



Evaluation of Coronary Artery Disease: Characterizing the Unique Pattern of Symptoms in the Obese and Morbidly Obese

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BACKGROUND

Obesity is an important risk factor for coronary artery disease (CAD), ventricular dysfunction, congestive heart failure, stroke, and cardiac arrhythmias.¹ The American Heart Association and American College of Cardiology guidelines for secondary prevention in CAD list obesity as a major modifiable cardiovascular risk factor.² Obesity is a conditional risk for developing cardiovascular risk factors such as diabetes, dyslipidemia, hypertension, and obstructive sleep apnoea.^{3,4} About two-thirds of patients who have had a myocardial infarction (MI) have a higher than normal body-mass index (BMI) of 25 or above.⁵

Several pathophysiological pathways have been proposed by which obesity increases the risk for developing CAD and adverse cardiovascular events. Obesity reduces insulin sensitivity, enhances free fatty acid turnover, increases basal sympathetic tone, induces a hypercoagulable state, and promotes systemic inflammation, all of which contribute to the progression of CAD.^{5,6}

While obesity is clearly a risk factor for developing CAD, it is less clear if obese patients present with unique symptoms during the initial evaluation of CAD.

OBJECTIVES

We sought to determine if obese and morbidly obese patients present with unique baseline symptoms in the initial evaluation of CAD.

STUDY DESIGN

Design: A prospective cohort study was initiated in six countries (France, Germany, Italy, Spain, UK, US). Three hundred and twenty cardiologists participated and 1,608 patients were recruited: Europe (n=1,264), US (n=344). Cardiologists were asked to select from a list of symptoms that were exhibited at first presentation: chest pains, shortness of breath, pain on inside of left arm, general pain in arms/shoulders, dizziness, nausea, fatigue, pain in lower jaw, GI issues, or None.

Inclusion Criteria: Symptomatic patients 18 years and older presenting to a cardiologist for evaluation of coronary artery disease

- Participating Sites:
 - Cardiologists with 3 to 29 years of experience;
 - See at least 30 patients at intermediate or high risk of CAD per month;
 - Mix of private practice (office setting) and hospital based

METHODS

- Each site enrolled up to 5 consecutive patients
- Patients were assigned to categories of Low, Intermediate, or High pre-test risk for CAD based on clinician assessment
- Weight categories were defined according to BMI: Underweight (BMI<18.5); Normal weight (BMI 18.5-24.9); Overweight (BMI 25-29.9) Obese (BMI 30-35); Morbidly Obese (> 35);
- Patient demographics were compared using bivariate tests commensurate with their distribution.
- Outcomes of interest were:
 - Proportions of patients according to baseline BMI category, pre-test likelihood of CAD, and comorbidities (Figure 1)
 - Proportions of patients according to baseline risk category (Figure 2)
 - Patient reported symptoms during the evaluation of CAD (Tables 1 & 2)

