

# پہ نام خدا





# 17<sup>th</sup> International Congress of Nephrology, Dialysis, and Transplantation

Organized by Iranian Society of Nephrology

Tabriz, Iran 19-22 November 2019

CME Course

TABRIZ  
2019





*I*

***IMPORTANCE OF MPV IN PREDICTING CARDIAC  
MECHANICS PARAMETERS AND CIMT  
IN ESRD CHILDREN***





***Alaleh Gheissari .***  
***Pediatric Nephrologist***  
***Professor of pediatrics***  
***IUMS***



# INTRODUCTION

---

❖ CVD is the main cause of death in ESRD children

❖ **Traditional risk factors:**

- hypertension,
- dyslipidemia,
- obesity

❖ **Uremic risk factors:**

- inflammation,
- Oxidative stress,
- endothelial dysfunction

❖ **Various types of CVD:**

- premature atherosclerosis,
- myocardial disease,
- systolic and diastolic dysfunction,
- coronary artery disease,
- heart failure





# ***PREDICTION OF CVD***



# ECHO-CARDIOGRAPHY BASED INVESTIGATIONS

---

- ❖ Coronary artery calcification score,
- ❖ Carotid-intima-media thickness (CIMT),
- ❖ Left ventricular mass index (LVMI)
- ❖ **Global longitudinal strain (GLS)**
- ❖ **Strain rate (SR)**
  - Eco should be done when achieving dry-weight then every 1-3 year

