

Venice, Italy October 16-18 2015

14<sup>th</sup> Edition

# VENICE 2015 ARRHYTHMIAS

SPECIAL EDITION

FOOD & ARRHYTHMIAS



**Friday, October 16, 2015**  
Consiglio Room 10:45-12:30

**Fad diets such as liquid-based programs and high-protein regimen can cause arrhythmias in the adolescent people**

**Samuel Lévy, MD, Prof. FESC, FAHA, FACC**  
**Aix-Marseille Université, France**

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## Disclosure

Chairman of the Safety Committee for vernakalant (Cardiome  
Pharma)

Honorarium modest: <5000 USD/year

# What is a Fad Diet?

- Obesity, with its comorbidities such as metabolic syndrome and cardiovascular diseases, is a major public health concern
- Fad diets attract people who want to lose weight quickly and easily and keep that weight off
- “A fad diet is an eating regime **that focuses on a particular food or a group of foods**.... (Wikipedia)”
- **High-protein (HP) diets** are fad diets often advocated for weight reduction and weight loss maintenance
- Diets are equally successful in reducing weight at 2 years and risk factors for CV disease and diabetes<sup>1</sup>

# Potential beneficial outcomes of protein ingestion

Rational for protein ingestion

High-Protein diets

- 1) **increased satiety**--protein increases satiety to a greater extent than carbohydrate or fat
- 2) **increased thermogenesis**--high-protein diets increase thermogenesis, which also influences satiety and augments energy expenditure
- 3) **maintenance or accretion of fat-free mass**--in some individuals, a moderately higher protein diet may provide a stimulatory effect on muscle protein anabolism

# Critical Review of most commonly used diets

The ANSES (French Agency) reviewed currently used diets in 2009

- The intake in **proteins** exceeds the **recommended Dietary Allowances (RDA)** in 80% of diets
- **Intake of lipids** (fat) is superior to the RDA in 50% of diets (40% are below the RDA)
- **Intake in fibers** is reduced in 74 % of diets (in some 10 times less)
- **Supply of iron** insufficient in 61 % of diets
- **Intake in salt** is above the RDA by the WHO (5g/day) in 58 % of diets
- **Supply in vitamin D** below the RDA in 77 % of diets

# Classification of Regimen (ANSES 2009)

Type	Hyper-protein <sup>1</sup> >27% of TEI	Hyperglucid >55% of TEI	Hyper Lipid >40% of TEI
<b>Highly hypocaloric</b> <800 kcal	Mayo Scarsdale	Lemon Detox diet Cabbage soup diet	
<b>Very hypocaloric</b> (800-1200 kcal)	<b>Atkins 1</b> Californian 1 F Fricker 1,2,3		<b>Atkins 1</b> Californian 1 Miami 2 Montignac 2
<b>Hypocaloric</b> (1200-1500kcal)	Cohen 1 Fricker 1+, 3+ Miami 1	Ornish Weight Watchers	Cohen 1 Miami 1 Montignac 1+
<b>Non hypocaloric</b> (>1500 kcal)	<b>Atkins 2</b> Cohen 2 <b>Dukan 1, 2 et 3</b> Fricker 2+		Atkins 2, 3 <b>Dukan 2</b> Cohen 2 Californian 1 M

1. > 2.2 g/kg/day

TEI= Total energetic intake

# Popular High-Protein Diets

## ***Dr Atkins Diet « Revolution »***

- 1972: 15M copies sold in USA
- Low in carbohydrates(CH) and high in proteins
- Complex CH: cereals, potatoes, pasta, couscous..
- Simple CH: glucose, fructose, saccharose i.e. fruit, vegetables, milk,
- ***2010; The New Atkins Diet for a New You***
  - Low CH, no limit in calories
  - Easier to follow

## **Dr Dukan (July 2011)**

- Short initial phase (PP) 2 to 6 days: pure proteins (meat, fish, sea-food, eggs, low-fat milk (List of 72 foods)  
2L/day of water  
No CH (except stevia), no limit in calories
- Second phase « maintenance » (PL)
  - Proteines plus vegetables (List of 28)
- Stabilisation phase
  - 1 day a week of strict protein
- Consolidation phase
  - Return to normal

# Drawbacks of High-Protein Diet

## Dr Atkins

- Can induce the « yo-yo » effect
- Excess in fat intake and increase risk of CV events
- Increase risk of cancer
- May alter renal function
- After 2 months: deficit in vitamines B1, folic acid, vitamin C, iron and magnesium<sup>1</sup>

