MICRO LABS LIMITED

Diabetes Update

Vol. 1 | Issue 11 | 2020

Dear Doctor,

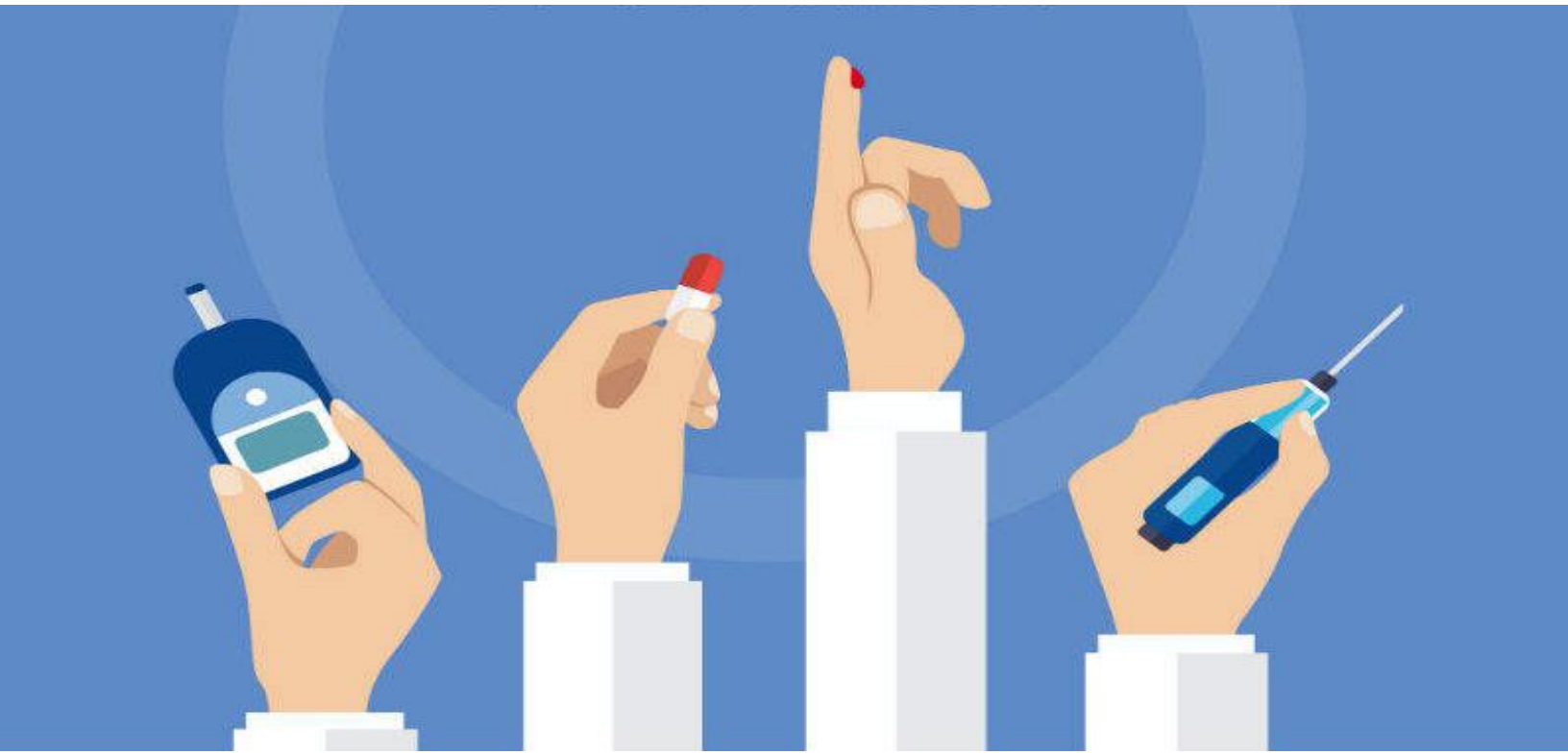
Greetings from Micro Labs Limited. We are happy to bring you **"DIABETES UPDATE"** which contains latest and interesting news in the field of Diabetes and Endocrinology.

