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A Deadly Triangle of Obesity, Metabolic Syndrome and Cardio Renal Syndrome.

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Obesity is growth-intimidatingand has been called a pandemic. Its association to hypertension, insulin resistance, new cardio-vascular events, rising incidence, and prevalence of renal problems is well documented[1,2]. The co-existing cardiac and renal disease encourage cardio-renal syndrome (CRS) [3]. The exposition of obesity, especially in children is a major risk for metabolic syndrome (Mets), than in adults[4]. This death triangle emphasizes the poor outcome of these patients. That is why The World Health Organization(WHO) has emphasized the awakening, the identification, and the treatment of obesity. Our study goal was to reveal the relationship between obesity, metabolic syndrome, and cardiorenal syndrome. We directed a retrospective cross sectional descriptive study. 127 patients with chronic kidney disease, who were admitted during a month period at our clinic, were involved. Obesity was defined according to Body Mass Index (BMI) as, $\geq$ 25 kg/m^2. NCEP/ATP III criteria was used to define metabolic syndrome [17]. Statistical analysis has included Student's t-test, bivariate and multivariate regression. As result: The mean age was 50 ± 27 yrs. Reword the highlighted section.62.2 % were males and 37.8 % were females. All candidates having a high percentage of obesity of 70.8% (90pts), Metabolic syndrome 67.7 % (86 pts), and Cardiorenal Syndrome 85 % (108 pts).No statistical differences between sexes were found. However, result did show a strong relationship between obesity and Diabetes mellitus at p= 0.07. Result also indicate a strong relationship with statistical significance between cardiorenal syndrome and obesity, p=0.003, and cardiorenal syndrome with metabolic syndrome, p=0.0005. In addition, there was also a high prevalence of Anemia, at 70. % (89 pts), with a strong association with both cardiorenal and metabolic syndrome.

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I. INTRODUCTION:

Obesity rates are tremendous, growing significantly since the 1960s[1,2].Its incidence and prevalence in the last two decades has been drastically increasing. Its association to hypertension, insulin resistance, new cardio-vascular events, rising incidence, and prevalence of renal problems is well documented[1,2].Overweight is defined as having a BMI of 25–29.9, while obesity is BMI>30, and severe obesity is a BMI >40 (or ≥35 in the presence of comorbidities) [5].Statistical data shows that currently, approximately 30% of adults in the United States are obese and 34.4% are overweight[6]. Obesity increases the risk of cardiovascular disease, coronary heart disease, stroke, type 2 Diabetes Mellitus, insulin resistance, premature birth, kidney disease, some type of cancer, impairs life quality, and premature mortality. The link between diabetes and obesity is well known, and itis called "diabesity" [8].However, the association of metabolic syndrome and cardiorenal disease is recognized as cardiorenal metabolic syndrome [7]. It should be noted that Cardiometabolic syndrome, Diabetes Mellitus type 2,cardiovascular and kidney diseaseare the most prevalent association with obesity. The co-existing cardiac and renal disease encourage cardio-renal syndrome (SCR). This correlation together makes a death triangle in mortality. The objective of this study is to evaluate the magnitude of the association of obesity in cardiorenal patients, while also examining the powerful connection of obesity with metabolic syndrome, Diabetes Mellitus, and cardiorenal connotation.

II. STUDY AND METHODS

127 patients hospitalized in our institution were enrolled in the study. All patients were morethan 18years old. A completed questionnaire to obtain information regarding their gender, age, height and weight to calculate body mass index, waist circumference, diabetes, history of hypertension and drugs used, was performed. Patients were defined as hypertensive if they were undergoing treatment with antihypertensive drugs or if their untreated systolic blood pressure was >130 mmHg and/or diastolic blood pressure >85 mmHg. Normal waist circumference was defined as,<102 cm for males and<88 cm for females. The SCR(what is SCR)?was defined

according to consensus conference of the Acute Dialysis Quality Initiative[9,16], serum creatinine (sCr) for renal failure and hemoglobin (Hb) measures for anemia. Renal failure was considered an elevation of serum creatinine levels ≥ 1.5mg/dl. Anemia was considered when hemoglobin levels were < 13.0 gr/ dl in men and < 12 gr/dl in women according to the World Health Organization.Obesity was defined according to Body mass index (BMI) ≥ 25 %. NCEP/ATP III criteria was used to define metabolic syndrome .

Statistical analysis's: Data analysis was conducted using the Statistical Package for Social Sciences for Windows version 11 (SPSS Inc., Chicago, IL, USA). The chi-square test and logistic regression analysis were used to determine correlations between different variables

III. RESULTS:

The average age of the study population was 50±27 years. Male patients were 79(62.2%) vs. females patients 48 (37.8%). There was no significant differences between sexes (p≥0.05). We didn'tfound a relation between age and the risk for SCR. A high rate of SCR was found in approximately 108 patients (85%). The mean age for patients with cardiorenal syndrome was 54.4± 14.6 years and 38.5±11.5years for patients without cardiorenal syndrome.

