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Original article

Postoperative CPAP and BiPAP use can be safely omitted after laparoscopic Roux-en-Y gastric bypass

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Abstract

Background: Obstructive sleep apnea (OSA) is prevalent in the morbidly obese population. The need for routine preoperative testing for OSA has been debated in bariatric surgery publications. Most investigators have advocated the use of continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP) in the postoperative setting; however, others have reported pouch perforations or other gastrointestinal complications as a result of their use. From a review of our experience, we present an algorithm for the safe postoperative treatment of patients with OSA without the use of CPAP or BiPAP.

Methods: From January 2003 to December 2007, 1095 laparoscopic Roux-en-Y gastric bypasses were performed at our institution. Preoperative testing for OSA was not routinely performed. A prospective database was maintained. The data included patient demographics, co-morbidities (including OSA and CPAP/BiPAP use), perioperative events, complications, and follow-up information. Patients with known OSA were not given CPAP/BiPAP after surgery. They were observed in a monitored setting during their inpatient stay, ensuring continuous oxygen saturation of >92%. All patients used patient-controlled analgesia, were trained in the use of incentive spirometry, and ambulated within a few hours of surgery. The outcomes were compared between the OSA patients using preoperative CPAP/BiPAP versus those with OSA without preoperative CPAP/BiPAP versus patients with no history of OSA.

Results: A total of 811 patients were included in the study group with no known history of OSA. Of the 284 patients with a confirmed diagnosis of OSA, 144 were CPAP/BiPAP dependent. Statistically significant differences were present in age distribution and gender, with men having greater CPAP/BiPAP dependency. No significant differences were found in body mass index, length of stay, pulmonary complications, or deaths. One pulmonary complication occurred in the OSA, CPAP/BiPAP-dependent group, three in the OSA, non-CPAP group, and six in the no-known OSA group. No anastomotic leaks or deaths occurred in the series.

Conclusion: Postoperative CPAP/BiPAP can be safely omitted in laparoscopic Roux-en-Y gastric bypass patients with known OSA, provided they are observed in a monitored setting and their pulmonary status is optimized by aggressive incentive spirometry and early ambulation. (Surg Obes Relat Dis 2008; 4:512–514.) © 2008 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords: Obstructive sleep apnea; Gastric bypass; Continuous positive airway pressure; Bi-level positive airway pressure; Pulmonary complications

Morbid obesity, defined as a body mass index >40 kg/m^2, afflicts >20 million Americans and is commonly associated with one or more co-morbidities such as hypertension, diabetes, and obstructive sleep apnea (OSA) [1]. OSA is defined as a transient respiratory cessation during sleep, associated with a drop in the percentage of hemoglo-

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bin oxygen saturation [2]. OSA has been linked to complications such as pulmonary hypertension, myocardial infarction, and premature death. Up to 90% of obese patients reportedly have OSA [3–7]; however, its true prevalence in the community is unknown [8] and a linear correlation with increasing body mass index has not been demonstrated [9].

The need for routine preoperative testing for OSA before bariatric procedures has been debated in published studies [4,5,10]. Once diagnosed, most OSA patients are treated with either continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP). Both modalities are delivered by a well-fitted mask with typical pressures of 10–16 cm H_2O or greater for BiPAP [3]. Compliance with these modalities, however, is variable, because some patients cannot tolerate the masks or the supplemental air pressures.

The positive effects of surgical weight loss on the resolution of OSA are well documented in bariatric reports [5,8,9,11,12]. Most investigators have advocated the use of CPAP/BiPAP in the postoperative setting [3,10,12]. However, cases of pouch perforations or other gastrointestinal complications as a result of CPAP/BiPAP use have been reported [2,13,14]. In the present study, we reviewed our experience with the management of OSA in bariatric surgery patients and present an algorithm for safe postoperative management without the use of CPAP or BiPAP.

Methods

From January 2003 to December 2007, 1095 laparoscopic Roux en-Y gastric bypass (LRYGB) procedures were performed at our institution. Preoperative testing for OSA was not routinely performed. Smoking cessation for ≥3 months preoperatively was a prerequisite, and nicotine levels were checked to confirm patient compliance. All patients were educated preoperatively on the importance and use of incentive spirometry, as well as regarding early ambulation within 4 hours of surgery. Patient-controlled analgesia was used for postoperative pain management, and all patients received a dose of antibiotics at induction and for 24 hours thereafter.

