

Using NT-ProBNP for risk stratification in individuals with diabetes: a retrospective study from a large diabetes centre in the UAE

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Background

Patients with diabetes are at higher risk for developing cardiac and renal complications. N-terminal (NT)-pro hormone BNP (NT-proBNP) is a sensitive biomarker for early detection of cardiac and renal failure.

Aims

In this study, we investigated associations of high and low NT-proBNP levels with clinical and metabolic parameters among patients with diabetes.

Methods

Patients with diabetes with available NT-ProBNP measurement and with an eGFR >45 were identified from ICLDC electronic database. Demographic and clinical parameters were extracted. Patients were grouped based on serum NT-proBNP levels; ≤ 125 pg/ml (NT-low) and > 125 pg/ml (NT-high). Statistical analysis were done in SPSS 26.0; results are presented as median (IQR).

Results

Out of 590 patients (56.1% females; 76.6% Emiratis), 209 (35.4%) had NT-ProBNP > 125 pg/ml. Clinical and demographic parameters were compared between NT-high and NT-low patients (Table1). NT-high patients were significantly older than NT-low (61.3 vs 67.5 years, $p < 0.001$) and had longer duration of diabetes (13.1 v 10.4 years, $p = 0.011$). Compared to NT-low, NT-high patients had higher calculated 10-year CV risk (13.12 v 8.72, $p < 0.001$), troponin (0.01 v 0.007 ng/ml, $p < 0.001$), creatinine (84.6 v 69.4 mg/dL, $p < 0.001$), hs-CRP (3.69 v 1.99 mg/L, $p = 0.009$), urinary microalbumin (22.61 v 13.38, $p = 0.025$) and lower eGFR [83.82 v 100.76 ml/min, $p < 0.001$], albumin (41.60 v 43.35 g/L, $p = 0.001$), Haemoglobin (125 v 129 g/dL, $p = 0.031$), HDL (1.19 v 1.27 mmol/L, $p = 0.011$), LDL (2.01 v 2.18 mmol/L, $p = 0.024$), non-HDL (2.20 v 2.47 mmol/L, $p = 0.043$), total cholesterol (3.49 v 3.81 mmol/L, $p = 0.005$).

Conclusion

Observations from our study suggests that in patients with diabetes, elevated serum NT-ProBNP is significantly associated with worsening of parameters associated with cardiac and

renal complications. Further prospective studies are warranted to ascertain the causality and clinical value of using NT-ProBNP to monitor the risk for diabetes-related complications.

Table 1: Comparison of demographic and clinical parameters between NT-low (≤ 125 pg/ml) and NT-high (>125 pg/ml) patients with Diabetes

Parameter	NT-low	NT-high	P-value *
Age (Years)	61.3 (54.2-67.2)	67.5 (60.0-74.6)	0.000
Weight (Kg)	83.15 (71.65-95.00)	80 (72.00-93.03)	0.328
BMI (Kg/m ²)	32.35 (27.92-37.04)	31.93 (27.60-36.38)	0.536
CV risk (10-year risk)	8.72 (4.87-15.30)	13.12 (7.64-24.96)	0.000
eGFR (ml/min/1.73 m ²)	100.76 (81.62-120.66)	83.82 (64.60-104.14)	0.000
HbA1c (%)	7.1 (6.4-8.2)	7.4 (6.6-8.5)	0.049
high-sensitivity C-reactive protein (hs-CRP)(mg/L)	1.99 (0.70-3.02)	3.69 (2.64-7.66)	0.009
Haemoglobin (g/dL)	129 (116.25-140.00)	125 (112.00-137.00)	0.031
Creatine kinase (units/L)	82.7 (56.00-113.20)	71.9 (52.60-119.00)	0.587
Albumin (g/L)	43.35 (41.70-45.20)	41.6 (39.90-43.50)	0.000
Microalbumin (mg/dL)	13.38 (4.51-36.26)	22.61 (5.69-83.95)	0.025
Creatinine (mg/dL)	69.4 (57.90-85.30)	84.6 (66.13-98.55)	0.000
HDL-c (mmol/L)	1.27 (1.07-1.50)	1.19 (1.04-1.40)	0.011
LDL-c (mmol/L)	2.18(1.72-2.89)	2.01 (1.58-2.68)	0.024
Non-HDL-c (mmol/L)	2.47(1.92-3.21)	2.2 (1.71-2.95)	0.043
Total Cholesterol (mmol/L)	3.81 (3.23-4.58)	3.49 (3.03-4.20)	0.005
BP systolic (mmHg)	128 (117.00-142.00)	130 (117.00-147.00)	0.269
BP Diastolic (mmHg)	74 (67.00-80.00)	72 (64.00-80.00)	0.050
Troponin (ng/ml)	0.01 (0.005-0.011)	0.01 (0.008-0.022)	0.000
Lipoprotein(a) (mg/dL)	51 (16.25-88.00)	29 (10.75-108.00)	0.376
Age at Diagnosis (Years)	49.48 (40.54-56.45)	52 (43.23-62.00)	0.001
Duration of Diabetes (Years)	10.45 (4.88-17.55)	13.11 (6.31-20.33)	0.011

*Mann-Whitney U test