Obesity is a disease even without comorbidities

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Cairo, Egypt

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SARASOTA MEMORIAL HOSPITAL

Over 800 Beds
Over 800 Physicians on Staff
4000 Employees
20th Largest Public Hospital in US
27,000 Admissions per year
3 Time Magnet Nursing Status
Number One Ranking for MI Care
You are more than welcome to visit our hospital in Sarasota, Florida

Disclosure of financial relationships:
M. El Shahawy, MD, MS, FESC, FACC, FAHA

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Consultant: Nitro Med Inc., CVT

Speakers Bureau: Abbot, Amgen, Astra Zeneca, BMS, Boehringer, Novartis, Pfizer, Sanofi

Faculty member CME: Expert exchange and NACE

Major stock shareholder: None
• Pre-Test Questions

Pre-Test Question 1

• How many calories are in a Venti (large) Starbucks’s Coffee Frappuccino?
  A. 120 calories
  B. 220 calories
  C. 380 calories
Pre-Test Question 2

What is the prevalence of over weight and obesity in the USA?

A. 20 million
B. 50 million
C. 80 million
D. Over 100 million

Pre-Test Question 3

What is the most accurate way to assess obesity?

A. BMI
B. Waist measurement
C. Waist /Hip ratio
Pre-Test Question 4

Perivascular and epicardial adipose tissue volume is very commonly increased in obese subjects:

A. True
B. False

Question #7

Obesity even without comorbidities is a disease

• A. True
• B. false
Question #X

Adipose Tissue is the largest endocrine organ in body

- A. True
- B. false

Pre-Test Question X1

The most common early structural and functional cardiovascular abnormalities found in asymptomatic obese subjects is/are:

A. Abnormal rise in BP post mild exercise
B. Abnormal small vessel elasticity [C2]
C. Abnormal carotid intima media thickness
D. None of the above
E. All of the above
Obesity and CVD: An Association or a Cause and Effect Relationship?

Types of Fat and location

1. White: Subcutaneous Tissue
2. Brown: Visceral tissue
3. Inhomogeneous: Perivascular [PVAT]:
   Periaortic
   Perirenal
   Epicardial
Visceral Adiposity:
The Critical Adipose Depot

Epicardial adipose tissue may be increased in visceral obesity

- Hypertension
- Diabetes
- Dyslipidemia

Patient with visceral obesity

Patient with peripheral obesity

No metabolic complications

Objectives

1. Understand that visceral Obesity is a disease frequently associated with expansion of the perivascular Adipose tissue which is associated with increased production of Atherogenic Adipokines and other biologically active molecules.

2. Understand "The central role of abdominal and perivascular adipose tissue" as a root cause of co-morbidities and Cardiometabolic risk.

Continue Objectives

3. Understand the importance of specific definition of obesity in 2018:
   - Visceral?
   - Perivascular/Epicardial?
   - Or Both Visceral and Perivascular?

Time to shift more attention to Perivascular/Epicardial adiposity as novel risk factor.
Definition of Obesity in 2018 must be specific:

1. Visceral
2. Perivascular/Epicardial
3. Visceral and perivascular

Percentage Breakdown of Deaths From Cardiovascular Diseases
United States: 2002 Preliminary

- 53% Coronary Heart Disease
- 18% Stroke
- 6% Congestive Heart Failure
- 5% High Blood Pressure
- 4% Diseases of the Arteries
- 0.4% Rheumatic Fever/Rheumatic Heart Disease
- 0.4% Congenital Cardiovascular Defects
- 13% Other
Obesity is the most prevalent risk factor in US:

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Prevalence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight (BMI ≥25)</td>
<td>108,330,000</td>
</tr>
<tr>
<td>Obesity (BMI ≥30)</td>
<td>44,250,000</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>102,340,000</td>
</tr>
<tr>
<td>TC=200 to 239 mg/dl*</td>
<td>61,080,000</td>
</tr>
<tr>
<td>TC ≥240 mg/dl†</td>
<td>41,260,000</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>~59,000,000</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>50,000,000</td>
</tr>
<tr>
<td>Tobacco smoking</td>
<td>47,670,000</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>10,600,000</td>
</tr>
</tbody>
</table>

TC = total cholesterol, *Borderline high risk, † High risk.  
American Heart Association, 2002 Heart and Stroke Statistical Update, Dallas, Tex, AHA; 2001
A New Understanding Of Obesity

“Genetics loads the gun But the environment pulls the trigger.”
George Bray, 1996

Enviroment Pulls the trigger

“Genetics loads the gun—the environment pulls the trigger.”
George Bray, 1996
The second leading preventable cause of death is attributed to dietary factors and physical inactivity.”
Prevalence

Obesity Worldwide

– One Billion Overweight (BMI ≥ 25)

– 300 Million Obese

World Health Organization
How Prevalent is Obesity?

