Use of 24 h esophageal pH monitoring to demonstrate alkaline reflux as a complication of gastric bypass surgery

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JP SHOENUT, RG DANZINGER. Use of 24 h esophageal pH monitoring to demonstrate alkaline reflux as a complication of gastric bypass surgery. *Can J Gastroenterol* 1994;8(6):395-397. A 35-year-old female who had previously undergone a gastric stapling procedure for morbid obesity presented with a persistent nocturnal cough that was treated over a three-year period as a gastric acid reflux complication of the bypass surgery. A barium swallow demonstrated gastroesophageal reflux, but the symptoms did not resolve after treatment with omeprazole and cisapride. Twenty-four hour esophageal pH monitoring subsequently found alkaline reflux in excess of 17% of the total time, with no acid reflux demonstrated. Surgical revision of the bypass leaving the hiatus alone corrected the reflux complication and the symptoms resolved without further treatment. The diagnostic capability of pH monitoring is illustrated in a patient with an unusual surgical complication.

Key Words: 24 h pH monitoring, Gastric bypass, Gastroesophageal reflux, Surgical complications

Propriétés de la paroi vasculaire des artères de fort calibre dans l'hypertension et effet du traitement antihypertenseur

RÉSUMÉ : Une patiente de 35 ans qui avait déjà subi une gastroplastie pour une obésité pathologique s'est présentée pour une toux nocturne persistante, traitée sur une période de trois ans comme s'il s'agissait d'une complication d'un reflux d'acide gastrique résultant de la chirurgie. L'épreuve au baryum a démontré qu'il y avait reflux gastro-oesophagien, mais les symptômes ne sont pas disparus après le traitement par oméprazole et cisapride. La surveillance du pH oesophagien sur 24 heures a par la suite révélé un reflux alcalin excédant de 17 % le temps total, sans reflux acide. La révision de la chirurgie a suffi à corriger la complication de reflux et les symptômes sont rentrés dans l'ordre sans autre traitement. Le pouvoir diagnostique de la surveillance du pH est illustré ici chez une patiente qui présentait une complication chirurgicale inhabituelle.

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A VARIETY OF COMPLICATIONS IN patients surgically treated for obesity has been described, the most frequent consisting of the breakdown of the staple line or stomal ulceration (1,2). In one report 96 of 201 patients (48%) required reoperation due to staple line breakdown (3). Reflux is an unusual complication in patients with gastric stapling. Twenty-four hour ambulatory esophageal pH monitoring has become the 'gold standard' in investigating gastroesophageal reflux disease; patient compliance is high and the test is reproducible (4-7). We describe the use of ambulatory pH monitoring in diagnosing a complicated reflux problem in a patient who had undergone a gastric stapling procedure for morbid obesity.

CASE PRESENTATION

A 35-year-old woman underwent gastric stapling for morbid obesity in 1980 and subsequently lost 36.3 kg. In 1990 she developed a persistent cough that awakened her at night and left a waterbrash taste. The patient also experienced heartburn following meals. In 1992 she was referred to a respirologist. Pulmonary function studies and chest x-rays were normal; however, a barium swallow demonstrated significant gastroesophageal reflux. Endoscopy revealed erosive esophagitis in the mid- and distal esophagus. The pa-

ACID REFLUX		Total	Uprght	Supine	Meal	PostP	HrtBrn
Duration	(HH:MM)	22:16	14:06	08:10	02:05	03:00	00:24
Number of reflux episodes	(#)	3	3	0	0	1	0
Number of reflux episodes longer than 5.0 minutes	(#)	0	0	0	0	0	0
Longest reflux episode	(min)	0	0	0	0	0	0
Total time pH below 4.00	(min)	0	0	0	0	0	0
Fraction time pH below 4.00	(%)	0.0	0.0	0.0	0.0	0.1	0.0
Maximum pH value	(pH)	---	---	---	9.0	8.6	9.1
Minimum pH value	(pH)	2.4	2.4	4.1	4.6	3.6	4.8

