other beverages
- Evidence that a preference for wine rather than beer or spirits is associated with beneficial lifestyle choices

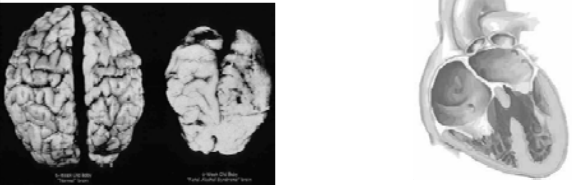


Advice re Alcohol

- Abstainers should not be advised to drink on health grounds
- Drinkers should keep to the recommended daily limits
- Patients exceeding these limits should be encouraged to reduce alcohol intake

Alcohol and the Developing Heart

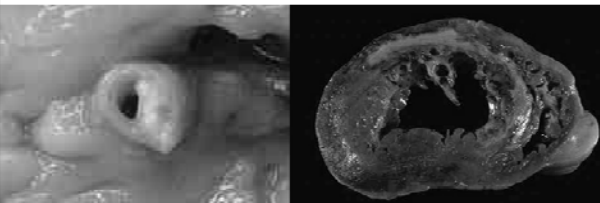
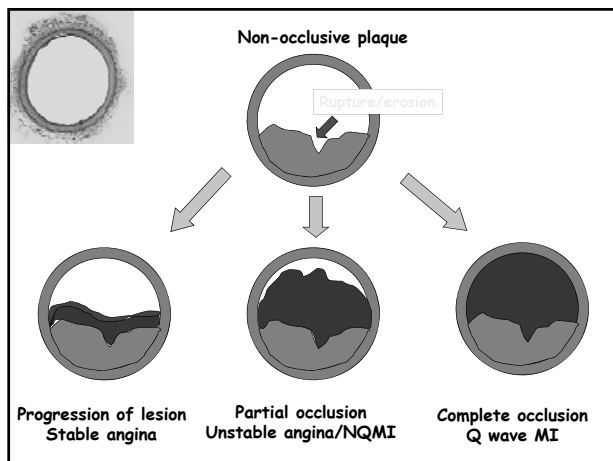
- Fetal alcohol syndrome
- 1st trimester
- 40% of cases with heavy use
- Structural heart defects (especially VSD)



Alcohol - Key Points

- Alcohol consumption is the norm in the UK
- Moderate EtOH consumption reduces risk of CAD
- Chronic, excessive use is associated with:
 - Hypertension
 - Congestive cardiac failure
 - Arrhythmias (especially atrial)
 - Sudden death
- Alcohol can damage the fetal heart

Tobacco

Cocaine

- 4.8% of 15 to 34 year olds had used cocaine in UK in 2010 (highest in Europe).
- 6.1% in 2009
- Traces of cocaine found on up to 99% of British Bank notes.

In a recent study by Maric *et al*:

- 6.1% of 1469 patients presenting to A&E with chest pain tested positive for cocaine.
- Only 18% of their notes made specific mention of this.

Emerg Med J 2010;27:548e550

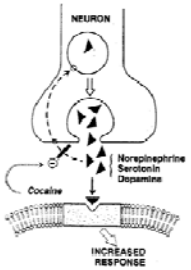


Q. A 31 year old man presents to casualty with severe interscapular pain, one hour after taking nasal cocaine. Clinical examination finds tachycardia, and a blood pressure of 210/115, but is otherwise unremarkable. A CT scan confirms a type B aortic dissection. The following drugs are available on the ward for acute control of his hypertension - which of them would NOT be appropriate?

- IV phentolamine
- IV metoprolol
- IV labetalol
- IV hydralazine
- IV nitroprusside

Cocaine and the heart

- Pharmacology
 - Inhibits pre-synaptic reuptake of norepinephrine, serotonin and dopamine
 - Indirectly acting sympathomimetic



Short serum t1/2
30-80 min

90% metabolised & excreted in urine over 2 weeks

Cocaine and the heart

- Cardiovascular effects
 - HT
 - LVH
 - Atheroma
 - Myocardial ischaemia / infarction
 - Arrhythmia
- Myocardial ischaemia
 - Vasoconstriction
 - HT
 - LVH
 - Atheroma (50% NCA)

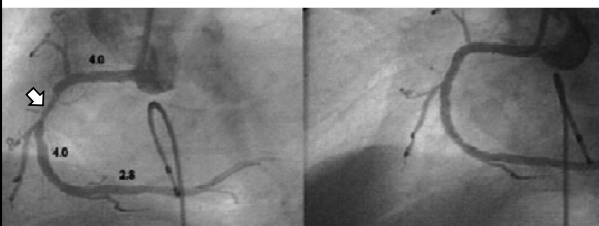
Cocaine and the heart

- Treatment
 - GTN, alpha blockade
 - NOT beta blockade

- IV phentolamine
- IV metoprolol
- IV labetalol
- IV hydralazine
- IV nitroprusside

Coronary angiography of the right coronary artery (RCA)

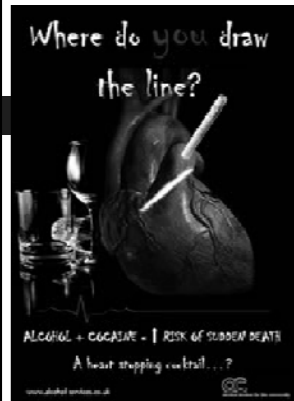
Coronary spasm



cocaethylene



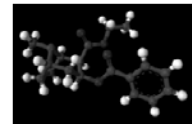
“Drinking with Charlie”....or Frankie



- In absence of alcohol, cocaine’s metabolites are inactive

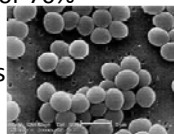
Cocaethylene Toxicity

- BP & Heart Rate Elevation Maintained
- >20 times increased chance of sudden death



IVDU - Endocarditis

- Incidence 150-2000 per 100000
- Mortality as high as 25%
 - consequence of the infectious agent, as well as the side of the heart involved (70:30)
- Predominantly right-sided heart involvement
- Staphylococcus aureus responsible for 70%
- Valve damage, embolisation
- Higher rate of recurrent endocarditis



Lifestyle



Summary

- Alcohol and tobacco are widely used legal substances
 - Misused
 - Important cardiac sequelae
- Alcohol
 - Cardiomyopathy
 - Atrial fibrillation
 - Hypertension
 - Coronary disease
- Cocaine
 - With alcohol – cocaethylene
 - Coronary artery spasm and myocardial ischaemia
- Tobacco – atherosclerosis
- Endocarditis associated with intravenous drug use
- Amphetamine, “ecstasy”, LSD

Review: Heart 2000;83:627–633

Think of substance misuse in everyone