RESULTS

Figure 1: Patient Proportions (N) by Weight Category

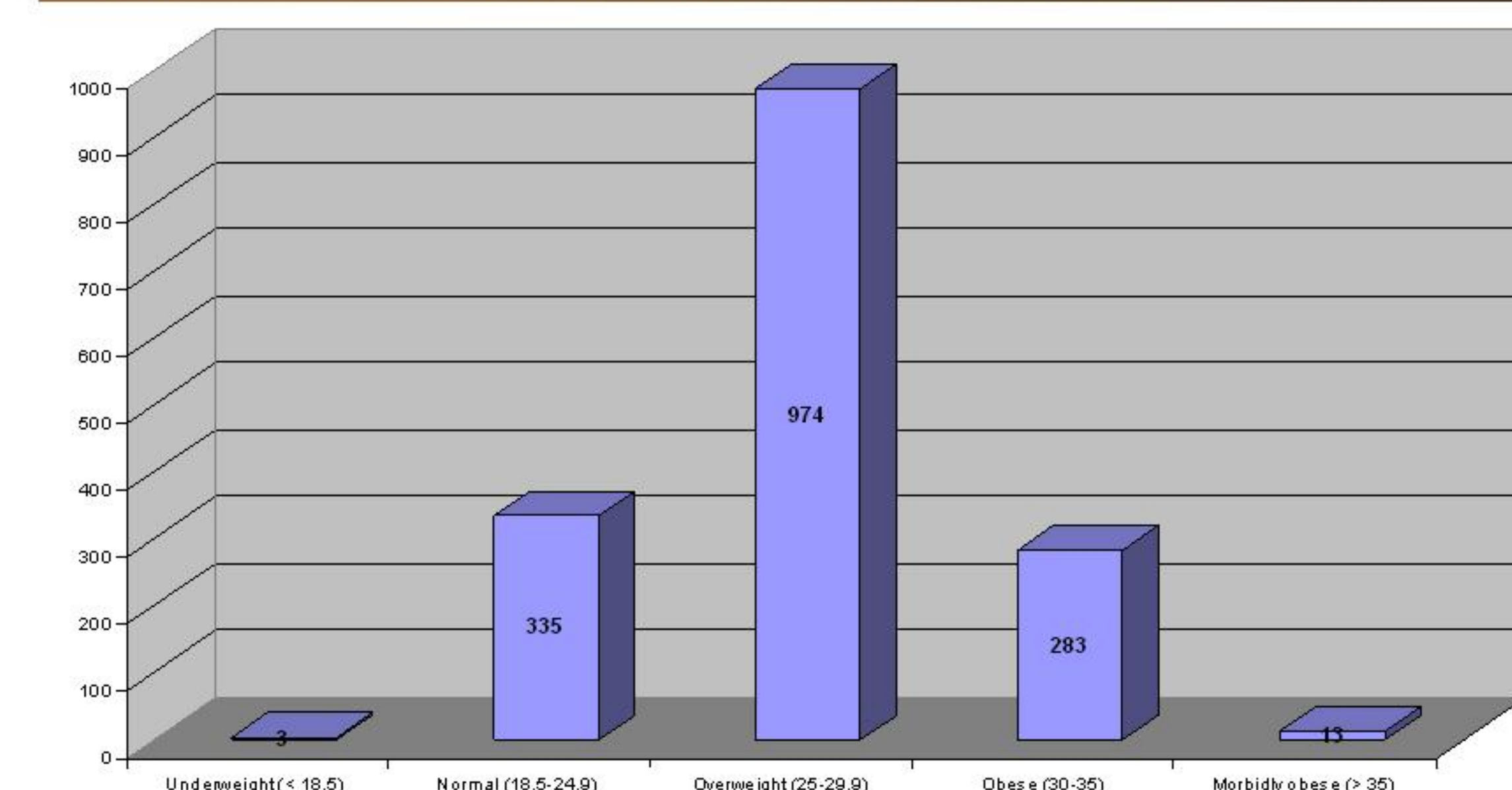
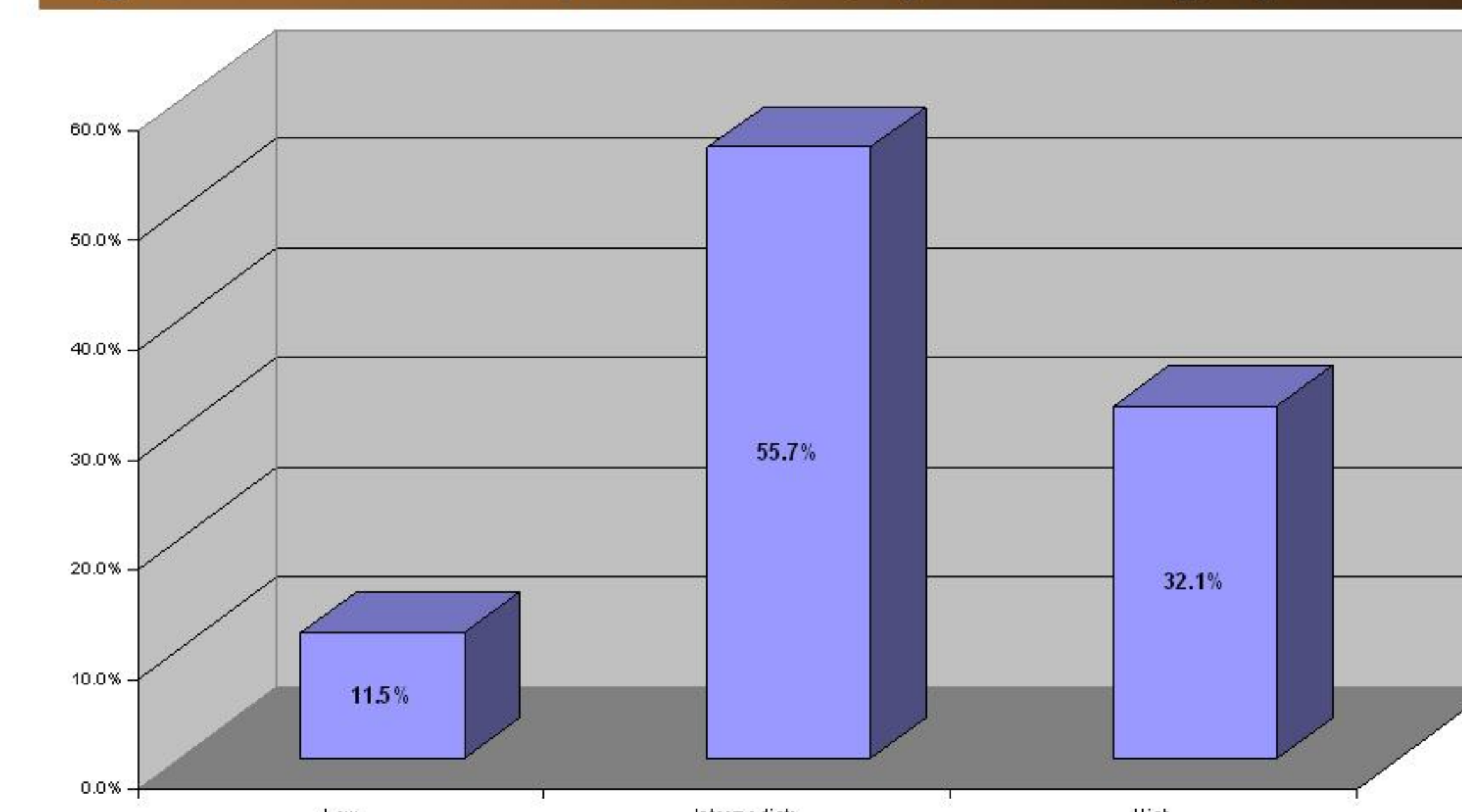