Table 1; Characteristics of the study population

Characteristics	Non- SCR (n = 19; 14.9%)	SCR (n = 108; 85%)	P value
Sex (male %)	79(62.2%)	48 (37.8%)	≥0.05
Age (y)	38.5 ± 11.5	54.4 ±14.6	≥0.05
Diabetes	0 (0%)	27 (25%)	<0.012
Mets	1 (2.4%)	68 (63%)	<0.005
Obesity	9 (47.4%)	80 (74.1%)	<0.003
HTA	1 (0.5%)	95 (87.9%)	<0.02
Dyslipidemia	5 (26%)	81 (75%)	<0.004

Figure 1

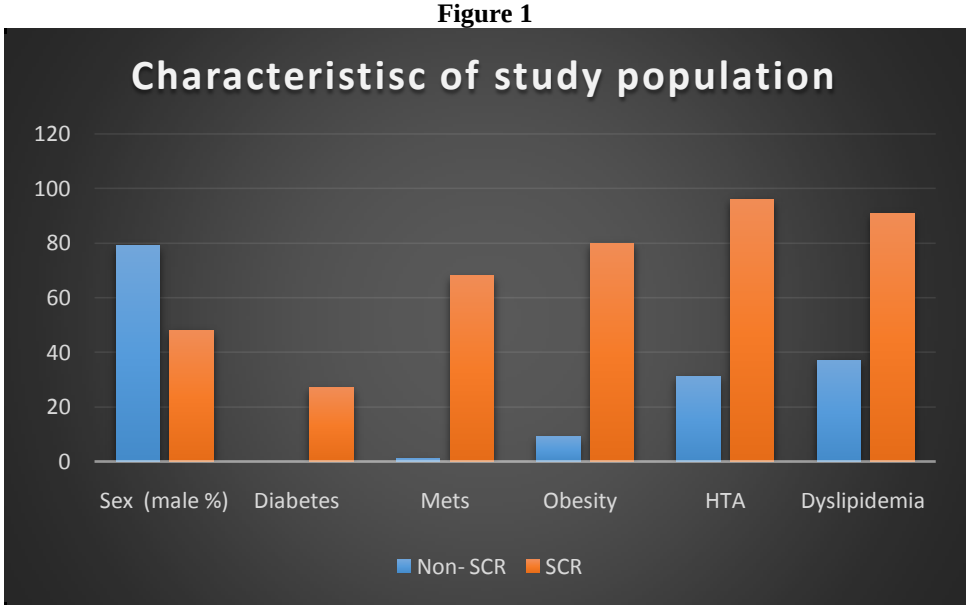

Table 2. SCR * Obesity Crosstabulation

		Obesity		Total
		normal	obez	
SCR	w/o SCR	9	10	19
	with SCR	28	80	108
Total		37	90	127

p≤0.003

Figure 3

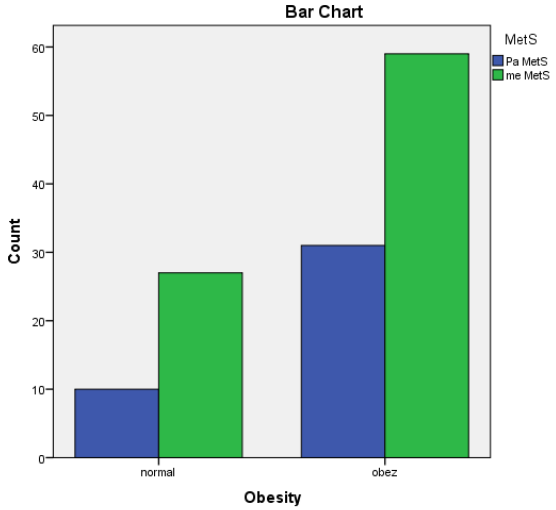

Table 3. SCR * MetSCrosstabulation

		MetS		Total
		w/oMetS	withMetS	
SCR	w/o SCR	1	18	19
	With SCR	40	68	108
Total		41	86	127

