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SHORT COMMUNICATION

Use of Foley's Catheter to Control Port-Site Bleeding in Bariatric Surgery

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Abstract Abdominal wall bleeding in the port-site insertion placed during laparoscopic bariatric surgery is often difficult to control. From January 2005 to August 2011, 226 patients underwent bariatric surgery at our institutions. Seventeen patients (7.5%) presented port-site bleeding that could not be controlled with electrocautery and Foley's catheter (24 F) was used for bleeding inhibition. Of the 17 patients, there were 12 females (70.6%) and five males (29.4%) with a mean age of 38.35 years. Mean body mass index (BMI) was 44.2. Most of bleeding port-sites were located in hypochondrium and were 12-mm size. After the catheter removal (median 36 h), bleeding did not recur in any case. There were no other complications related to the port-side bleeding and the Foley catheter placement. Hospital stay was not prolonged due to the use of the Foley catheter. Port-site bleeding in bariatric surgery is a frequent complication. In up to 7.5% of the cases, the haemorrhage cannot be controlled with electrocautery. Compression with Foley catheter balloon is a safe and efficient method to stop bleeding.

Keywords Laparoscopy · Haemorrhage · Port-site · Foley's catheter

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Introduction

Port-site bleeding is a frequent intraoperative complication of bariatric surgery. The haemorrhage arises from subcutaneous or intramuscular vessels damaged during the introduction of the laparoscopic ports. Stopping the bleeding from these port sites can be problematic because of the small size of the incision and the fact that these bleeding points are situated deeply. This is especially true in obese patients with a large subcutaneous adipose tissue. In morbid obese patients undergoing bariatric surgery, control of the bleeding requires enlargement of the incision and placement of deep sutures, which is technically complicated because of the deep location of the haemorrhage source; at the ends, it leads to larger wounds, associated with more postoperative pain, an increased risk of wound infections and ugly scars. When the bleeding is not completely stopped, it can lead to haematoma formation and even massive haemoperitoneum [1–3].

Patients and Methods

From January 2005 to August 2011, 226 patients underwent bariatric surgery at our institutions. Seventeen patients (7.5%) presented port-site bleeding that could not be controlled with electrocautery and Foley's catheter was used to stop bleeding.

Investigated variables were age, gender, surgical technique, size and location of the bleeding port-site, duration of the Foley catheter placement, postoperative complications of the Foley catheter insertion and hospital stay.

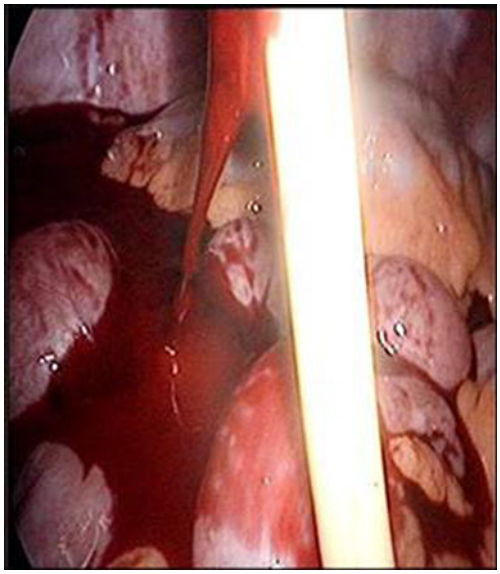

Fig. 1 Port-site bleeding into the abdominal cavity. Introduction of the Foley catheter

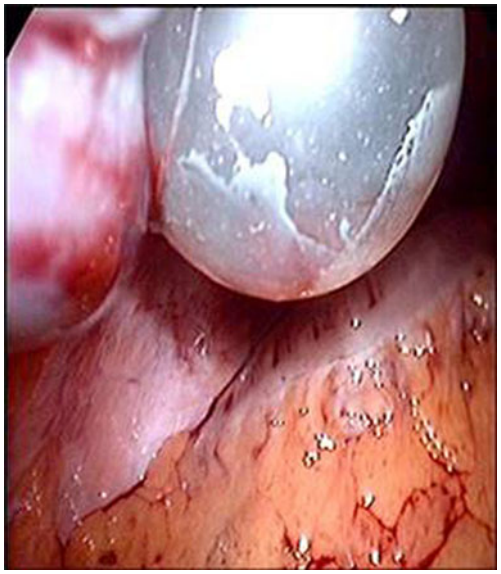

Fig. 3 Traction of the Foley catheter. Stop of bleeding

Description of the Technique

Once the bleeding port-site was identified, the port is reintroduced. A Foley catheter (24 F) is introduced through the port up to the peritoneal cavity and the balloon is inflated at maximum of its capacity. Then the port is removed. At this moment, a progressive traction is done until confirmation with the camera of complete stopping of the bleeding into the peritoneal cavity. The catheter is fixed into the abdominal wall, compressing the bleeding vessel, with a silk stitch 1 just as if we were fixing drainage (Figs. 1, 2 and 3).