Postoperatively, all patients with a known history of OSA were observed in a monitored setting overnight and given 2–4 L/min supplemental oxygen using nasal cannula. CPAP/BiPAP was not used after surgery, even in patients with documented preoperative use. Alarms were set to alert the nursing staff for desaturation at <92%, and all respiratory events were documented on the patient charts. Patients were observed in a telemetry ward unless it was unavailable, in which case they were admitted overnight to the surgical intensive care unit. Supplemental oxygen was discontinued before discharge, and the patients were instructed to not use their CPAP or BiPAP devices at home.

A prospective database was maintained. The data included patient demographics, co-morbidities (including OSA and CPAP/BiPAP use), perioperative events, complications, and follow-up information.

The 30-day outcomes were compared between the OSA patients who had used preoperative CPAP/BiPAP, OSA patients without preoperative CPAP/BiPAP use, and patients with no known history of OSA. Emphasis was given to pulmonary complications, defined as respiratory distress, pneumonia (documented clinically and/or radiographically), and reintubation. Statistical analysis was performed using the analysis of variance test for continuous variables and the chi-square test for dichotomous variables.

Results

The results are outlined in Table 1.

Included in our study group were 811 patients (74%) with no known history of OSA. Of the 284 patients (26%) with a confirmed diagnosis of OSA, 144 (13%) were CPAP/BiPAP dependent, and 140 (12%) had not used CPAP/BiPAP preoperatively.

Statistically significant differences were found in the age distribution ($P < .05$) and gender ($P < .05$), with men having greater CPAP/BiPAP dependency than women (30% versus 10%, respectively). No significant differences were present in body mass index, length of stay, pulmonary complications, or deaths.

One pulmonary complication occurred in the OSA, CPAP/BiPAP-dependent group and three pulmonary complications occurred in the OSA, non-CPAP group. Five patients in the no-known OSA group developed pneumonia.

Table 1
Patient results

Variable	OSA with CPAP/BiPAP	OSA without CPAP/BiPAP	No known OSA	*P* value
Patients (n)	144	140	811	—
Age (y)				<.0001
Average	47	44	43	
Range	20–64	22–62	18–67	
BMI (kg/m^2)				.966
Average	49	47	49	
Range	38–87	39–80	35–72	
Gender (n)				<.05
Male	51	29	86	
Female	93	111	725	
Length of stay (d)				.244
Average	2.7	2.2	2.5	
Range	2–7	2–5	2–13	
Conversion to open procedure (n)	0	0	0	—
Pneumonia (n)	1	3	5	NS
Reintubation (n)	0	0	1	NS
Anastomotic leak (n)	0	0	0	NS
Death (n)	0	0	0	NS

OSA = obstructive sleep apnea; CPAP = continuous positive airway pressure; BiPAP = bilevel positive airway pressure; BMI = body mass index; NS = not significant.

One patient in the no-known OSA group required reintubation secondary to acute respiratory distress. No anastomotic leaks or deaths occurred in the series.

Discussion

The incidence of pulmonary complications has been reported to be as great as 4% after open gastric bypass procedures [3]. Many investigators have advocated the use of CPAP/BiPAP to reduce the incidence of such complications [3,12]. However, others have considered their postoperative use to be hazardous, asserting that because the pylorus's valvular mechanism is bypassed, CPAP/BiPAP can potentially cause excessive distension of the gastrointestinal tract, leading to perforation and anastomotic leaks [13,14].

At our institution, we do not use CPAP/BiPAP in the treatment of postoperative LRYGB patients with known OSA. The analysis of our data has demonstrated that patients with a history of OSA can be safely treated in a monitored non-intensive care unit setting, regardless of their CPAP/BiPAP history, with no difference in postoperative length of stay or incidence of pulmonary complications, anastamotic leak, or mortality. We believe that the major factors contributing to the low incidence of postoperative pulmonary complications in our patients included preoperative patient education, incentive spirometry, and early ambulation.

Patients who want to resume the use of CPAP or BiPAP are advised to visit their pulmonologist for retesting, because many will have resolution or marked improvement of their sleep apnea after LRYGB. A retrospective cohort study demonstrated that 60% of patients who required CPAP preoperatively no longer required CPAP at 2 years after gastric bypass [9,10].

Conclusion

The results of our study suggest that postoperative CPAP/BiPAP use can be safely omitted in LRYGB patients with known OSA, provided that they are observed in a monitored non-intensive care unit setting, with staff familiar with bariatric patients, and that their pulmonary status is optimized by aggressive incentive spirometry and early ambulation.

Disclosures

The authors claim no commercial associations that might be a conflict of interest in relation to this article.

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