

Case Report

Severe Intra-abdominal Infection due to *Streptococcus Milleri* Following Adjustable Gastric Banding

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Background: Laparoscopic adjustable gastric banding represents a safe and effective bariatric surgical method. Nevertheless, complications such as intra-abdominal infections are associated with high morbidity and mortality.

Case Report: A 50-year old morbidly obese female patient underwent adjustable gastric banding with the Swedish band (SAGB). After an uneventful postoperative follow-up of 2 years, she developed band infection due to colon microperforation during endoscopic polypectomy. As the causative microorganism, *Streptococcus Milleri* was revealed. Band removal was required, and recovery was quite prolonged.

Conclusion: Intra-abdominal infection with *Streptococcus Milleri* can cause severe and life-threatening disease. Therefore, early diagnosis and surgical intervention combined with body weight adapted antibiotic therapy for a sufficiently long period of time seems necessary. In patients with intra-abdominal implanted devices such as the SAGB who undergo endoscopic polypectomy, antibiotic prophylaxis should therefore be considered.

Key words: Intra-abdominal infection, laparoscopy, adjustable gastric banding, morbid obesity, *Streptococcus Milleri*

Introduction

Morbid obesity defined as body mass index (BMI) ≥ 40 kg/m² is a world-wide health problem and is

associated with serious morbidity and decreased life expectancy. Bariatric surgery has proven to be an effective method for permanent weight loss. Laparoscopic adjustable gastric banding is a safe, feasible and effective surgical procedure.¹⁻⁴ Infectious complications remain serious in any type of surgery, in particular when associated with foreign bodies, in patients suffering from severe co-morbidities and in obese individuals. Infections of the adjustable banding device require band removal in the vast majority of cases. However, such complications are in general rare.^{3,5,6} Following uncomplicated adjustable gastric banding procedures, late postoperative intra-abdominal infections are extremely rare and can or cannot be associated with the device. The spectrum of pathogens associated with intra-abdominal infections is diverse and depends on the origin of the infection. In the case of perforated stomach, small bowel or colon, mixed infection can be expected and gram-negative rods, gram-positive cocci and anaerobes are routinely isolated.

Streptococci are not predominant pathogens; however, they have also been reported to be involved in such infections in up to 10% of patients. Group *Milleri* streptococci, including the species *intermedius*, *constellatus* and *anginosus*, have been found to cause severe infections in humans. Frequently, these pathogens cause abscesses which are difficult to treat, and because of the production of exotoxins, these bacteria can cause life-threatening sepsis and recurrent disease if antibiotics are not given long enough and at sufficiently high dosage.⁷

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The presented case reports a patient with severe intra-abdominal infection due to *Streptococcus Milleri* following a primarily uneventful gastric banding procedure.

Case Report

In 2001, a 50-year-old female suffering from morbid obesity with body weight 160 kg (BMI 50 kg/m²), hypertension and diabetes mellitus was operated with a Swedish adjustable gastric band (SAGB, Obtech, Ethicon Endo-Surgery) according to a standardized protocol. The postoperative course was uneventful, and the patient was discharged 3 days after surgery. Gradual filling of the balloon was carried out, aiming at an entire filling volume of 7.5 ml after 12 months. No more manipulation at the port was necessary thereafter, and at 2 years follow-up, she had lost 58 kg (BMI 35.3 kg/m²).

Because of recurrent episodes of cramp-like abdominal pain and red blood on stool appearing 2 years after gastric banding, she underwent colonoscopy. A sessile adenomatous polyp, not on a stalk, in the transverse colon (polyp size 2 cm) was removed by means of electro-cautery snares. The procedure was performed without any immediate obvious complications. Neither sedation nor analgesia was required. However, from this time on, the patient suffered from mild abdominal complaints with algospasms and nausea.

Six weeks after endoscopic polypectomy, she was admitted to hospital presenting with upper abdominal pain and fever up to 38.8°C. Clinical examination showed mild upper abdominal pain without signs of subcutaneous infection. Ultrasound, X-ray and computed tomography were unremarkable. Besides a white blood cell count of 12,500 g/l (normal range 5,000-10,000 g/l) and an elevated C-reactive protein of 22.43 mg/dl, no pathologic findings could be detected. Microbiologic testing of port-fluid did not reveal bacterial contamination. However, antibiotic therapy with Amoxicillin / Clavulanic acid (2200 mg every 8 hours) was administered, and the patient was discharged 6 days later with normalized laboratory values in good clinical condition.

