**Associations of Cardio-Renal Biomarkers in Chronic Kidney Disease patients with Non-Alcoholic Fatty Liver Disease**

**Introduction:** Non-Alcoholic Fatty Liver Disease (NAFLD) and Chronic Kidney Disease (CKD) are both associated with increased risk of cardiovascular disease(CVD). Novel biomarkers may aid early diagnosis and guide prognosis. We studied the associations of Cardio-Renal biomarkers in a cohort of non-dialysis dependent CKD (NDD-CKD) patients with NAFLD.

**Methods:** Patients with and without ultrasound characteristics of NAFLD were identified within the Salford Kidney Study(SKS), a large single-centre NDD-CKD cohort study.

Available cardio-renal biomarker (KIM-1, NGAL, MPO, Anti ApoA1, NTproBNP and HsTNT) results at SKS baseline were used in this study. Associations of biomarkers with NAFLD and major outcomes (MACE, mortality and ESKD) were studied using Cox-Regression analysis.

**Results:** Of the 3061 patients registered in SKS, 630 patients (NAFLD-137, Normal-493) had had liver US, complete datasets and analysis of baseline CRBM. Demographics and median values (with IQR) of biomarkers are expressed in the Table-1.In a Multivariable Cox-Regression Model adjusted for age, gender, NAFLD Status and baseline history of cardiovascular risk factors, TropT (HR:1.008, P=0.021), NGAL (HR:1.003, P<0.001) and KIM-1(HR-1.001, P=0.005) showed associations with MACE. All biomarkers except Anti Apo-A1 showed a positive association with mortality with Trop T showing a strong association HR 1.012, P<0.001. Higher KIM-1 and NGAL were associated with progression to ESKD. (Table-2)

**Conclusions:** The biomarker associations were very much reflective of the renal and cardiac status of the patient group. A strong independent association of biomarkers was observed with outcomes in this cohort, but NAFLD was not independently associated with any particular pattern.

**Table-1 Demographics and baseline biomarker characteristics**

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| --- | --- | --- | --- |
| **VARIABLE** | **NAFLD (n=137)** | **NORMAL (n=493)** | **P-VALUE**  **NAFLD vs Normal** |
| AGE (years; range) | 65 (59-72) | 67 (54-74) | 0.237 |
| Gender (Male) | 84 (61.3%) | 294 (59.6%) | 0.723 |
| Anti-Apo-A1(OD) | 0.51 (0.31-0.74) | 0.48 (0.30-0.77) | 0.814 |
| KIM-1 (pg/ml) | 364.4 (254.7-561.7) | 338.6 (220.5-527.9) | 0.137 |
| MPO (ng/ml) | 28.7 (21.5-52.9) | 36.5 (20.9-59.7) | **0.055** |
| NGAL (ng/ml) | 191.9 (142.8-262.1) | 214.6 (136-323.8) | **0.054** |
| NTproBNP (pg/ml) | 179.7(78-544) | 299.7 (116.6-958.9) | **0.005** |
| HsTropT (ng/L) | 14.9 (7.8-23.7) | 15.7 (7.9-28.7) | 0.541 |
| eGFR (CKD-EPI) ml/min/1.73m2 | 39.6 (28.6-58.2) | 31.2 (20.4-44.1) | **0.000** |

**Table-2** **Biomarker association with renal outcomes**

|  |  |  |
| --- | --- | --- |
| Variable | HR(95%CI) | p-Value |
| MPO (ng/ml) | 0.999(0.995-1.003) | 0.632 |
| AAA 1 (OD) | 1.132(0.712-1.802) | 0.600 |
| NT pro BNP (pg/ml) | 1(1-1) | 0.289 |
| Hs cTnT (ng/L) | 1.006(0.996-1.017) | 0.251 |
| KIM-1 (pg/ml) | 1.001(1-1.001) | **0.000** |
| NGAL (ng/ml) | 1.004(1.002-1.005) | **0.000** |