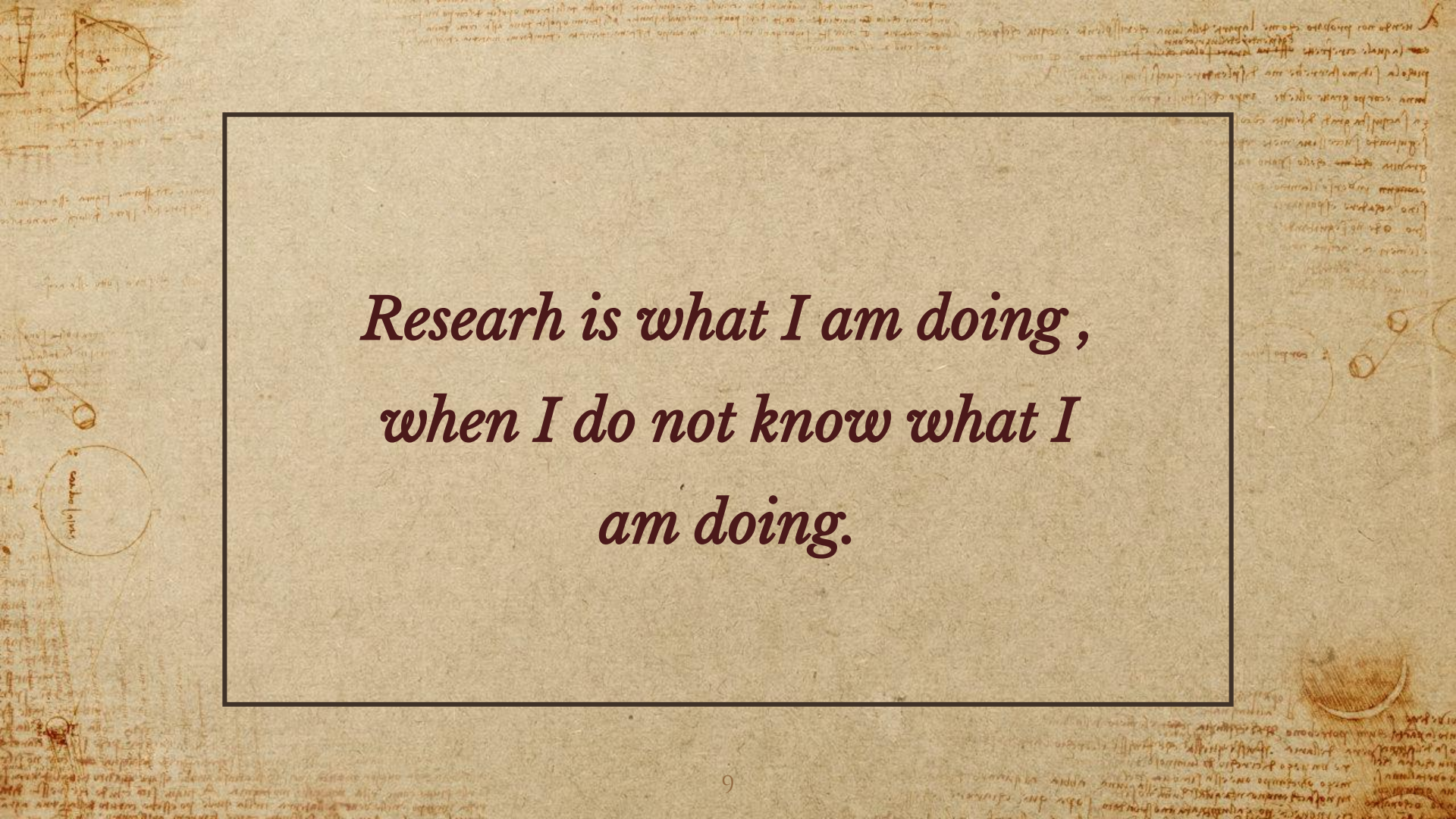


# BIOMARKERS BASED INVESTIGATIONS

---

- ❖ IL6
- ❖ IL18,
- ❖ Myeloperoxidase,
- ❖ Vascular cell adhesion molecule (VCAM)
- ❖ Matrix metalloproteinases,
- ❖ Proteomics,
- ❖ **MPV**





*Research is what I am doing,  
when I do not know what I  
am doing.*





***MPV HAS BEEN RECOGNIZED AS A MARKER OF  
CARDIOVASCULAR EVENTS EVEN IN NORMAL POPULATION***



# *METHOD & PARTICIPANTS*

---

## ✦ Cross-Sectional Study

✦ 2016-2018

✦ 42 patients

▮ ≤ 18 years

▮ At least 6 months  
under dialysis

▮ HD or CAPD

✦ 60 control group

## Exclusion criteria for case group:

✦ uncontrolled HTN

✦ CHD

✦ consuming any kind of  
antithrombotic or NSAIDs

✦ Diabetes mellitus

✦ Severe obesity

✦ Thyroid Dysfunction

✦ Malignancies & hematological  
disorders;

✦ passive smokers;

✦ presence of active infection



## *METHOD & PARTICIPANTS*

---

- ❖ Evaluating medical records since 2011 to determine any thromboembolic events, in the past (DVT, PE, CVT)
- ❖ Demographic and anthropometric data
- ❖ Venous blood samples
- ❖ Echo- Cardiography
  - ▮ Cardiac Parameters
- ❖ Doppler Ultrasound
  - ▮ CIMT
- ❖ ECG



# *ECHOCARDIOGRAPHIC PARAMETERS MEASUREMENT*

---

- ❖ The same operator, EKO 7 (Samsung), 3 MHz transducer.
- ❖ The LV systolic function
  - Ejection fraction (EF)
  - Fraction of shortening using M-mode images
  - Global longitudinal strain (GLS)
  - Strain rate (SR)
- ❖ End systolic dimensions
- ❖ End diastolic dimensions
- ❖ LVMI

**USING AUTOMATED SPECKLE-TRACKING ECHOCARDIOGRAPHY SOFTWARE**



## RESULTS:

# DEMOGRAPHIC DATA OF PARTICIPANTS

---

	<i>Patient</i>	<i>Control</i>	<i>P value</i>
<i>Age</i>	10.34± 4.72	9.90± 5.07	0.65
<i>Weight</i>	27.77± 16.34	33.62± 16.29	<b>0.02</b>
<i>Systolic BP</i>	115.23± 15.53	106.90± 13.56	<b>0.005</b>