Within the next few days, abdominal pain re-emerged, and she developed subfebrile body temperature. Ultrasound examination revealed subcuta-

neous and intra-abdominal fluid collections, and diagnostic laparoscopy was indicated. Multiple small abscesses along both the transverse colon and the adjacent connecting tube of the banding device were found, and therefore the band was removed. The infection seemed to be triggered by colonoscopic polypectomy with a possible microperforation, because both the port-site and the balloon revealed no clinical sign of infection. The subcutaneous swab grew peptostreptococci susceptible to Amoxicillin/Clavulanic acid, which was again given for antibiotic treatment. After an uneventful postoperative course, the patient was discharged on the 11th postoperative day. Orlistat (Xenical®, Roche, Great Britain) was administered to diminish the patient's regain of weight.

Two weeks later, she presented again with symptoms similar to those reported previously. Blood testing revealed elevated C-reactive protein and elevated white blood cell count. A computed tomography of the abdomen indicated an intra-abdominal abscess measuring 20 x 30 x 5 cm localized ventral to the small bowel (Figure 1). Mini-laparotomy with drainage of the abscess was performed, and *Streptococcus Milleri* was cultured. The patient was enrolled in a double-blind multicenter trial for intra-abdominal infection study protocol 3074A1-306-WW – Tigecycline versus Piperacillin / Tazobactam (Wyeth-Lederle, Vienna), and recovered within 9 days (As our Center is still blinded until final publication of the study, we do not know in which arm the patient was randomized).

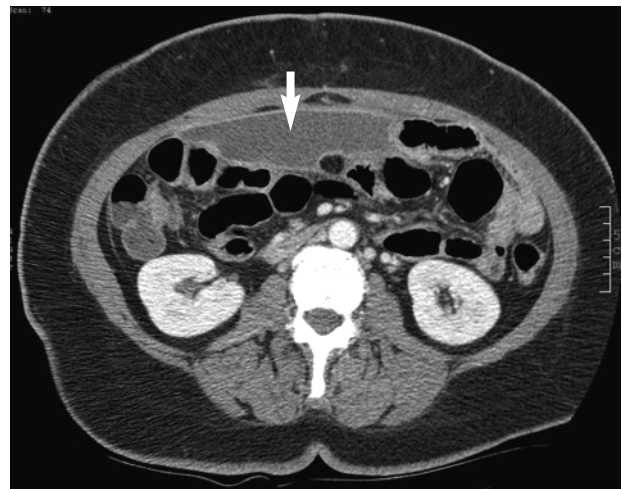


Figure 1. Axial CT-image (5 mm slice thickness): intra-abdominal abscess localized ventral to the small bowel (arrow).

She was discharged asymptomatic with normalized laboratory parameters, normal body temperature, without radiologically detectable intra-abdominal abscess, and with sterile culture of drainage tip after removal on day 7.

Six days later, she was re-admitted to hospital because of diffuse abdominal pain and fever. C-reactive protein was again increased to 15.3 mg/dl, and computed tomography of the abdomen showed re-occurrence of the intra-peritoneal abscess. The abscess was percutaneously drained by means of ultrasound guidance. Again, *Streptococcus Milleri* was isolated. This time the antibiotic regimen consisted of clindamycin (600 mg every 8 hours) and Amoxicillin / Clavulanic acid. Body temperature and C-reactive protein decreased to normal levels, and 10 days later she was discharged with a pigtail-drainage catheter kept in place and continuous antibiotic therapy with Clindamycin for the next 6 weeks. Thereafter, the drainage catheter was removed, and microbiologic testing no longer showed growth of pathogenic micro-organisms.

Because of body weight regain of 40 kg following band removal, the patient arbitrarily contacted another center for bariatric surgery, using internet-data searching where she was recommended to undergo a biliopancreatic diversion (BPD). On post-operative day 2, she was re-operated due to a leakage of the gastro-enteral anastomosis and required intensive care treatment for 1 week due to infectious complications. Within 3 weeks, she had an assumed complete recovery thereafter. Another 3 weeks later, the patient was readmitted to our department with abdominal pain and fever. Her weight at this time was 122 kg. CT scan showed multiple communicating intra-abdominal abscess formation. Pigtail drainage was carried out again. Microbiologic testing revealed *E. coli* and *Proteus mirabilis* growth, presumably resulting from the leakage of the gastro-enterostomy. The antibiotic regime consisted of Clindamycin (1800 mg) and Ertapenem (1000 mg) for 5 days. Finally, the patient recovered completely within 14 days, and was discharged thereafter in good condition with normal laboratory values and unremarkable CT findings.

Six months after the BPD, the patient is in a good condition; there has not been any recurrence of intra-abdominal infection. Her current weight at 6 months follow-up is 102 kg.

