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The Relationship between Bariatric Surgery-Induced Weight Loss and Heart Rate Variability

Thesis

Submitted for Partial Fulfillment of Master's Degree in Cardiology

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Mohamed Gamal El Mikawy

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List of Abbreviations

Abb.	Full term
BMI	*Body mass index*
BPD	*Biliopancreatic diversion*
CVD	*Cardiovascular disease*
HbA1C	*Glycated hemoglobin*
HF	*High Frequency*
HRV	*Heart rate variability*
HS	*Highly significant*
IHD	*Ischemic heart disease*
IL	*Interleukin*
IVSD	*Inter ventricular septum diameter*
LF	*Low Frequency*
LVEDD	*Left ventricular end diastolic diameter*
LVEF	*Left ventricular ejection fraction*
LVESD	*Left ventricular end systolic diameter*
LVH	*Left ventricular hypertrophy*
NCEP	*National Cholesterol Education Panel*
NS	*Non significant*
PACs	*Premature atrial contraction*
PVCs	*Premature venticular contraction*
PWD	*Posterior wall diameter*
RVD	*Right ventricular diameter*
RVSP	*Right ventricle systolic pressure*
RYGB	*Roux-en-Y gastric bypass*
S	*Significant*
TG	*Triglycerides*
TNF	*Tumor necrosis factor*
tPA	*Tissue plasminogen activator*
ULF	*Ultra Low Frequency*
VLF	*Very Low Frequency*

INTRODUCTION

Obesity is one of the greatest public health challenges of current times, with over 2.6 million people dying annually as a result of being overweight ***(World Health Organization, 2011).***

Altered autonomic nervous system activity has been reported in patients with obesity ***(Abate et al., 2001).*** Indeed, sympathetic overactivity has also been described in association with obesity ***(Gao et al., 1996);*** and spectral analysis showed decreased Heart rate variability (HRV) with weight gain ***(Poirier et al., 2003)***.

A high body mass index (BMI) is significantly associated with myocardial infarction, coronary insufficiency, and sudden death; the association seems strongest with sudden death ***(Rabkin et al., 1977).*** Although, obesity alone is considered a major modifiable risk factor for ischemic heart disease ***(Eckel et al., 1998).***

Moreover, Weight-stable obese subjects have an increased risk of arrhythmias and sudden death, even in the absence of cardiac dysfunction, and the risk of sudden cardiac death with increasing weight is seen in both genders ***(Rabkin et al., 1977).***

Heart rate variability (HRV) refers to the variation in intervals between heartbeats and reflects cardiac autonomic

modulation, which is influenced in a favorable way by increased parasympathetic activity ***(Peterson et al., 1988)***.

Weight loss after diet or gastroplasty in morbidly obese patients has been shown to reverse the deleterious impacts of obesity on cardiac autonomic nervous system modulation, with subjects showing enhanced HRV after reduction in body mass index (BMI), through increased cardiac vagal modulation ***(Karason et al., 1999).***