Obesity epidemic is sweeping the world and there is no evidence that this phenomenon will plateau in the near future.

2 out of 3 US adults are overweight or obese. “Obesity can truly be called America's newest and fastest-growing epidemic.”

Prevalence of Obesity in U.S. Adults

Percentage of State Obese (BMI > 30)

- No Data
- <10%
- 10-14%
- 15-19%
- 20-24%
- 25-29%
- >30%

CDC Overweight and Obesity
Parallel epidemics of obesity and diabetes

Diabetes

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;4%</th>
<th>4%–4.9%</th>
<th>5%–5.9%</th>
<th>&gt;6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Obesity

(BMI ≥30 kg/m²)

<table>
<thead>
<tr>
<th>Year</th>
<th>10%–14%</th>
<th>15%–19%</th>
<th>20%–24%</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CDC. www.cdc.gov.

“speedo” sign

Scientific American
2004;14(3):20
Definition of Obesity in 2018 must be specific:

1. Visceral
2. Perivascular/Epicardial
3. Visceral and perivascular

Excess Abdominal and or PVAT/ Epicardial Adiposity = High-Risk Fat

Adiposity induces inflammatory changes in adipose tissue


Pathophysiologic link between Obesity and Atherosclerosis
Obesity and CVD:

- Excess abdominal and/or perivascular adipose tissue are the link for the development of comorbidities i.e. diabetes, hypertension, dyslipidemia & cardiovascular disease, including atherothrombosis.
Fat Cells & Mediators of Insulin Resistance:

**Adipokines:**
Metabolically active molecules link Obesity and Atherothrombosis

**Atherogenic:**
- Leptin
- Resistin
- Visfatin
- CRP
- IL-6
- PAI-1
- Angiotensinogen
- MCP-1

**Antiatherogenic:**
- Adiponectin
- Omentin
- Apellin

3. **Pathophysiology**
From Obesity To Co morbidity &
Cardiometabolic Syndrome
And
Cardiovascular events

**Pathophysiologic link of Obesity to Atherosclerosis**
Visceral and or Perivascular Adipose tissue are the link for the development of comorbidities & Cardiovascular Disease Including Atherothrombosis

- Reversible risk factors: A, B, C
- Sub clinical atherosclerosis
- Changes in Glucose, Hypertension and Lipid metabolism
- Disease progression
- Disease and CV Events: Diabetes, Stroke, MI
- Death

**Metabolic Syndrome**

Obesity
Secret
Excess
Atherogenic Adipokines
CVD Risk Factors Cause Endothelial Dysfunction Resulting in Vascular Disease

Normal Vessel

Diseased Vessel

IGF1 = Insulin-like Growth Factor 1; ANG-II = Angiotensin II; OxLDL-C = Oxidized Low-density Lipoprotein Cholesterol; HTN = Hypertension; NO = Nitric Oxide


Excess of Atherogenic Adipokines can lead to Endothelial dysfunction, sub-clinical and clinical Atherosclerosis
Consequences of Obesity

- Type 2 diabetes
- Hypertension
- Dyslipidemia
- CVD
- Stroke
- Gall bladder disease
- Osteoarthritis
- Sleep apnea
- Cancer (endometrial, breast, prostate, and colon)

- Depression
- Thromboembolic disease
- Social stigma and discrimination
- Decreased quality of life
- Increased mortality (may curtail gains in life expectancy)
- Increased primary care and specialty visits

What the Odd Ratio for Obesity in causing CVD???

INTERHEART study
Guidelines for the Diagnosis of obesity:

Who is a high Risk?

(Frequently you do not need guidelines)
What are the current Guidelines for the Diagnosis of Obesity?