- Association of Preoperative Blood Glucose Level and Postsurgical Gastroparesis Syndrome after Subtotal Gastrectomy
- Glycemic Characteristics and Clinical Outcomes of COVID-19 Hospitalized Patients
- Evaluation of oxidative stress levels in obesity and diabetes by the free oxygen radical test

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited



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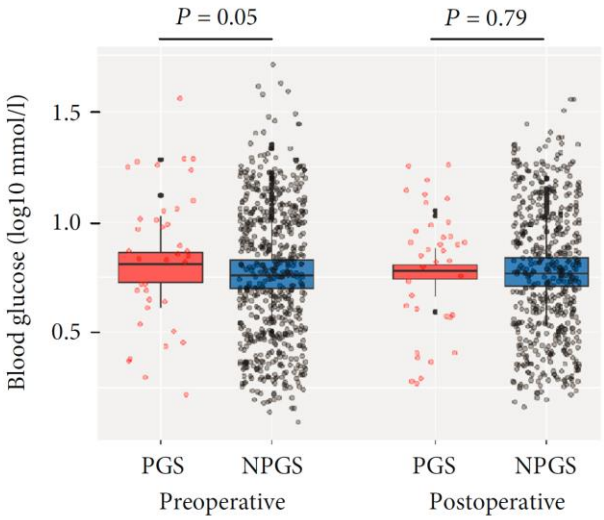
Association of Preoperative Blood Glucose Level and Postsurgical Gastroparesis Syndrome after Subtotal Gastrectomy

Postsurgical gastroparesis syndrome (PGS) presents with symptoms suggesting gastric retention, including delayed gastric emptying, in the absence of mechanical obstruction. Diabetes has been found to be associated with gastroparesis. This study aimed to investigate the relationship between preoperative blood glucose level and PGS and develop a nomogram for individualized prediction.

This study retrospectively analyzed 633 patients with gastric cancer who underwent subtotal gastrectomy. Preoperative blood glucose levels were evaluated via receiver operating characteristic (ROC) curve analysis. Chi-squared tests and multivariable logistic regression analyses were used to develop a predictive model for PGS, presented as a nomogram, which was assessed for its clinical usefulness.



Thirty-eight of 633 patients were diagnosed with PGS. Based on the ROC curve analysis, the preoperative blood glucose cutoff value for PGS was 6.25 mmol/L.

A model incorporating the independent predictors (P < 0:1 in multivariate logistic regression analysis) was developed and presented as a nomogram. (figure 2).

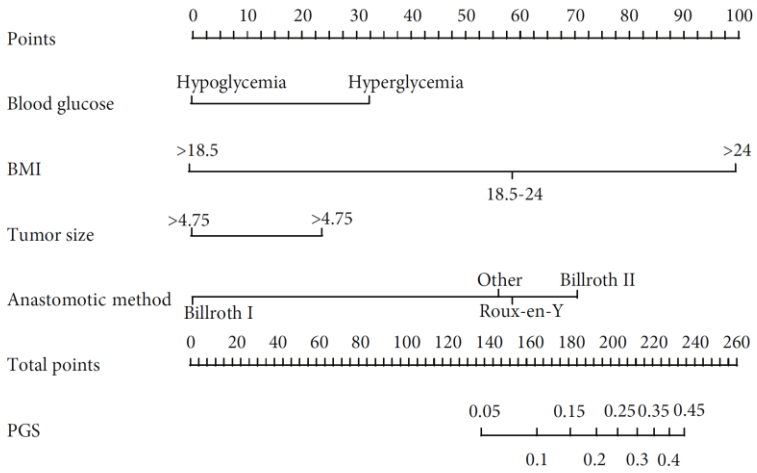
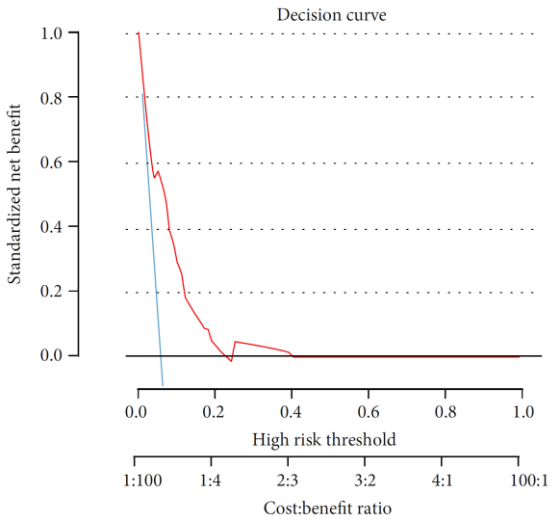


FIGURE 2: Developed nomogram.