# *RESULTS:*

## *BIOCHEMICAL PARAMETERS*

---

- ❖ Calcium × phosphorus product  $\geq 40\text{mg}^2/\text{dl}^2$  in 60% patients
- ❖ 20% of HD and 25% of CAPD: phosphorus  $> 5.5\text{mg}/\text{dl}$
- ❖ PTH : 14%  $> 200\text{ pg}/\text{mL}$ .
- ❖  $\text{Kt}/\text{V} \geq 1.3$  in 80% HD
- ❖  $\text{URR} \geq 65\%$  in 80% HD



# HEMATOLOGIC PARAMETERS IN THE PARTICIPANTS

---

Parameters	Patients	Control	P Value
RBC	4.28± 0.78	4.35± 0.62	0.58
Hemoglobin	11.16± 1.72	11.35± 1.02	0.5
Hematocrite	34.56± 5.61	34.26 3.63	0.7
Platelet	226.11± 111.93	317.93± 131.92	<b>0.0001</b>
MPV	9.26± 1	8.8± 0.56	<b>0.009</b>



## CARDIAC INDICES IN THE PARTICIPANTS

Cardiac Indices	Patients	Control	P Value
CIMT (mm)	0.41 0.09	0.33 0.06	<b>0.0001</b>
Abnormal CIMT %	21 (50%)	5 (8.3%)	<b>0.0001</b>
LVMI g/m <sup>2</sup>	109.73 77.35	75.9 33.34	<b>0.003</b>
LVH %	21 (50%)	6 (10%)	<b>0.0001</b>
EDD mm	35.76 10.71	25.03 6.88	<b>0.0001</b>
EF %	69.71 9.17	71.6 5.7	0.2
Strain Rate /s	1.8 0.45	1.95 0.15	<b>0.01</b>
Global Longitudinal Strain	-18.53 3.05	-19.68 1.49	<b>0.01</b>



## CORRELATIONS BETWEEN PLT AND MPV WITH DEMOGRAPHIC, BIOCHEMICAL, HEMATOLOGICAL, AND CARDIAC MECHANICS PARAMETERS IN PATIENTS

---

Variable	Platelets ( $\times 10^3/\mu\text{L}$ )		MPV (fL)	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age	-0.046	<b>0.002</b>	0.63	<b>0.0001</b>
BMI	-0.39	<b>0.01</b>	0.44	<b>0.003</b>
Systolic BP	-0.35	<b>0.02</b>	-0.07	0.65
AST	0.26	0.09	-0.31	<b>0.04</b>
Cholesterol	0.45	<b>0.003</b>	-0.25	0.1
CRP	-0.34	<b>0.02</b>	0.48	<b>0.001</b>



## CORRELATIONS BETWEEN PLT AND MPV WITH DEMOGRAPHIC, BIOCHEMICAL, HEMATOLOGICAL, AND CARDIAC MECHANICS PARAMETERS IN PATIENTS

Variable	Platelets ( $\times 10^3/\mu\text{L}$ )		MPV (fL)	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
RBC	0.16	0.29	0.31	<b>0.04</b>
Hgb	-0.03	0.85	0.42	<b>0.005</b>
Hct	-0.009	0.95	0.5	<b>0.001</b>
PLT			-0.39	<b>0.009</b>
LVMI	-0.5	<b>0.001</b>	0.39	<b>0.01</b>
EDD	-0.45	<b>0.002</b>	-0.26	0.08
EF	0.07	0.63	-0.32	<b>0.03</b>