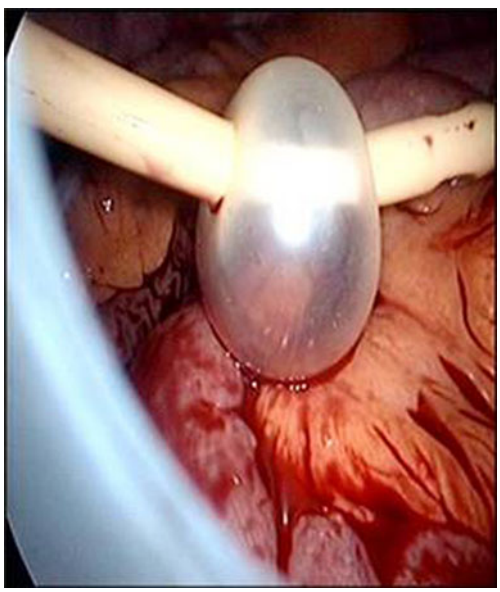

Fig. 2 Foley catheter balloon inflation

Results

A total of 226 patients underwent bariatric surgery from January 2005 to August 2011. Seventeen patients (7.5%) presented port-site bleeding that could not be controlled with electrocautery and Foley catheter was used to stop bleeding. Of the 17 patients, there were 12 females (70.6%) and five males (29.4%) with a mean age of 38.35 years (range 20–63 years). Mean body mass index (BMI) was 44.2 (range 36–56). The surgical technique was 164 gastric by-pass (72.6%), 32 lap bands (14.2%) and 30 sleeve gastrectomies (13.2%).

The size and location of the bleeding port-sites are described in Table 1; most of them were located in hypochondrium and were 12-mm size. Median time for catheter removal was 36 h (range 24–48 h). After the catheter removal, bleeding did not recur in any case. There were no other complications related to the port-side bleeding and the Foley catheter placement. Median hospital stay was 4 days and in any case was prolonged due to the use of the Foley catheter.

Table 1 Port size and location of the port insertion

	Number of cases, *n* (%)
Size, mm	
5	3 (17.6)
12	14 (82.4)
Location	
Epigastrium	2 (11.7)
Right hypocondrium	8 (47)
Left hypocondrium	7 (41.2)

Discussion

Abdominal wall vessels injury produced by port introductions during laparoscopic surgery is infrequent (< 2%) [1, 4]. Normally, the insertion of the port tends to damage subcutaneous or intramuscular branches. In most cases, when the bleeding vessel is superficial, haemorrhage is controlled with electrocautery, but in deep branches or intramuscular ones that tend to retract with electrocautery, the latter is often unuseful. Moreover, in morbid obese patients, even subcutaneous bleedings are difficult to be managed due to the large adipose tissue [5].

Diverse predisposing factors to port-site bleeding have been described, including obesity and port insertion without transillumination. In obese patients, the large subcutaneous adipose tissue prevents transillumination with the camera [6]. The size of the port is also a predisposing factor for bleeding. In our series, 82% of the cases of bleeding (14 cases) appeared in 12-mm port-sites. This affirmation seems to be logical because the larger the port, the greater risk of injury to the vessels of the abdominal wall [2].

In our study, we observed that most bleeding port-sites are located outside the line alba. Anatomically, line alba of the abdomen is the place where anterior and posterior layers of the rectum muscles coalesce. In this location, there are no muscular fibers and therefore, the insertion of a port is less traumatic and the risk of a vascular damage is lower [7].

Diverse methods have been described to control such haemorrhage refractory to electrocautery, including an en bloc suture of the orifice with Reverdin needle or assisted by catheter [8, 9]. Other authors proposed to plug the port-site hole with haemostatic agents (Surgicel®) [2]. The classical method to control the bleeding required enlargement of the incision and placement of deep sutures, which is technically complicated because of the deep location of the haemorrhage source and at the ends it leads to larger wounds, associated with more postoperative pain, an increased risk of wound infections and ugly scars.

In literature, there are only two reports describing the use of Foley catheter to control the port-side bleeding. Fasolino et al. [2] reported six cases of Foley catheter use and compared them with the use of Reverdin needle, concluding that the employment of Foley catheter is easier and faster, but the use of Reverdin needle is safer. However, Aharoni et al. [10], analyzing 17 patients (12 Foley and five Reverdin needle), preferred the use of Foley catheter, because it is as safe as the suture with Reverdin needle, but is associated with lower postoperative pain. Both studies were performed in gynaecologic surgeries, probably in patients with BMI under normal limits. In our experience, en bloc suture with Reverdin needle in morbid obese patients is technically difficult and prolongs surgery. Moreover, the Foley catheter, in addition to the haemostatic function, also serves as intra-abdominal drainage. If the compression is not sufficient to stop bleeding and there is a non-suspicious haemoperitoneum, intraperitoneal blood may drain through the holes at the top of the catheter, allowing an early diagnosis of haemoperitoneum.

Conclusion

Port-site bleeding in bariatric surgery is a complication more frequent than expected. In up to 7.5% of the cases, the haemorrhage cannot be controlled with electrocautery. Compression with Foley catheter balloon is a safe and efficient method to stop bleeding.

Conflict of Interests All authors (Jaime Ruiz-Tovar, MD, PhD, Pablo Priego-Jimenez, MD and Gabriel Alejandro Paiva-Coronel, MD) declare that they have no conflict of interests in the preparation of this manuscript.

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