The nomogram showed good discrimination with a C-index of 0.710. Decision curve analysis for the nomogram is presented in Figure 3. The predictors of PGS included preoperative hyperglycemia (odds ratio (OR) 2.3, P = 0:03), body mass index (BMI; OR 0.21, P = 0:14 for BMI < 18:5 and OR 3.0, P = 0:004 for BMI > 24), and the anastomotic method (OR 7.3, P = 0:001 for Billroth II and OR 5.9, P = 0:15 for Roux-en-Y). The predictive model showed good discrimination ability, with a C-index of 0.710, and was clinically useful.



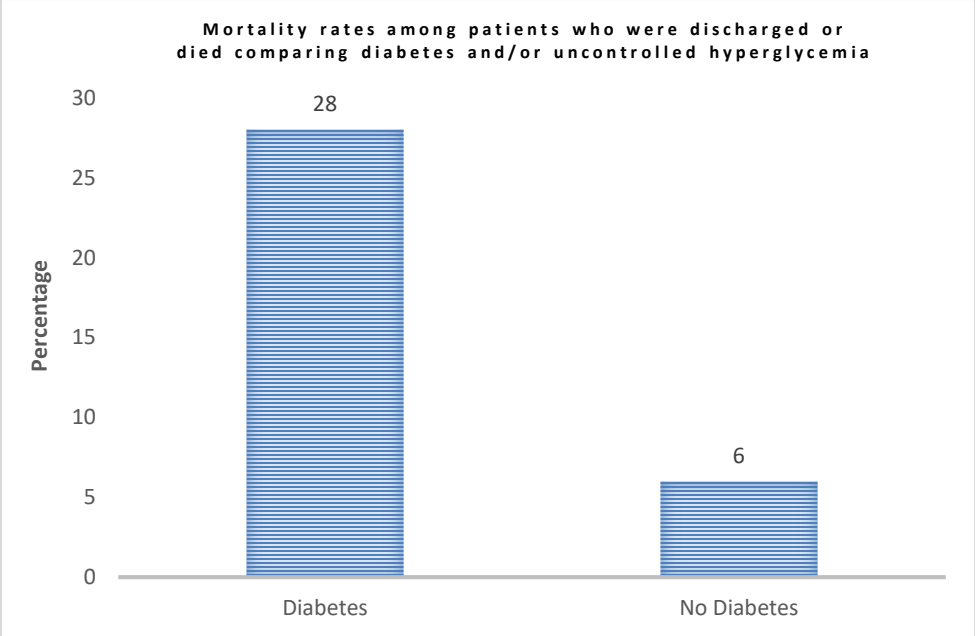
This is the first study to determine the relationship between preoperative blood glucose level and PGS, showing that pre-operative hyperglycemia effectively predicts PGS.

Source: Mao C et al. J Diabetes Res. 2020. 7058145, 1-7.

Glycemic Characteristics and Clinical Outcomes of COVID-19 Hospitalized Patients

Diabetes has emerged as an important risk factor for severe illness and death from COVID-19. This retrospective observational study of laboratory-confirmed COVID-19 adults evaluated glycemic and clinical outcomes in patients with and without diabetes and/or acutely uncontrolled hyperglycemia hospitalized March 1 to April 6, 2020. Diabetes was defined as A1C ≥6.5%. Uncontrolled hyperglycemia was defined as ≥2 blood glucoses (BGs) > 180 mg/ dL within any 24-hour period. Data were abstracted from Glytec's data warehouse.