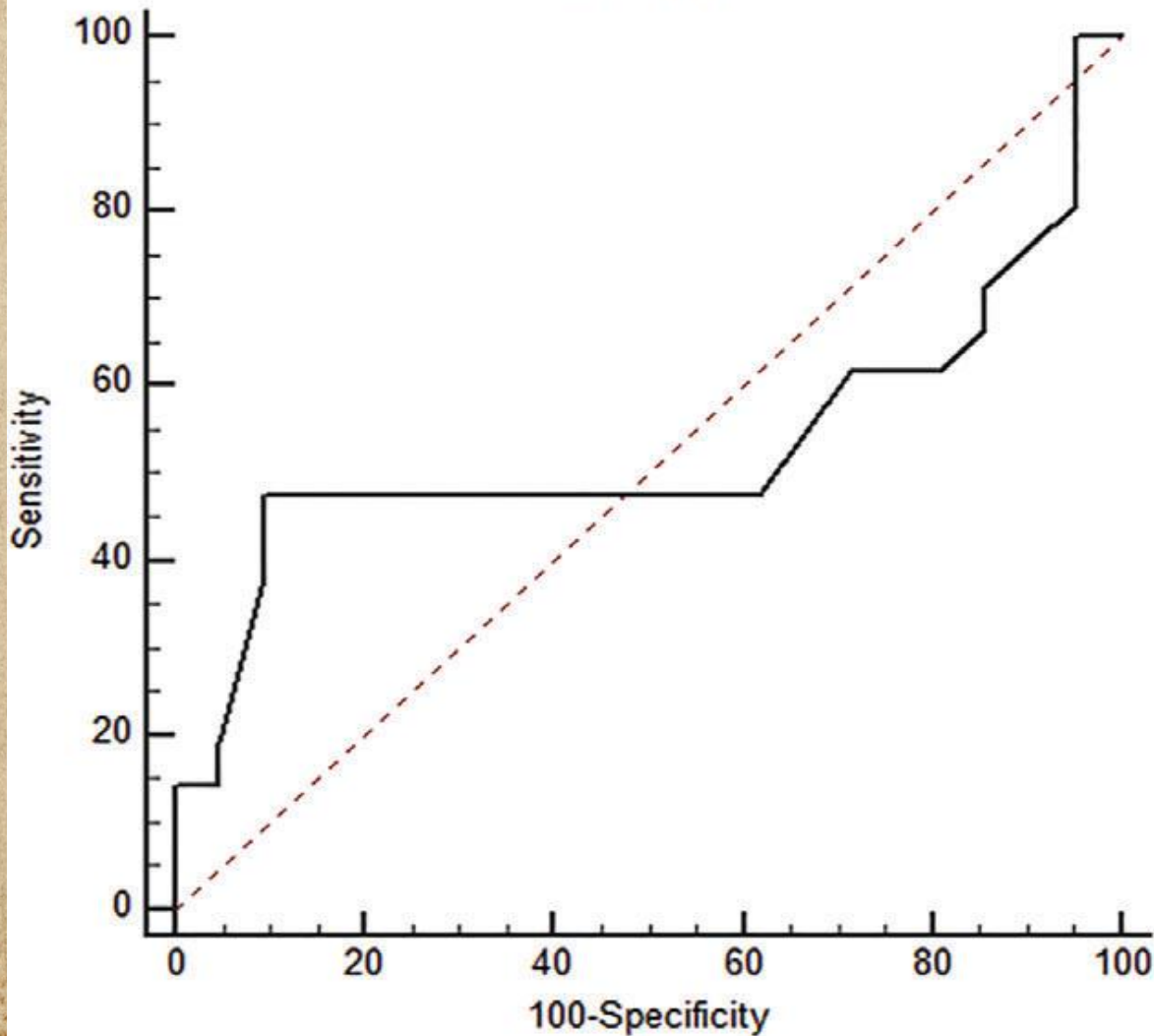


# ROC CURVE ANALYSIS

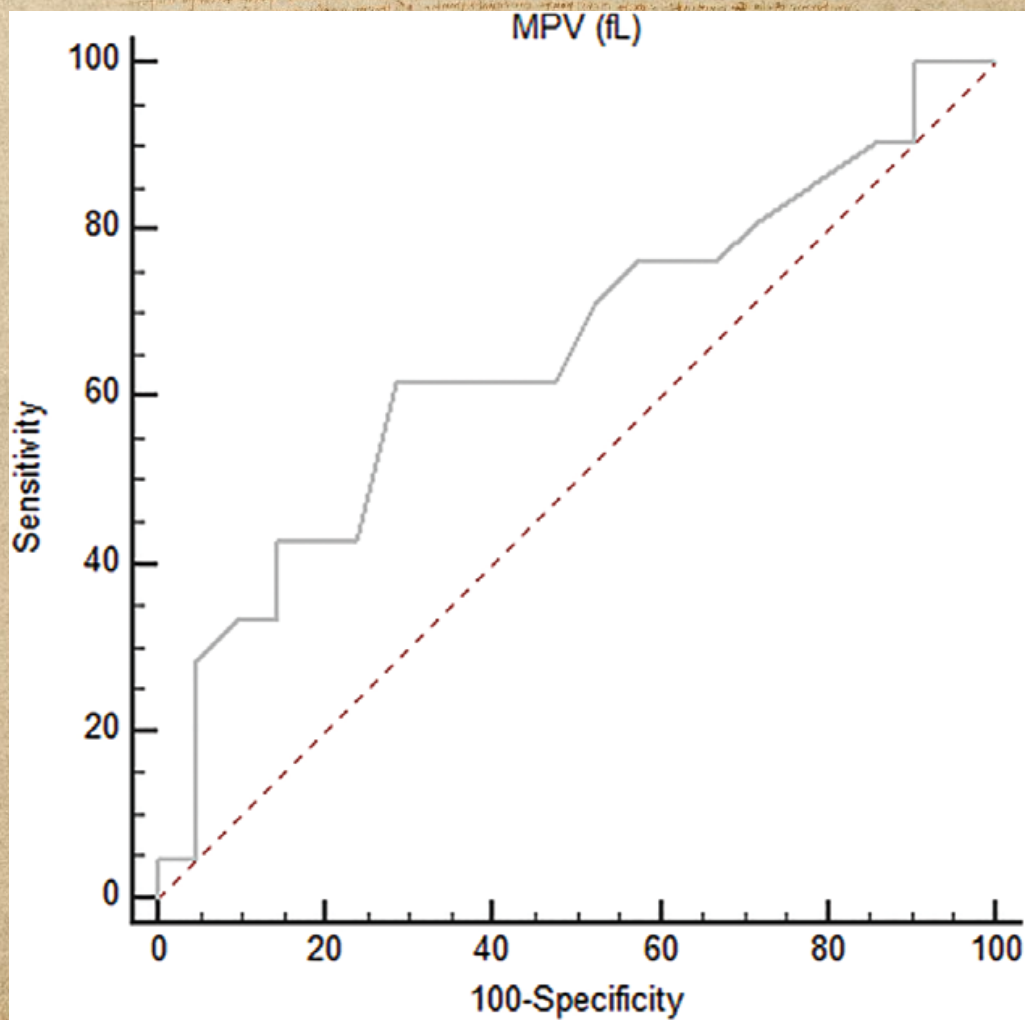
---

- ❖ The AUC for MPV in predicting abnormal CIMT equals to 0.53 ( $P = 0.74$ )
  - ▮ 47.62% sensitivity and 90.48% specificity at 9.35 fL cut-off (Fig. 1)
- ❖ The AUC of MPV for diagnosis LVH was 0.65 ( $P = 0.07$ )
  - ▮ 61.9% sensitivity and 71.43% specificity at 9.35 fL cut-off (Fig. 2).











# CONCLUSION

---

- ❖ MPV was correlated with LVMI and ejection fraction in children under dialysis.
- ❖ MPV measurement did not show an appropriate predictive value in determining left ventricular hypertrophy and subclinical atherosclerosis in this population.