Figure 2: Patient Proportions (%) by Risk Category



RESULTS (cont.)

- Results: Age distribution <50 (13.9%), 51-60 (28.8%); 61-70 (31.2%), 71-80 (19.8%), 80+ (5.5%) and gender (67.1% male) did not vary significantly across the six countries;
- The baseline cardiovascular risk profile for the entire cohort was low (11.5%), intermediate (55.7%), and high (32.1%);
- The population was stratified according to BMI: Underweight (BMI<18.5, n=3); Normal weight (BMI 18.5-24.9, n=335); Overweight (BMI 25-29.9, n=974) Obese (BMI 30-35, n=283); Morbidly Obese (> 35, n=13);
- Compared to normal weight patients, Morbidly obese patients were more likely to exhibit chest pains (92% vs. 63%, P<0.05) and pain on inside of left arm (54% vs. 13%, P<0.05);
- Compared to normal weight patients, obese patients were more likely to exhibit fatigue (31% vs. 20%, P<0.05).

CONCLUSIONS

- Variations exist in the presenting symptoms of normal weight, obese, and morbidly obese patients with CAD
- During the initial evaluation for CAD, obese and morbidly obese patients are significantly more likely to exhibit chest pain, pain on inside of left arm, and fatigue compared to normal weight patients
- While the present study shows a relationship between BMI and CAD symptoms, alternative methods should be developed that more accurately characterize excess body fat so that the relationship between Obesity and CAD can be studied more accurately

Table 1: Percentage of US Patients Exhibiting Symptoms at First Presentation

	Underweight (under 18.5) (0*)	Normal weight (18.5-24.9) (73)	Overweight (25-29.9) (181)	Obesity (30-35) (82)	Morbidly obese (more than 35) (8*)	Total (344)
Chest pains	0%	74%	72%	54%	88%	68%
Shortness of breath	0%	55%	54%	52%	63%	54%
Pain on inside of left arm	0%	12%	13%	12%	50%	13%
General pain in arms/shoulders	0%	12%	4%	4%	0%	6%
Dizziness	0%	9%	10%	15%	13%	11%
Nausea	0%	14%	4%	7%	25%	8%
Fatigue	0%	9%	19%	21%	50%	18%
Pain in lower jaw	0%	3%	4%	1%	25%	4%
GI issues i.e. Acid indigestion	0%	1%	3%	13%	13%	5%
None	0%	11%	10%	12%	13%	11%

Significantly higher than average P<0.05
Significantly lower than average P<0.05

Table 2: Percentage of European Patients Exhibiting Symptoms at First Presentation

	Underweight (under 18.5) (3*)	Normal weight (18.5-24.9) (262)	Overweight (25-29.9) (793)	Obesity (30-35) (201)	Morbidly obese (more than 35) (5*)	Total (1264)
Chest pains	67%	60%	58%	64%	100%	60%
Shortness of breath	0%	37%	42%	57%	60%	44%
Pain on inside of left arm	67%	13%	15%	15%	60%	15%
General pain in arms/shoulders	0%	12%	7%	10%	20%	9%
Dizziness	0%	8%	9%	13%	20%	10%
Nausea	0%	12%	7%	8%	0%	8%
Fatigue	67%	23%	27%	36%	60%	28%
Pain in lower jaw	0%	6%	7%	6%	20%	7%
GI issues i.e. Acid indigestion	0%	4%	4%	6%	20%	5%
None	0%	15%	13%	5%	0%	12%

Significantly higher than average P<0.05
Significantly lower than average P<0.05

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