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EFFECT OF BARIATRIC SURGERY ON RENAL FUNCTION IN ASIAN COHORT

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Objectives : Investigate change in creatinine, estimated glomerular filtration rate (eGFR), urine albumin creatinine ratio (UACR) and urine protein creatinine ratio (UPCR) pre and post bariatric surgery in obese diabetic patients.

Methods : This is a retrospective, single center which included 88 patients who underwent bariatric surgery from 2008 to 2013. Two were excluded as they were on immunosuppressants. Laparoscopic Roux-En-Y gastric bypass (LGB) and Laparoscopic sleeve gastrectomy (LSG) were performed by surgeons in Singapore General Hospital. Renal parameters such as creatinine, eGFR and UACR and UPCR were obtained.
Albuminuria was categorized as normal, moderately increased (UACR>3 to 30 mg/mmol Or UPCR 0.2-0.5 g/g), severely increased (UACR>30 mg/mmol Or UPCR >0.5 g/g).
CKD-EPI equation was used to estimate GFR. Hyperfiltration is defined as eGFR more than 125 ml/min/1.73m2.
Data analysis was performed in Stata Version13.1 (StataCorp, College Station, Tx 77845, USA) and R 3.3.1 (www.r-project.org) at significance level of 5%.Generalised estimating equation (GEE) model was used to examine the differences from baseline to follow up.

Results : Baseline characteristics were age 45.7 (37.9, 52.6) years; 43% male; 47.7% Chinese, 26.7% Malay and 23.3% Indian. 76.7% had LGB and 23.3% had LSG. Median weight was109.5 (95.1, 126.7) kg and hba1c 8.3 (7.3, 9.3) %. Median creatinine was 69 (56, 85) umol/L and eGFR 103 (86.6, 113.4)ml/min/1.73m2.
When analyzed as an entire cohort, a decrease in creatinine by 9.4 (5.3, 13.6) umol/L from baseline was observed at year 1 (P<0.0001). An increase in eGFR by 4.25 (1.5, 7.0) ml/min/1.73m2 from baseline was observed at year 3 (P=0.0026).
On multivariate analysis, number of hypertension medications was significant (coefficient= - 3.70, 95% CI=(-5.01, -2.394)) at P value <0.0001 and age at time of surgery was significant (coefficient= -1.32, 95% CI=(-1.78, -0.864)) at P value <0.0001 in predicting eGFR.
Patients were divided into two groups, one with hyperfiltration (eGFR more than 125 ml/min/1.73m2) and the other with chronic kidney stage 3 (eGFR less than

60 ml/min/1.73m2). For hyperfiltration group, there was decrease in eGFR significant at Year 1 to 3. For chronic kidney stage 3, there was increase in eGFR significant at Year 1 to 3.
In terms of albuminuria, an increase in the proportion of patients in the normal group and decrease in proportion in the moderately increased albuminuria group were observed on follow up.
There was improvement in hba1c, weight loss and decrease in number of hypertension and proteinuria medications (such as angiotensin converting enzyme inhibitors, angiotensin receptor blockers, aldosterone antagonists, epithelial sodium channel blockers) even up to 5 years post surgery.

Conclusions : Improved glycemic control, decreased weight, decreased hyperfiltration and improved inflammatory state are possible contributing factors to improvement in UACR and eGFR post bariatric surgery.
Patients with higher number of hypertension medications tended to have worse eGFR presumably because of the poor blood pressure control. Limitations include lack of measured GFR, retrospective nature, no control group and small sample size

Keywords : batriatric surgery, diabetes mellitus, creatinine, albuminuria