p≤0.005

Figure 3

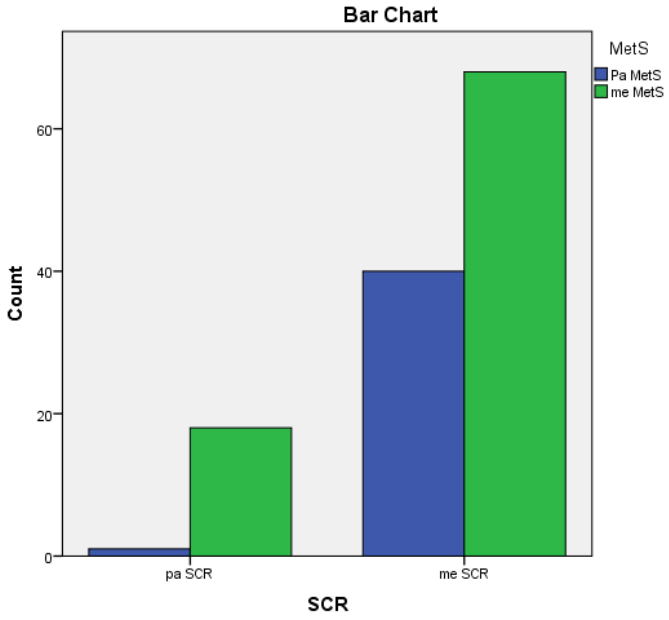

Table 4. SCR * DM Crosstabulation

		DM		Total
		with DM	w/o DM	
SCR	w/oSCR	0	19	19
	with SCR	27	81	108
Total		27	100	127

p≤0.09

Figure 4

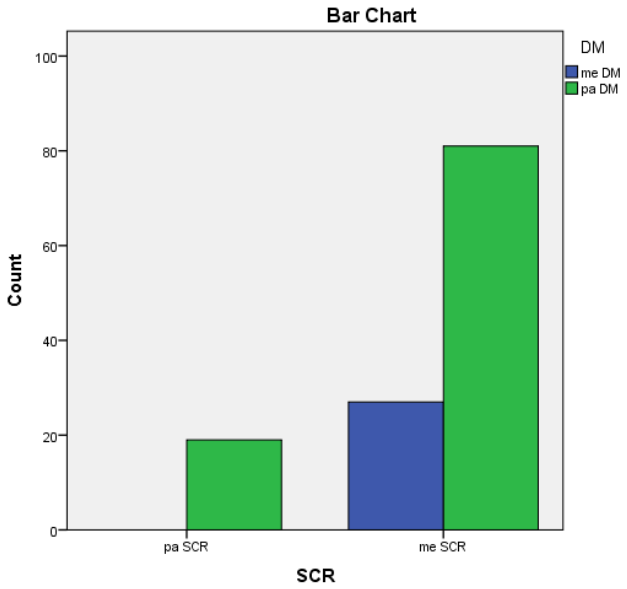

Table 5.Zero-order correlation coefficients for all variables in the study

	1	*2*	*3*	*4*	*5*	*6*
1.Obesity						
2.Col	-0.40832					
3. Mets	0.483165	-0.26745				
4.SCR	-0.32138	0.190339	-0.22036			
5.HTA	0.241143	-0.21202	0.096923	-0.3885		
6.DM	0.241731	-0.02791	0.323561	-0.2312	-0.10795	
7.Hb	-0.11062	0.077062	-0.1273	-0.2191	0.012072	0.126997

Note: critical value = ±0.11 (p≤0.01)

IV. DISCUSSION:

Obesity is associated with an increased risk of morbidity and mortality and is associated with reduced life expectancy [10-14]. Obesity is associated with numerous comorbidities such as, CVD, type 2 diabetes, hypertension, CKD, certain cancers, and sleep apnea [15].Chronic Kidney Disease is a vital risk factor for cardiovascular disease and mortality. The prevalence of kidney disease growth leads to obesity, Diabetes Mellitus, Hypertension, etc. Cardiorenal syndrome is strongly associated with patients with renal disease. It is a very complex disease in which both renal and heart are affected. This created a feedback cycle with worsen progression of both organs and carries a bad prognosis. To reduce the burden of CKD (what is CKD)?and related diseases, it is essential to identify modifiable factors in high-risk individuals such that intervention strategies can be developed and implemented. It is well known that exercise improves many of the risk factors associated with the development of CKD. The poor prognosis of these patients raises the need to integrate weight loss programs. These findings point the need for closer follow-up and the implementation of preventive measurements for the higher risk group of population.Early intervention and goal directed therapycan help preventor delay the onset of CKD by having tailored program.Medical history, behaviours, life style modification and an interdisciplinary collaboration to improve factor identifications and better control of Cardiorenal Syndrome and MetSshould be explored.

V. CONCLUSION:

This study found a high prevalence of Cardiorenal syndrome. Obesity, metabolic syndrome, high systolic blood pressure, diabetes, and dyslipidemia were associated with development of SCR. Control of modifiable risk factors, especially metabolic syndrome and blood pressure, should be optimized to reduce the risk of SCR. Most importantly, we found that dyslipidemia was not adequately controlled and precautions should be taken regarding the follow-up of patients. Unfortunately, the availability of effective therapeutic strategies for sustained weight loss and management of Metabolic Syndrome remains limited. Finally, life-style

modification and diet remain as the crucial factors to improve outcomes. On the other hand, MetS is an independent risk factor, often associated with cardio-vascular complications. It has been presented as the primary driver of the dramatic rise of Cardiorenal syndrome.

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