Among 1122 patients in 88 U.S. hospitals, 451 patients with diabetes and/or uncontrolled hyperglycemia spent 37.8% of patient days having a mean BG > 180 mg/dL. Among 570 patients who died or were discharged, the mortality rate was 28.8% in 184 diabetes and/or uncontrolled hyperglycemia patients, compared with 6.2% of 386 patients without diabetes or hyperglycemia ($P < .001$). Among the 184 patients with diabetes and/or hyperglycemia who died or were discharged, 40 of 96 uncontrolled hyperglycemia patients (41.7%) died compared with 13 of 88 patients with diabetes (14.8%, $P < .001$). Among 493 discharged survivors, median length of stay (LOS) was longer in 184 patients with diabetes and/or uncontrolled hyperglycemia compared with 386 patients without diabetes or hyperglycemia (5.7 vs 4.3 days, $P < .001$).



Patients with uncontrolled hyperglycemia had a particularly high mortality rate.

Among hospitalized patients with COVID-19, diabetes and/or uncontrolled hyperglycemia occurred frequently. These COVID-19 patients with diabetes and/or uncontrolled hyperglycemia had a longer LOS and markedly higher mortality than patients without diabetes or uncontrolled hyperglycemia. Patients with uncontrolled hyperglycemia had a particularly high mortality rate.

Source: Bode B et al. J Diabetes Sci Technol. 2020 May 9:1932296820924469. doi: 10.1177/1932296820924469. [Epub ahead of print]

Evaluation of oxidative stress levels in obesity and diabetes by the free oxygen radical test

Worldwide, obesity and type 2 diabetes mellitus (T2DM) have emerged in epidemic proportions. This problematic issue has affected both high- and low-income countries alike, and by 2030 the global prevalence of T2DM is expected to surpass 7.5% (from 6.2% in 2010). Both obesity and T2DM are associated with increased levels of oxidative stress.

This study aimed to evaluate oxidative stress levels in obese non-diabetic and obese diabetic subjects, and to identify possible correlations between biochemical and oxidative stress parameters in these patients.

A total of 102 obese subjects were recruited from outpatient clinic. Oxidative stress was evaluated from a single drop of capillary blood using the CR3000 analyser (Callegari, the Catellani group, Parma, Italy). Oxidative stress was evaluated from a single drop of capillary blood. Reactive oxygen species (ROS) were evaluated using the free oxygen radical test (FORT). The free oxygen radical defence (FORD) assay was used to measure antioxidant levels.

In this study, we included 102 obese patients (mean age: 62.14 ± 10.19 years, 79.41% female) and 30 healthy controls (mean age: 44.60 ± 18.76 years, 70.00% female). Obese patients had higher BMI (35.75 ± 3.75 kg/m2 vs 24.56 ± 1.78 kg/m2, P < 0.0001).

FORT levels were higher in obese subjects (3.04 ± 0.36 mmol/L H2O2) vs controls (2.03 ± 0.14 mmol/L H2O2) (P < 0.0001). FORD levels were lower in obese subjects (1.27 ± 0.13 mmol/L Trolox) vs controls (1.87 ± 1.20 mmol/L Trolox) (P = 0.0072).

Obese diabetic subjects had higher FORT values (3.16 ± 0.39 mmol/L H2O2) vs non-diabetic counterparts (2.99 ± 0.33 mmol/L H2O2) (P = 0.0233). In obese subjects, FORT values correlated positively with body mass index (BMI) (r = 0.48, P = 0.0000), waist circumference (WC) (r = 0.31, P = 0.0018), fasting plasma glucose (FPG) (r = 0.31, P = 0.0017), total cholesterol (TC) (r = 0.27, P = 0.0068) and uric acid (r = 0.36, P = 0.0001). FORD values correlated negatively with BMI (r = -0.43, P = 0.00001), WC (r = -0.28, P = 0.0049), FPG (r = -0.25, P = 0.0130), TC (r = - 0.23, P = 0.0198) and uric acid (r = -0.35, P = 0.0002). In obese diabetic subjects, FORT values correlated positively with BMI (r = 0.49, P = 0.0034) and TC (r = 0.54, P = 0.0217). FORD values were negatively associated with BMI (r = -0.54, P = 0.0217) and TC (r = -0.58, P = 0.0121).

