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Original Article

Does weight loss due to bariatric surgery affect serum uric acid levels?

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ARTICLE INFO

Article history:

Received 11 June 2015

Accepted 13 July 2015

Available online xxx

Keywords:

Bariatric surgery

Obesity

Uric acid

ABSTRACT

Background: In the current scenario, bariatric surgery has become a popular modality for long-term weight loss among obese population. The available data mainly concentrated on its impact on diabetes, dyslipidemia, hypertension, and or metabolic syndrome. However, there is paucity in literature regarding effectiveness of laparoscopic sleeve gastrectomy on serum uric acid.

Methods and materials: In a prospective interventional study, 100 obese patients were studied for weight loss and change in serum uric acid levels postlaparoscopic sleeve gastrectomy. The subjects were enrolled for a period of 1 year. Three patients died during the study and nine were lost to follow-up. All subjects were classified according to WHO criteria of obesity, as mild, moderate, and severe obesity groups. Body weight, body mass index, and uric acid levels were determined at baseline, 3 months, and 6 months postsurgery.

Results: Statistically significant reduction in postoperative body weight and body mass index were noted in comparison to preoperative values. The preoperative mean uric acid levels for mild, moderate, and severe obese groups were 4.65, 5.91, and 6.06 mg/dl, which decreased to 2.55, 5.04, and 4.46 mg/dl at 6 months postsurgery, respectively. However, on comparison of the change in uric acid levels among the three obesity groups from 3 months to baseline ($P = 0.17$) and from 6 months to baseline ($P = 0.08$), no group was found superior in terms of reducing uric acid level after surgery.

Conclusions: Bariatric surgery reduces the body mass and leads to the significant reduction in serum uric acid levels. However, this reduction was comparable among obesity groups.

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1. Introduction

In India, obesity is emerging as an important health problem particularly in urban areas, paradoxically

coexisting with undernutrition. Almost 30–65% of adult urban Indians are either overweight or obese or have abdominal obesity.¹ Major epidemiological studies have shown positive relationship between obesity and various metabolic indices, such as hypertension, glycemic

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<http://dx.doi.org/10.1016/j.cmpr.2015.07.008>

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status, cardiovascular risk factors, and even with hyperuricemia.

Chronic hyperuricemia is the underlying cause of gout. It is not only associated with increased risk of cardiovascular disease and mortality but also cardiovascular disease risk factors, such as obesity, hypertension, diabetes, and dyslipidemia, are also associated with it.² Elevated uric acid levels are associated with obesity, particularly with visceral adiposity, via both increase in production and decrease in excretion of urate.^{3,4}

Bariatric surgery is currently the only modality that provides a significant, sustained weight loss for the patient who is morbidly obese, with resultant improvement in obesity-related co-morbidities including hyperuricemia. Only few international studies are available showing longitudinal changes in uric acid levels after bariatric surgery.⁴⁻⁸ There is no much data available on effect of bariatric surgery on uric acid levels in the Indian context.

1.1. Aim

To evaluate the effect of weight loss on levels of serum uric acid and incidence of gout following surgery in patients who have undergone bariatric surgery.

2. Methods and materials

2.1. Site of study

This was a hospital-based study conducted in the Department of Medicine, Surgery, and Institute of Minimal Access Surgery, at Sir Ganga Ram hospital, New Delhi.

2.2. Study type, duration, and sample size

This was a prospective, interventional study done in the period from April 2012 through June 2013. One hundred obese consenting patients were enrolled in the study and subjected to bariatric surgery.

The following definitions were used:

1. *Significant weight loss*: it was defined as loss of >5% of body weight of usual weight in the last 6 months.
2. *Overweight*: it was defined as body mass index >25 but <29.9.
3. *Obesity*: If the body mass index was >30, it was further classified, according to World Health Organization as mild, moderate, and severe. Mild obesity (Class I) is if body mass index was between 30 and 34.9, moderate (Class II) was between 35 and 39.9, and severe (Class III) was >40.⁹

2.3. Inclusion criteria

1. An obese patient who had underwent bariatric surgery and had documented weight loss of >5% or more of usual weight.
2. Patient who was willing to give consent.
3. Patient who was willing for follow-up till 6 months for metabolic parameters.
4. Adult patient of >18 years

2.4. Exclusion criteria

1. Any patient with <5% weight loss of basal body weight over the period of 6 months.
2. Weight loss due to medications like Orlistat, Sibutramine, and Rimobabant.
3. Weight loss in children below the age of 18 years.
4. Patient with weight loss due to medical disease like hyperthyroidism on antithyroid drugs, tuberculosis, AIDS, or chronic disease.
5. Patients who declined to give consent.
6. Pregnancy.
7. Psychiatry illness.

2.5. Serum uric acid assessment

Serum uric acid analysis was done with calorimetric Uricase assay. Blood samples were taken after overnight (10–12 h) fast. The reference range of uric acid was taken between 3.6 and 8.3 mg/dl.

Preoperative period: All enrolled subjects fulfilled the eligibility criteria for the bariatric surgery. Upper GI endoscopy was performed in all patients to exclude any upper GI pathology. All patients had endocrine, dietetic, and psychological consultations and women also had gynecological examinations. Blood samples were taken before the surgery, and 3 and 6 months after the surgery, and uric acid levels were measured.

Operative period: Under general anesthesia, laparoscopic sleeve gastrectomy was performed. Harmonical knife was used to cut gastrocolic omentum next to the wall of stomach and in the middle of gastrocolic omentum vessels. Cutoff line of the omentum reached upward to the left diaphragmatic branch and downwards approximately 4–6 cm from pylorus. The first charge separated greater curvature toward the crow's foot and following charges separated the curvature along the body of the stomach to the angle of His. The stomach was reduced to the narrow tube with a diameter of 35 F; tightness was checked by methylene blue test and drain near cutoff line was placed.

Postoperative period: Patients were discharged on 3rd postoperative day unless there was any complication. Low calorie semisolid diet with low sodium was advised to all patients for the first 2 weeks, followed by low fat and low calorie normal diet afterwards.

Follow-up: All patients were followed up for 6 months after this surgery, and uric acid levels were obtained at 3rd and 6th month postsurgery.

2.6. Statistical analysis

Statistical analysis was performed by the SPSS program for Windows, version 17.0. Continuous variables are presented as mean \pm SD, and categorical variables are presented as absolute numbers and percentage. Normally distributed continuous variables were compared using ANOVA. If the *F* value was significant and variance was homogeneous, Bonferroni multiple comparison test was used to assess the differences between the individual groups; otherwise,

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