بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Myostatin Level in CRF Patients with and Without HBV and Its Correlation with Sarcopenia

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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ASM	amount of appendicular SMI
BDNF	brain-derived neurotrophic factor
BIA	bioelectrical impedance analysis
BMI	body mass index
BSN	Brazilian Society of Nephrology
BUN	Blood urea nitrogen
CKD	Chronic kidney disease
CRP	C-reactive protein
CSA	cross-sectional area
CT	computerized tomography
CVD	cardiovascular disease
DXA	dual energy X-ray absorptiometry
ESRD	end-stage renal disease
EWGSOP	European Working Group on Sarcopenia in Older People
GFR	glomerular filtration rate
GH	growth hormone
HBV	Hepatitis B virus
HIV	human immunodeficiency virus
HOMA-IR	homeostasis model assessment of insulin resistance
hs	high-sensitivity
IGF1	Insulin-like growth factor 1
IGF-1	insulinlike growth factor-I
IL	interleukin
MRI	Magnetic resonance imaging
mTOR	mammalian target of rapamycin
PedsQL	Pediatric qualify of life inventory
QOL	quality of life
RRT	renal replacement therapy
SD	standard deviations
SMI	skeletal muscle mass
TGF-alpha	Transforming Growth Factor-alpha
TNF-α	tumor necrosis factor-alpha
URR	urea reduction rate
VFA	visceral fat area

ABSTRACT

Background; Myostatin (MSTN), a member of TGF-β superfamily, is produced in the skeletal muscle to inhibit myocyte differentiation. MSTN expression is increased in the skeletal muscle in patients with chronic kidney disease (CKD), which may play a role in the pathogenesis of sarcopenia or in the protein energy wasting (PEW), **Aim and objectives;** to assess myostatin level in CRF patients with HBV and its correlation with sarcopenia, **Subjects and methods;** This study is a cross - sectional study, was carried out at at outpatients' clinics and internal medicine and nephrology department Ain Shams university hospital and Sharq Elmadinah Hospital, Alexandria, on 70 patients on regular hemodialysis divided into 3 groups: (Group A); included 20 patients with HBV infection, (Group B); included 20 patients without HBV infection, (Group C); included 10normal persons without CRF or HBV, during period from February 2021 till August 2021, **Result;** Myostatin level showed a significant negative correlation with BMI and SMI, **Conclusion**; The serum myostatin level was significantly higher in hemodialysis patients than controls, particularly in post-HCV cirrhotic than non-cirrhotic ones. Serum myostatin level was significantly related to sarcopenia pathogenesis as a predictor marker, **Keywords; Chronic renal disease; Myostatin; BMI; Cirrhosis.**

INTRODUCTION

Chronic kidney disease (CKD) has become a worldwide epidemic with an occurrence rate in the population of approximately 5%–15%. Prevalence of end-stage renal disease (ESRD) population relying on dialysis is also on the rise **(De Nicola et al., 2016) (Annual Data Report, 2017)**.

Sarcopenia is a syndrome characterized by a progressive and systemic decrease in muscle mass and strength, leading to physical dysfunction, poor quality of life (QOL), and the risk of death **(Cruz-Jentoft, et al 2019)**.

Myostatin is a member of TGF-β superfamily, is produced in the skeletal muscle to inhibit myocyte differentiation. Myostatin expression is increased in the skeletal muscle in patients with chronic kidney disease (CKD), which may play a role in the pathogenesis of sarcopenia or in the protein energy wasting, **(Verzola D,et al 2017) (Wang XH,et al 2014)**.

Hepatitis B virus (HBV) infection is a serious health problem in the Egyptian population. Positivity for hepatitis B surface antigen accounts for 70% cases of chronic hepatitis and cirrhosis.

Chronic hepatitis B (CHB) viral infections are known to have adverse effects on kidney function. Rarely, CHB viral infections can cause deposition of immune complexes, leading to secondary glomerulopathies **(Korean Association, et al 2016)(Chan HL,et al 2011)**

Aim Of The Work

In This study we aimed to assess myostatin level in CRF patients with HBV and its correlation with sarcopenia

Chapter (1)

Chronic Kidney Disease

Chronic kidney disease (CKD) is a clinical syndrome secondary to the definitive change in function and/or structure of the kidney and is characterized by its irreversibility and slow and progressive evolution. Another important aspect is the pathology represents a higher risk of complications and mortality, especially cardiovascular-related. An adult patient is identified with CKD when they present, for a period equal to or greater than three months, glomerular filtration rate (GFR) lower than 60 ml/min/1.73 m2, or GFR greater than 60 ml/min/1.73 m2, but with evidence of injury of the renal structure. Some indicators of renal injury are albuminuria, changes in renal imaging, hematuria/ leukocyturia, persistent hydroelectrolytic disorders, histological changes in kidney biopsy, and previous kidney transplantation (**Ammirati, 2020).**

Albuminuria is defined by the presence of more than 30 mg of albumin in the 24-hour urine or more than 30 mg/g of albumin in an isolated urine sample adjusted by urinary creatinine. The main causes of CKD include diabetes, hypertension, chronic glomerulonephritis, chronic pyelonephritis, chronic use of anti-inflammatory medication, autoimmune diseases, polycystic kidney disease, Alport disease, congenital malformations, and prolonged acute renal disease (**Chen et al., 2019).**

CLASSIFICATION

CKD is categorized into five stages, according to the GFR, and in three stages, according to the albuminuria, as shown in the tables below (**Hebert et al., 2010).**

TABLE (1): CKD STAGE; GFR = GLOMERULAR FILTRATION RATE (**Hebert et al., 2010).**

Stages	GFR value ml/min/1.73m2	Classification
I	>90	Normal or High
II	60-89	Slightly decreased
III A	45-59	Mild to moderately decreased
III B	30-44	Moderately to severely decreased
IV	15-29	Severely decreased
V	<15	Kidney failure

TABLE (2): CATEGORIES ALBUMINURIA; A/C RATIO = ALBUMIN/CREATININE RATIO IN ISOLATED URINE SAMPLES (**Hebert et al., 2010).**

Category	24-Hour Albuminuria mg/24 h	A/C Ratio Mg/g	Classification
A1	<30	<30	Normal to discrete
A2	30-300	30-300	Moderate
A3	>300	>300	Severe

Therefore, an adult patient with diabetic nephropathy, GFR estimated = 42 ml/min, and albuminuria of 200 mg/24 hours for over three months is classified as a CKD stage IIIB A2 patient. It is worth remembering that albuminuria between 30-300 mg/g used to be called ''microalbuminúria'', and greater than 300 mg/g, "macroalbuminuria''. The inclusion of the degree of albuminuria in the CKD classification is justified as a way of estimating the risk of progression of renal dysfunction, as shown in the table below (**Winearls and Glassock, 2009)**: