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ANALYSIS OF OXIDATIVE STRESS AS A MARKER OF CARDIOVASCULAR RISK IN CHILDREN ON REGULAR HEMODIALYSIS

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Abstract:
Introduction: *Chronic kidney disease (CKD) is a noteworthy general health issue around the world, and its fundamental outcomes incorporate loss of renal capacity prompting end-organize renal malady (ESRD), expanded danger of cardiovascular ailment (CVD), critical increment in horribleness and mortality, and a diminishing in health-related personal satisfaction.* ***Aims and objectives****: The basic aim of the study is to analyze the oxidative stress and total antioxidant capacity as a biomarker of cardiovascular risk in those children who are on regular hemodialysis.* ***Methods:*** *This cross sectional study was conducted at Children Hospital Lahore during February 2018 till September 2018. The data were collected from the age of less than 18 years children of both sexes. There were 50 children who was selected for this study. At the season of the examination, every one of the patients were on ordinary three HD sessions for every week; each time for 3– 4 h (all out 12 h week by week) for over 3 months with polysulfone dialyzing films, after creatinine freedom had fallen underneath 8– 12 or potentially pharmacological treatment and diet had demonstrated lacking to control clinical side effects. The mean dialysis term was 2.18±1.36.* ***Results:*** *The information were gathered from 50 dialysis patients. The mean age of this investigation is 15years. We gathered all the statistic information of patients. At before-dialysis session, span of malady emphatically associated with TPX, at the same time, adversely connected with TAC. At after-dialysis session, HIF-1α adversely corresponded with each of TPX and OSI; while, OSI decidedly associated with TPX.* ***Conclusion:*** *It is inferred that HD patients, the clinical and prognostic centrality of oxidative status related with cardiovascular hazard factors is altogether different from the all inclusive community.*

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INTRODUCTION:

Chronic kidney disease (CKD) is a noteworthy general health issue around the world, and its fundamental outcomes incorporate loss of renal capacity prompting end-organize renal malady (ESRD), expanded danger of cardiovascular ailment (CVD), critical increment in horribleness and mortality, and a diminishing in health-related personal satisfaction. Chronic kidney sickness (CKD) is connected with a truly expanded danger of cardiovascular dismalness and mortality [1]. Different assistant and helpful changes of the cardiovascular structure, for instance endothelial brokenness, vein setting, left ventricular hypertrophy (LVH) and updating of the vessel divider with hyperplasia and calcification occur from the get-go all through CKD (mastermind 2-4 CKD) and add to the undeniable danger of ischemic cardiovascular sickness (CVD) and sudden heart death [2]. While a hindered renal limit can bother "customary" chance variables like hypertension, dyslipidaemia, exacerbation, and oxidative weight, the going with disintegrating of mineral homeostasis and subsequently furthermore bone processing is in all likelihood the key player inciting animated CVD [3]. To highlight the central occupation of mineral assimilation for both, cardiovascular and skeletal genuineness, the term chronic kidney illness mineral bone issue (CKD-MBD) was created starting late [4].

Cardiovascular illness (CVD) is the huge explanation behind dreariness and mortality in patients with end-orchestrate renal ailment (ESRD) on haemodialysis (HD). Since ESRD once in a while results from hypertension and diabetes mellitus, the expanded CVD hazard in these patients has been believed to be the delayed consequence of these essential diseases [5]. Before long, it has been illuminated how ESRD addresses fundamentally a CVD hazard factor self-sufficiently by both hypertension and diabetes mellitus [6].

This incited the wide affirmation that chronic cell hypoxia of the kidney is the last ordinary pathway in the development of CKD provoking inescapable kidney disillusionment [8]. A get-together of elucidation factors, appointed hypoxia inducible interpretation factors, are unequivocally prompted by low tissue oxygen strain and are most likely going to have work in the oxygen-recognizing segment and reparative reaction [9].

Aims and objectives

The basic aim of the study is to analyze the oxidative stress and total antioxidant capacity as a biomarker of cardiovascular risk in those children who are on regular hemodialysis.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted at Children Hospital Lahore during February 2018 till September 2018. The data were collected from the age of less than 18 years children of both sexes. There were 50 children who was selected for this study. At the season of the examination, every one of the patients were on ordinary three HD sessions for every week; each time for 3– 4 h (all out 12 h week by week) for over 3 months with polysulfone dialyzing films, after creatinine freedom had fallen underneath 8– 12 or potentially pharmacological treatment and diet had demonstrated lacking to control clinical side effects. The mean dialysis term was 2.18±1.36.

In patients, blood tests were drawn preceding and after hemodialysis session. Pattern lab examinations were done for patients and controls including total blood check, serum urea and creatinine, blood vessel pH, blood vessel blood gases and disease screening included blood and urinary societies by standard strategies.