ALKALINE SHIFT		Total	Uprght	Supine	Meal	PostP	HrtBrn
Duration	(HH:MM)	22:16	14:06	08:10	02:05	03:00	00:24
Number of reflux episodes	(#)	62	50	13	12	7	3
Number of reflux episodes longer than 5.0 minutes	(#)	10	7	4	1	0	0
Longest reflux episode	(min)	40	20	40	8	5	3
Total time pH above 8.00	(min)	228	116	112	23	8	4
Fraction time pH above 8.00	(%)	17.1	13.7	23.0	18.5	4.3	18.1
Maximum pH value	(pH)	---	---	---	9.0	8.6	9.1
Minimum pH value	(pH)	2.4	2.4	4.1	4.6	3.6	4.8

Channel 1 = pH (pH)

 Supine = S ——— Meal = M ——— PostP = P ———
 HrtBrn = H ——— ChPain = C ———

Figure 1) Prerevision 24 h esophageal pH study in a 35-year-old woman with a gastric stapling procedure for morbid obesity

tient was put on 10 mg cisapride four times daily and 20 mg omeprazole daily. The patient remained symptomatic. Manometry and 24 h esophageal pH studies were conducted. A normal lower esophageal sphincter with a resting pressure of 15 mmHg was identified. Peristalsis in the body of the esophagus and the upper esophageal sphincter was normal. Ambulatory pH studies were performed using the Synectics system (Carsen Group Inc). An antimony pH catheter was positioned 5 cm above the lower esophageal sphincter. The patient took no medication 72 h before testing. The pH studies showed no acid reflux but demonstrated alkaline reflux (pH greater than 8.0) 17.1% of the total time, 23% of the time when supine. There were 11 alkaline reflux

events longer than 5 mins and the length of the longest event was 40 mins (supine) (Figure 1).

In April 1993 the patient underwent surgery where it was discovered that the afferent limb of the Roux-en-Y had been incorrectly anastomosed to the proximal gastric pouch above the staple line and the efferent limb anastomosed end to side, further down. This resulted in an isoperistaltic delivery of bile and pancreatic juice to the gastric remnant. The stomach emptied through the gastrojejunostomy in an antiperistaltic fashion. The limbs of the Roux-en-Y were taken down and the efferent limb anastomosed to the proximal gastric pouch for isoperistaltic drainage. Post-operative course was unremarkable. In August 1993, the patient underwent re-

peat esophageal studies. Manometry was unchanged following surgical revision, but pH studies showed a reduced alkaline reflux index. The percentage of time the pH was greater than 8.0 diminished to 1.3% of the total time, 0% when supine. There was only one alkaline reflux event and it lasted 9 mins. Acid reflux (percentage time pH less than 4.0) was 6% of the total time. The patient's respiratory symptoms and esophagitis resolved following the revision surgery. Thirteen years following the original gastric stapling, the patient had regained the weight she had lost.

DISCUSSION

The surgical treatment of morbid obesity has had mixed results, both in terms of patients maintaining their initial

weight loss and complications of the surgery. The staple line remained intact in the patient described, however she regained all of the initial weight loss. The technical complication discovered during the revision surgery was unusual and we are unaware of it being reported elsewhere. The alkaline reflux demonstrated during the initial pH monitoring was the first indication that additional surgery might be necessary.

Alkaline reflux is particularly harmful to the esophagus. The development of esophageal complications is more likely in patients who demonstrate alkaline reflux; the incidence of Barrett's esophagus is also greater (8-10). In the patient presented here, alkaline reflux appeared to be associated with erosive esophagitis found during endoscopy. The amount of alkaline reflux (pH greater than 8.0) was substantially in excess of what is reported for normal subjects: 17.1% versus 0.03% (personal communication). Following surgery, the patient's alkaline reflux index remained high (1.3%) compared with control subjects, although no figures are available for comparison of alkaline reflux in patients with gastric bypass. The pH shift pre- to postrevision was, however, dramatic (Figure 2). Signifi-

Figure 2) Distribution of 24 h esophageal pH data, pre- and postsurgical revision

cant alkaline reflux, such as in this patient, is considered to be related to previous foregut surgery. The type of procedures implicated include: vagotomy, Billroth II resection and pyloroplasty (11-13).

CONCLUSIONS

In this report the use of ambulatory pH monitoring was of vital importance in the definition of a potentially serious

reflux problem and pointed to the error in reconstruction that led to surgical correction. Reflux disease is typically thought of as an acid reflux problem and efficacious agents such as omeprazole are frequently used without fully documenting the pattern and type of the actual reflux. Twenty-four hour ambulatory pH testing is the only available method that can quantify and determine the type of refluxate.

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