## Dr Dukan

- Induce the « yo-yo » effect 4y after 80% of 5000 persons returned to initial weight
- Deficit in vitamins minerals and fibers
- Acidosis (bad breath)
- Osteoporosis
- Cardiovascular:
- Depression and loss ,of self-esteem
  
- *Excluded from Conseil de l'Ordre January 2014*

1. Gardner et al. Am J Clin Nutr. 2010 Aug;92(2):304-12. Epub 2010 Jun 23.



# Liquid Protein Diets

- Cambridge Weight plan
  - « Slim/Fast »
- Strictly established amount of food



# Complications and Side-effects of High Protein Diets

- Increased mortality<sup>1</sup>
- Disregulation of blood calcium
- Renal complications in KD patients
- Hypocalcemia
- Hypokalemia
- GI: Constipation
- Cardiovascular events ?

## Liquid protein diets and torsade de pointes

Singh BN, Gaarder TD, Kanegae T, Goldstein M, Montgomerie JZ, Mills H.  
JAMA. 1978 Jul 14;240(2):115-9.

- 3 women, aged 27, 33, and 35 years, experienced recurrent syncope 5 months after losing 36 to 41 kg using liquid protein diets. No abnormalities were noted during physical examination
- K levels varied between 2.9 and 3.9 mEq/L.
- ECGs: prominent U waves, QUc prolongation, and ST and T wave abnormalities
- Syncopal episodes were due to ventricular tachycardia and fibrillation
- Caution should be exercised in the use of liquid protein diets for weight reduction in obesity.

# CASE REPORT Recurrent torsades de pointes in association with a very low calorie diet

E-J. T. Crawford<sup>1</sup> and D. Cochran<sup>2</sup> 2009

- A 40 year woman suffered cardiac arrest outside hospital and received bystander CP resuscitation . VF was diagnosed
- Following 3 150-J biphasic shocks, SR was re-established
- On arrival at hospital, pt had a Glasgow Coma Score of 3/15.
- ECG: sinus tachycardia widespread ST depression. The average QT =300ms. Using Bazett's formula, the corrected QT interval (QTc) was 455 ms lesions. A medical and drug history taken from her husband
- no chronic illnesses apart from essential hypertension
- The patient had been on a very low calorie diet for the 6 months before her collapse. The prescribed diet consisted of an intake of 530 kcal.day)<sup>1</sup>, usually in liquid form

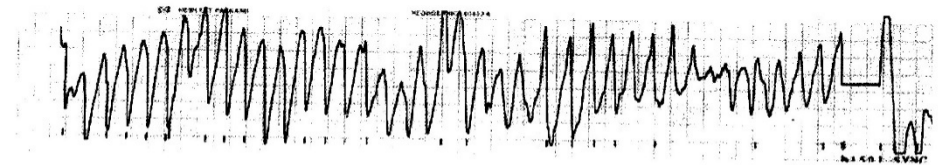


Figure 2 Electrocardiography rhythm strip taken 12 h after admission, demonstrating first episode of torsades de pointes.