<table>
<thead>
<tr>
<th>GUIDE LINES</th>
<th>Defining Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCEP.ATP III</td>
<td>Waist circumference</td>
</tr>
<tr>
<td></td>
<td>&gt;40 in (102 cm)</td>
</tr>
<tr>
<td></td>
<td>&gt;35 in (88 cm)</td>
</tr>
<tr>
<td>W.H.O BMI ≥30 kg/m2 and or</td>
<td>Waist to Hip ratio</td>
</tr>
<tr>
<td></td>
<td>Men &gt;0.9</td>
</tr>
<tr>
<td></td>
<td>Women &gt;0.85</td>
</tr>
<tr>
<td>AHA/NHLBI</td>
<td>≥ 40 inches in men</td>
</tr>
<tr>
<td></td>
<td>≥ 35 inches in women</td>
</tr>
<tr>
<td>international Diabetes Federation</td>
<td>waist ≥ 94 cm males and ≥80 cm females</td>
</tr>
</tbody>
</table>
Assessing Overweight & Obesity?

Assessing Overweight & Obesity:

- BMI
- **Waist circumference**
- Waist/Hip Ratio >0.9

2. NIH National Heart, Lung, and Blood Institute. *Obes Res*. 1998;6(suppl 2):S1S.
Waist Circumference:

*Critically correlates with cardiovascular risk.

*How is it measured?

BMI or Waist Measurement?
Waist Circumference

*Critically correlates with metabolic syndrome

≥ 40 inches in men [102 cm]*
≥ 35 inches in women [88 cm]**

*90 cm for Asian men
**80 cm for Asian women

*How is it measured?

Waist Circumference:
Where to measure? How?
Note: the waist precedes the pt. into the room
Novel Method for Early Detection of CV Disease Risk in Asymptomatic Obese subjects with and without Comorbidities

And

Determination of Early Cardiovascular Risk Category/SCORE {ECVDRS}
Screening Tests for Early Detection And Determination of Cardiovascular Risk Category
Include Tests for:

1. Vascular Evaluation
2. Cardiac Evaluation
3. Modifiable Disease Contributors

Publications from CV Center of Sarasota/Florida/ USA

Novel abnormal cardiovascular findings and data on obesity without comorbidities recently published* from our cardiovascular Health assessment center in Sarasota ,Florida
Obesity and CVD: An Association or a Cause and Effect Relationship?

Obesity Even Without Comorbidity is a Risk Marker for CVD including Stroke

El Shahawy, MD, MS, FESC, FACC, FAHA, FSCCT, Clinical Professor of Medicine Universities of Florida and South Florida, Medical Director Cardiovascular Disease Assessment Center at Cardiovascular Center of Sarasota, Sarasota, Florida, USA;

Presented at the AHA International Stroke Conference Late braking Clinical Trials, New Orleans, February 1st, 2012
Obesity Even Without Comorbidity is a Risk Marker for CVD including Stroke

Presented at the AHA International Stroke Conference Late braking Clinical Trials, New Orleans, LA, February 1st, 2012

Recent (April, 2017) studies on obesity without comorbidities published* from our cardiovascular Health assessment center in Sarasota, Florida

*Annual Congress European Association of preventive Cardiology in Malaga, Spain. APRIL 6th-8th, 2017
Decades of obesity even without comorbidities in asymptomatic subjects is associated with significant cardiovascular structural and functional abnormalities

Presented at the annual meeting of the European Congress of Cardiology/Euro Prevent
On April 6/2017
Malaga/Spain
Take home messages and conclusions on Obesity and Cardiovascular disease

TAKE HOME MESSAGES
#1

Excessive production of the Atherogenic Adipokines and Angiotensinogen are the pathophysiological link between Obesity, Metabolic Syndrome and Atherosclerosis
TAKE HOME MESSAGE

# 2

- Early identification of cardiovascular abnormalities associated with obesity, risk stratification and optimal treatment cannot be achieved without the cutting edge tools described and dedicated and specialized team, in this rapidly evolving area of cardiovascular prevention.