Discussion

Laparoscopic adjustable gastric banding is an established method for the treatment of morbid obesity.^{1,2,6} At our institution, 737 patients underwent surgery for implantation of an SAGB between 1996 and 2004. The advantages are effective weight loss, minimal invasiveness with short hospital stay, total reversibility of the procedure and the adjustment of the restriction according to the patient's individual demands.^{1,2,6} In a small percentage, problems such as infectious complications, band penetration, pouch dilatation or band leakage are reported.^{3,5,6} At our institution, a single-shot antibiotic prophylaxis with Flucloxacilin at increased dosage of 4 g is administered immediately before surgery. Contamination of the port system or suppuration of the port location caused by *Staphylococcus epidermidis* or *aureus* due to inappropriate puncture technique are seen in a small number of patients. Intra-abdominal infections following SAGB in general are extremely rare^{3,5,6} in particular in patients without port infection or band migration.

In the case presented here, the reason for the intra-abdominal abscess and the late band infection most likely was a silent microperforation of the intestinal wall during colonoscopic polypectomy leading to bacterial migration. In general, colonoscopy is a safe investigation with a risk of 0.5-3.0% for clinically significant perforation requiring surgery.⁸ In case of clinically significant microperforation of the colon during polypectomy, bacterial infection of the adjacent gastric banding device with commensals of the normal GI flora such as *Streptococcus Milleri* is presumed.

Streptococcus Intermedius, *Streptococcus Constellatus* and *Streptococcus Anginosus* are known as the "*Streptococcus Milleri* group". These pathogens are often associated with infections of the head, neck, respiratory and the intestinal tract and they tend to cause abscess formation at any location. All members of the *Streptococcus Milleri* group are susceptible to Clindamycin, Penicillin, Amoxicillin, Cefotaxime and Ceftriaxone.⁷ Resistance to Clindamycin recently has been seen in our own institution.

The patient presented several times with non-specific abdominal pain, subfebrile body temperature and elevated inflammation markers (C-reactive protein / white blood cell count). While computed tomography was not

reliable at the beginning of the symptoms, early diagnostic laparoscopy should be considered. During surgery, microbiological specimen can be obtained, the gastric banding device can be removed on demand and effective drainage of an abscess can be performed.⁵ Antibiotic treatment, based on susceptibility tests and administered for a sufficient period of time in an adequate dose is mandatory.³ In the case of an infection with *Streptococcus Milleri*, Clindamycin is an accepted first-line therapy due to the excellent penetration of the compound into the abscess and the high intracellular accumulation. Betalactam antibiotics usually are reported to be active against *Streptococcus Milleri*; however, they may be associated with treatment failure due to poor penetration into the abscesses.⁷

In obese individuals, this pharmacokinetic problem might be aggravated promoting treatment failures similar to our case. In the last instance, *E. coli* and *Proteus* were isolated, and a 1 week treatment course was successful. This might give further evidence of the difficulties in treating abscess formation caused by *Streptococcus Milleri* in a standardized way.

Between 2001 and 2003, a total of 219 surgical patients with Group *Milleri Streptococci* infections were identified at the Innsbruck University Hospital. Mixed infection involving also other bacteria is frequent. The spectrum of infectious diseases ranged from perforated appendicitis to perirectal abscesses and perforated sigmoid diverticulitis. Moreover, this pathogen was found frequently in infections of the biliary tract and following solid organ transplantation. Rare cases involved esophageal perforation and pleural empyema. The case of the infected SAGB was the first infection with *Streptococcus Milleri* in a patient who had undergone bariatric surgery. Most infections with Group *Milleri Streptococci* responded well to a combined surgical / antibiotic treatment. Nevertheless, we also observed cases with recurrent abscess formations which required repeated surgery and prolonged antibiotic treatment, and there were also cases of life-threatening septicemia.

We emphasize the awareness of infections with Group *Milleri Streptococci* in special cases that can be difficult to treat. The prevalence of this pathogen in surgery seems underestimated.

Conclusion

Intra-abdominal abscess formation and infection with *Streptococcus Milleri* following gastric banding is a rare but severe complication. Early diagnosis and effective treatment, including laparoscopy / laparotomy and drainage are necessary to prevent subsequent complications. The antibiotic treatment must be administered for an adequate period of time and in an adequate dose adapted to the body weight. In patients with intra-abdominal foreign bodies such as gastric bands, antibiotic prophylaxis should be considered if endoscopic polypectomy or other potentially contaminating procedures are performed, in order to prevent dissemination or translocation of intestinal bacteria.

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