# The enigma of sudden cardiac death related to dieting.

*Surawicz B, Waller BF. Can J Cardiol. 1995 1(3):228-31*

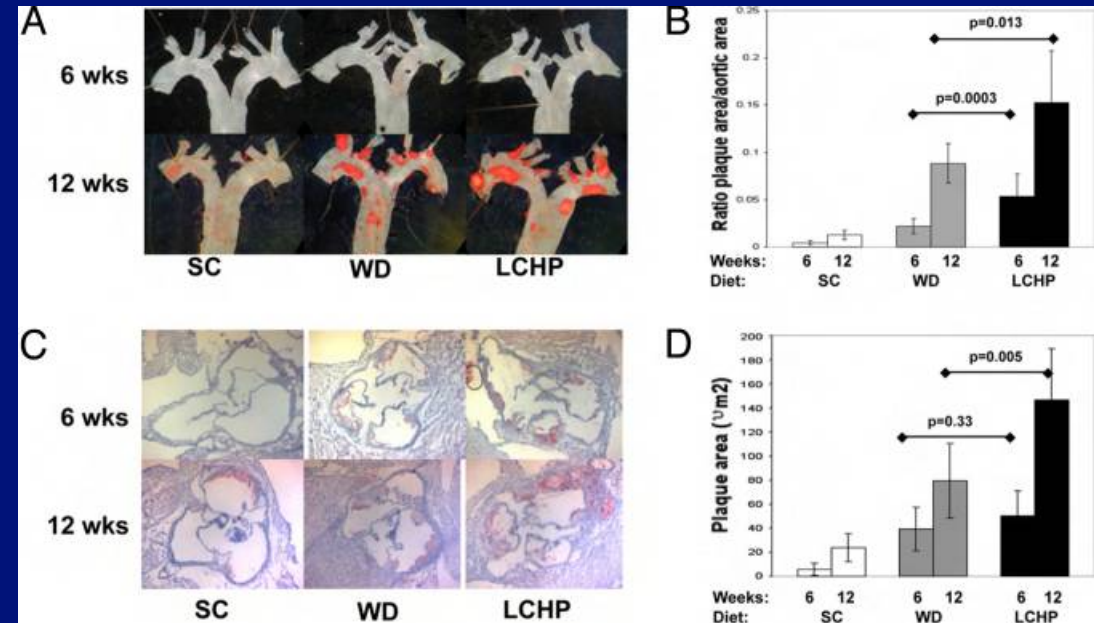
## Abstract

The use of liquid protein products for treatment of obesity in the United States in the 1960s and '70s was associated with an increased risk of sudden cardiac death. The latter was related to long QT interval occurring in the absence of structural abnormalities of the heart. In an attempt to increase understanding of this phenomenon, the authors examined the possible role of diet-related circumstances. **No evidence of increased incidence of sudden cardiac death or significant lengthening of QT interval in obesity, weight loss, starvation and dieting by methods other than liquid protein intake were found.** It was concluded that **sudden cardiac death during use of liquid protein products remains an enigma**, but that other methods of properly **medically supervised dieting appear to be safe**

# Vascular effects of a low-carbohydrate high-protein diet

Foo SY et al. Proc Natl Acad Sci U S A. 2009

- ApoE<sup>-/-</sup> mouse model of atherosclerosis and in a model of ischemia-induced neovascularization
- Mice on a LCHP were compared with mice maintained on either the standard chow diet (SC) or the Western diet (WD) which contains comparable fat and cholesterol to the LCHP
- *LCHP-fed mice developed more aortic atherosclerosis and had an impaired ability to generate new vessels in response to tissue ischemia.*



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## **Atrial fibrillation from liquid-protein diet**

Wood MA, Ellenbogen KA, Stambler BS

Am Heart J 1994 127:1667-8

# Obesity in Adolescents

The adolescents are likely

- To be obsessively concerned by their self-image
  - To have repeatedly failed to control their weight
  - Inactivity is often a component of obesity
  - R/O hypothyroidism, hyperadrenocorticism, in male hypogonadism, hypertension, impaired glucose tolerance
  - Estimate the daily caloric requirements
  - Iron deficiency more common
- Management
  - $\leq 1500$  kcal in male
  - $\leq 1000$ kcal in female
  - 1 hour of walking a day
  - Fragmentation of established amount of food
  - Psychological support
  - Progressive : Loss 1 pound a week





Thank you for your attention !

**12th Congress of the European  
Cardiac Arrhythmia Society**

**PARIS, FRANCE**

**April 17-19, 2016**

**ECAS 2016**

**[www.ecas-heartrhythm.org](http://www.ecas-heartrhythm.org)**

10.45-12.30

Featured Symposium

## Food and arrhythmias

Program Chairmen: Samuel Lévy \* – Maurizio Santomauro

### PROARRHYTHMIC EFFECTS ON ENERGY DRINK AND FOOD

Chairmen: A. Oto / Ankara, Turkey - C. Riganti / Naples, Italy \*

Fad diets such as liquid-based programs or high-protein regimens can cause arrhythmias in the adolescent people

S. Lévy / Marseille, France \*

Alcohol can cause arrhythmias in people with normal heart

R. Hatala / Bratislava, Slovak Republic \*

Long-term energy drink consumption is associated with arrhythmias in young people!

A. Capucci / Ancona, Italy

High levels of herbal remedies used by young people for allergy symptoms and to improve sports performance are proarrhythmic

G. Tenore / Naples, Italy \*

Energy drink-induced near-fatal ventricular arrhythmias treated with an implanted defibrillator

M. Santomauro / Naples, Italy