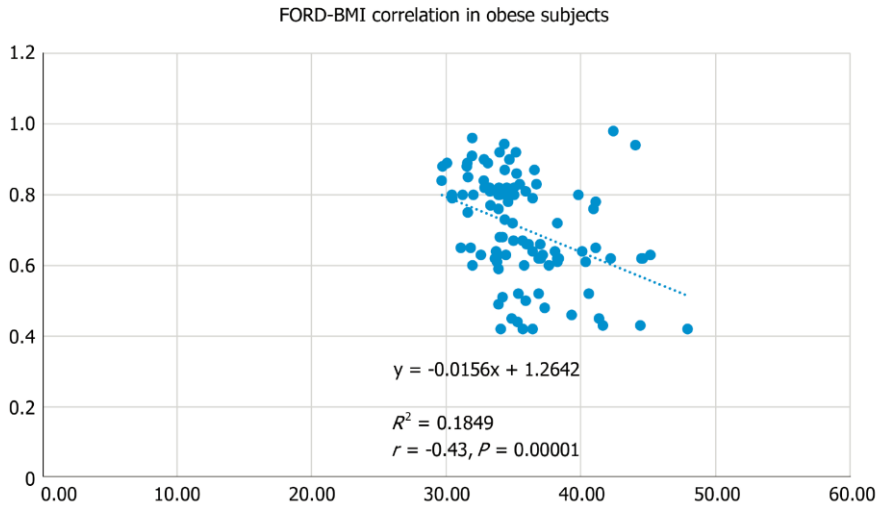


Figure 1 Correlation between free oxygen radical defence values and body mass index in obese patients.
FORD: Free oxygen radical defence; BMI: Body mass index.

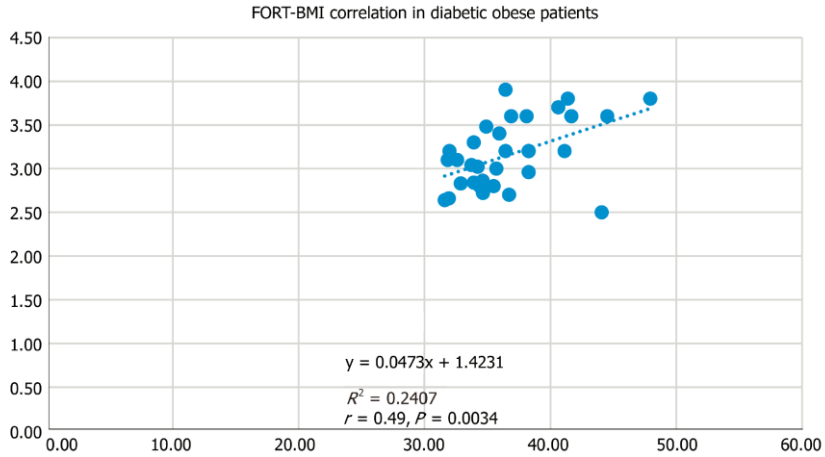


Figure 2 Correlation between free oxygen radical test values and body mass index in diabetic obese patients. FORT: Free oxygen radical test; BMI: Body mass index.

In conclusion, oxidative stress levels, as measured by the FORT and FORD assays, were higher in obese subjects vs healthy controls. ROS levels were elevated in diabetic obese patients vs obese non-diabetic patients and healthy controls. Obese patients had higher BMI, WC, FPG, TC, LDL-c, TG, UA and lower HDL-c vs healthy controls. In obese subjects, FORT levels correlated positively with BMI, FPG, TC and UA, and FORD levels correlated negatively with BMI, WC, FPG, TC and UA. Obese diabetic subjects were older, had higher FPG and lower HDL-c. In obese diabetic subjects, FORT levels correlated positively with BMI and TC, and FORD levels correlated negatively with BMI and TC. Taken together, these findings indicate that the management of obesity and (or) diabetes should also take into consideration strategies to reduce ROS levels and increase the antioxidant capacity of the body, in addition to the treatment of lipid abnormalities.

Oxidative stress levels, as measured by the FORT and FORD assays, were higher in obese subjects vs controls.

Source: Găman MA et al. World J Diabetes 2020; 11(5): 193-201