Oxidative Status

Oxidative pressure and natural cell reinforcement potential assurance were performed by utilizing photometric estimation units and a free extreme analyzer framework gave spectrophotometric gadget peruser. The BAP test gives a general proportion of the organic cell reinforcement potential estimating the blood grouping of cancer prevention agents equipped for decreasing the iron from ferric to the ferrous structure (cancer prevention agent hindrance). Results are communicated in µmol/L of the decreased ferric particles.

Statistical analysis

The data were analyzed using SPSS version 16.0. The values were expressed in mean and standard deviation.

RESULTS:

The information were gathered from 50 dialysis patients. The mean age of this investigation is 15years. We gathered all the statistic information of patients. The mean estimation of Urea is 64.34±2.44 mg/dl). All the statistic values are introduced in table 01.

Table 01

Parameters	**Mean values**
Albumin (g/dl)	6.567±3.27
Cholesterol, total (mg/dl)	154.8±4.21
HDL cholesterol (mg/dl)	44.65±3.21
LDL cholesterol (mg/dl)	79.65±3.66
C reactive protein (mg/dl)	12.01±2.11
Uric acid (mg/dl)	5.76±0.19
Urea (mg/dl)	64.34±2.44
Iron, total (µg/dl)	68.34±4.81
Transferrin (mg/dl)	149±5.17
Ferritin (ng/mL)	506.9±6.21
Protein, total (g/dL)	6.10±0.12

At before-dialysis session, span of malady emphatically associated with TPX, at the same time, adversely connected with TAC. At after-dialysis session, HIF-1α adversely corresponded with each of TPX and OSI ; while, OSI decidedly associated with TPX.

Table 02: Correlations among the measured parameters in CKD patients at before- and after-dialysis settings

Parameters	**Duration**	**Pyruvate**	**Lactate/Pyruvate ratio**	**HIF-1α**	**VEGF**	**TAC**	**Total peroxides**
Pyruvate							
Before dialysis	−0.193(0.234)						
After dialysis	−0.095(0.580)						
HIF-1α							
After dialysis	−0.186(0.249)	0.015(0.929)	0.229(0.156)				
TAC							
Before dialysis	0.265 (0.098)	−0.147(0.366)	−0.142(0.384)	0.068(0.676)	−0.206(0.202)		
After dialysis	0.022 (0.894)	−0.148(0.361)	0.105(0.517)	−0.220(0.173)	−0147(0.366)		
Total peroxides							
Before dialysis	−0.017(0.918)	−0.194(0.230)	0.128(0.430)	−0.138(0.394)	0.229(0.156)	−0.247(0.124)	
After dialysis	0.283 (0.077)	0.070(0.668)	−0.204(0.207)	**−0.529(0.001)**	−0.006(0.972)	0.168(0.301)	

Oxidative stress index							
Before dialysis	−0.093(0.566)	0.161(0.322)	0.156(0.337)	−0.172(0.287)	0.245(0.128)	**−0.469(0.002)**	**0.969(0.001)**
After dialysis	0.285 (0.075)	0.113(0.489)	−0.240(0.136)	**−0.459(0.003)**	0.062(0.705)	−0.155(0.340)	**0.944(0.001)**

Data shown are r value (*P*< value). HIF-1α= hypoxia induced factor-1α, VEGF= vascular endothelial growth factor. TAC = total antioxidant capacity.

DISCUSSION:

Relative hypoxia, as the critical activator of hypoxia-inducible factor, is discernible in chronic kidney malady tissues free of etiology and is thought to result from a mix of fundamental and helpful changes that consolidate; decreased peritubular circulation system related with glomerular harm, hairlike rarefaction, vasoconstriction, luminal narrowing of atherosclerotic vessels [11], expanded oxygen ask for from hyperfiltration and adjusted hypertrophy, confined oxygen dispersal as a result of extracellular framework improvement, and renal shortcoming [12]. Chronically debilitated patients on HD exist in uncommon condition in light of the way that their survival is poor upon medicines which are operational simply 12– 18 h for every week in six hour sessions. This technique subjects these patients to inestimable startling changes in the internal condition, especially fast moves in pH. In this examination, the before-dialysis measurements of plasma lactate, VEGF were out and out higher stood out from healthy controls while, lactate/pyruvate extent was fundamentally higher appeared differently in relation to after-dialysis level [13]. The lactate level would when all is said in done fall with dialysis, at any rate to some degree inferable from this strategy. In like manner plasma level was fundamentally lifted in after-dialysis session appeared differently in relation to healthy controls [14]. Hypoxia is joined by an immense augmentation in blood lactate and outrageous fundamental acidosis as a quick effect of anaerobic assimilation [15]. Beside the quick effects of anaerobic absorption, catecholamine-provoked instigation of cell glycolysis and resulting mix of lactate heightens the expanded fundamental lactate. In such conditions, amassed pyruvate is prepared into lactate [16].

CONCLUSION:

It is inferred that HD patients, the clinical and prognostic centrality of oxidative status related with cardiovascular hazard factors is altogether different from the all inclusive community. Despite the fact that an immediate causality can't be construed from such sort of correlative examinations.

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