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## Roux-En-Y Gastric Bypass Surgery Linked to Kidney Stones **CME**

News Author: Laurie Barclay, MD

CME Author: Désirée Lie, MD, MEd

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June 23, 2009 — Roux-en-Y gastric bypass surgery is associated with an increased postoperative risk for kidney stones, according to the results of a study of insurance claims data reported in the June issue of the *Journal of Urology*.

"Our study is not an indictment of bariatric surgery — the benefits of this surgery are well known," lead author Brian Matlaga, MD, from the Johns Hopkins University School of Medicine and James Buchanan Brady Urological Institute in Baltimore, Maryland, said in a news release. "Rather, we'd like to help physicians understand that their bariatric patients could be at risk for kidney stones, a condition that could be avoidable with proper preventative care."

Although mineral and electrolyte abnormalities are known to follow bariatric surgery and to increase the risk for urolithiasis, the prevalence of stone disease after bariatric surgery was previously unknown. The goal of this study was to assess the probability of being diagnosed with or treated for an upper urinary tract stone after Roux-en-Y gastric bypass surgery.

From 2002 to 2006, a total of 4639 patients who underwent Roux-en-Y gastric bypass surgery and a control group of 4639 obese patients who did not have surgery were identified from a national private insurance claims database. All patients had 3 or more years of continuous claims data. The main endpoints of the study were diagnosis and surgical treatment of a urinary stone.

Urolithiasis was diagnosed in 7.65% (355/4639) of patients after Roux-en-Y gastric bypass surgery vs 4.63% (215/4639) of obese patients in the control group ( $P < .0001$ ). Shock wave lithotripsy was more common in the Roux-en-Y group (81 [1.75%] vs 19 [0.41%];  $P < .0001$ ) as was ureteroscopy (98 [2.11%] vs 27 [0.58%];  $P < .0001$ ).

Roux-en-Y gastric bypass surgery significantly predicted being diagnosed with a urinary stone calculus (odds ratio [OR], 1.71; 95% confidence interval [CI], 1.44 - 2.04) and undergoing a surgical urinary tract procedure (OR, 3.65; 95% CI, 2.60 - 5.14).

"Roux-en-Y gastric bypass surgery is associated with an increased risk of kidney stone disease and kidney stone surgery in the postoperative period," the study authors write. "Clinicians should be aware of this hazard and inform patients of this potential complication. Future studies are needed to evaluate preventive measures in the high risk population."

Limitations of this study include those inherent to the use of an administrative claims database.

"It is likely that hyperoxaluria, which has been reported to be prevalent following these surgical procedures, is one of the inciting factors in stone formation," the study authors conclude. "As obesity is currently an important national health issue and bariatric surgery to treat it is increasing at a rapid rate, further studies are urgently required to better define the etiology of hyperoxaluria as well as other stone risk factors in this population."

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### Clinical Context

The number of bariatric surgeries performed in the United States has increased 5-fold from 1998 to 2002 with the rapid increase in prevalence of obesity. The Roux-en-Y gastric bypass procedure has superseded the jejunoileal bypass procedure but may still carry risks for hyperoxaluria associated with subsequent renal stones.

This is a longitudinal case-control study using claims data to examine the risk for renal stones and procedures for renal stones after Roux-en-Y gastric bypass vs no procedure for obesity.

## Study Highlights

- Deidentified claims data were used from the Blue Cross/Blue Shield Association in the United States with the dataset covering 2.4 million insured lives for 5 years (2002-2006).
- Patients who underwent Roux-en-Y gastric bypass surgery with enrollment for at least 3 years after surgery were included.
- Excluded were those with cancer, pregnancy, preexisting renal disease, or prior renal calculus.
- Control subjects with a body mass index greater than 35 kg/m<sup>2</sup> and 3 continuous years of follow up were matched for sex, age, diagnosis of diabetes, and hypertension.
- The main outcomes were a diagnosis of urinary calculi and stone removal procedures.
- 4639 patients were identified who had undergone Roux-en-Y gastric bypass with 4639 matched control subjects.
- Mean age was 45 years, there were 5 times more women than men, and median years of observation were 4.3 years.
- 64% were 35 to 54 years old.
- Total person-years studied were 21,362 in the Roux-en-Y group and 19,031 in the control group.
- An upper urinary tract calculus was diagnosed in 7.65% in the surgery group and 4.63% in the control group ( $P < .0001$ ).
- Mean time from surgery to diagnosis of a renal calculus was 558.65 days.
- Those who underwent Roux-en-Y gastric bypass surgery were not more likely to experience multiple stone events vs control subjects.
- Of the surgery cohort, 3.30% underwent a urologic procedure for renal calculus in the 3 years after surgery vs 0.93% in the control cohort ( $P < .0001$ ).
- Ureteroscopy and shock wave lithotripsy were used to a similar extent, whereas nephrolithotomy was used less commonly.
- The strongest predictor of a surgical procedure for upper renal tract calculus was having undergone Roux-en-Y gastric bypass surgery with ORs from 3.55 to 4.06.
- Roux-en-Y gastric bypass was a strong predictor of being diagnosed with renal calculus (OR, 1.71) and undergoing a surgical procedure for calculus (OR, 3.65).
- Shock wave lithotripsy was performed in 1.75% vs 0.41%, and ureteroscopy was performed in 2.11% vs 0.58% of the Roux-en-Y group vs the control group, respectively.
- There was a substantial increase in risk after 45 years, and men were more likely than women to undergo a procedure for renal calculus, but this was not statistically significant.
- Diabetes and hypertension were not more likely to be associated with undergoing a stone removal procedure.
- The authors concluded that the Roux-en-Y gastric bypass procedure was associated with an increased risk for renal calculus within 3 years and an increased risk for a procedure for renal calculus.
- They recommended that this increased risk for an upper renal calculus and procedures for renal calculus be communicated to patients who undergo bariatric surgery.

## Clinical Implications

- Roux-en-Y gastric bypass surgery for obesity is associated with an increased risk for renal calculus within 3 years of the procedure.
- Roux-en-Y gastric bypass surgery for obesity is associated with an increased risk for surgical procedures for renal calculus, with an OR of 3.65.