TAKE HOME MESSAGE

# 3

- Optimal CV prevention program cannot be achieved by Mobil Van or city visiting Caravan advertising prevention for stroke and heart attack
- It is Time that you let cardiovascular PREVENTIONIST give your heart the attention it needs by expert and dedicated team
- [Be good to your heart !!!]
TAKE HOME MESSAGES

# 4

Unless Obese patients change their lifestyle, existing cardiovascular and metabolic risk factors will worsen or new risk factors will develop.

TAKE HOME MESSAGES

# 5

The goals for managing obesity is to prevent or delay the development of T2DM, Metabolic Syndrome and CVD.
**TAKE HOME MESSAGE # 8**

Physician Dx of Overweight Status Predicts Successful Weight Loss.

Whether we like it or not, it seems that we matter in the battle against obesity.

So, don’t sweep it under the rug. Talk to your patients about their weight.


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**TAKE HOME MESSAGE # 7**

Obesity with and without co-morbidity is associated with structural and functional CV/Stroke risk markers far and beyond those in non obese subject

[Obesity is a significant cardio and cerebrovascular disease risk marker]
TAKE HOME MESSAGE

# 8
EARLY therapy aimed at this progression could drastically reduce CV/Stroke morbidity events in the 21st century and not just save your Heart and the Brain, but also reduce the cost of health care.

TAKE HOME MESSAGE

# 9
Medical management must shift its emphasis from treatment of advanced disease to early prevention of disease progression.

One ounce of Early CVD/Stroke prevention is better than pounds of late cure.

Time to Focus on early CVD prevention.
Evidence for early CVD in Asymptomatic Obese Subjects Still:

- Under Diagnosed
- Under Treated
- Under Controlled

Time for change:
The new practice pattern for CV risk reduction
What to Do ?

2003

Treatment of all risk factors rather than the disease: a new approach to world health

Philip A Poole-Wilson, 2003
What to Do in 2018?

Optimal Treatment of all risk factors rather than the disease:

PLUS

Utilize accurate and cutting edge tools to assess evidence for early CVD i.e. Subclinical Atherosclerosis, which must be treated aggressively to avert or delay morbid cardiovascular events

This must be

The new approach to world health in the 21st Century

MAHFOUZ EL SHAHAWY, MD  2018

EAT a GOOD BREAKFAST

SHARE YOUR LUNCH

GIVE YOUR DINNER TO YOUR ENEMY

Note Appetite is our worst enemy
Self Control

EXERCISE
Physical activity
≥30 min on most days

Walking the dog--- MS Style!
B. Pharmacologic

A,B,C,D…
**Goals for ABCDE… for Risk Factors Management in the Cardiometabolic Syndrome Beyond Lifestyle Modification is:**

**To be consistent with Guidelines [2018]:**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Target</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C</td>
<td>&lt; 7%</td>
<td>ADA</td>
</tr>
<tr>
<td>Blood pressure targets</td>
<td>&lt;120/80</td>
<td>AHA</td>
</tr>
<tr>
<td>Cholesterol: LDL</td>
<td>&lt;100 [&lt;70]</td>
<td>ACC/ AHA</td>
</tr>
<tr>
<td>Dietary changes</td>
<td></td>
<td>ADA</td>
</tr>
<tr>
<td>Exercise</td>
<td>30 minutes/day [5x week]</td>
<td>AHA</td>
</tr>
</tbody>
</table>

- Alternatively you Faille [F]

---

**Final Personal Message**

It is my sincere hope that global cardiovascular risk evaluation strategy in every obese and non-obese subject become part of every routine Screening program so that Metabolic CV complications can be markedly reduced.
Ban on Sugar-Sweetened Beverages?

Mayor Bloomberg proposes
Prohibit sugary beverage sales > 16 oz.
Significant debate and pushback…….
NY Times 5/31/12

Nov. 4, 2014
Berkeley, CA
1st U.S. city to approve penny-per-ounce tax

What obesity can do

Statue of David returns to Italy after 3 years in the USA
Final departing Recomandation
Donot ever forget that:

One ounce of Early cardiovascular prevention is better than pounds of cure

Today we must practice:
Evidence-based Medicine
We are ALL Preventive Health Care Providers

Children Should Know Their Grandparents and Become Great Grandparents Themselves
2004
Grand Parents should live long enough
to enjoy their grand children and grand children should grow
up to know their grand parents

[ December 2008]
Thank You

Improvement Never Ends . .

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