Journal of Parenteral and Enteral Nutrition

<http://pen.sagepub.com/>

Necrotizing Candida Infection After Percutaneous Endoscopic Gastrostomy: A Fatal and Rare Complication

Rainer Wirth, Jürgen Bauer and Cornel Sieber

JPEN J Parenter Enteral Nutr 2008 32: 285

DOI: 10.1177/0148607108316190

The online version of this article can be found at:

<http://pen.sagepub.com/content/32/3/285>

Published by:

<http://www.sagepublications.com>

On behalf of:

American Society for Parenteral
and Enteral Nutrition

[The American Society for Parenteral & Enteral Nutrition](#)

Additional services and information for *Journal of Parenteral and Enteral Nutrition* can be found at:

Email Alerts: <http://pen.sagepub.com/cgi/alerts>

Subscriptions: <http://pen.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - May 1, 2008

[What is This?](#)

Necrotizing Candida Infection After Percutaneous Endoscopic Gastrostomy: A Fatal and Rare Complication

Journal of Parenteral and
Enteral Nutrition
Volume 32 Number 3
May/June 2008 285-287
© 2008 American Society for
Parenteral and Enteral Nutrition
10.1177/0148607108316190
<http://jpen.sagepub.com>
hosted at
<http://online.sagepub.com>

Rainer Wirth, MD¹; Jürgen Bauer, MD²; and Cornel Sieber, MD²

Financial disclosure: none declared.

Gastrostomy site infections following percutaneous endoscopic gastrostomy (PEG) are the most common complication after PEG placement. Recent meta-analyses were able to show that PEG site infections can be reduced significantly with a systemic antimicrobial prophylaxis. This mostly cephalosporin- or penicillin-based prophylaxis does not cover fungal infections. Although *Candida* skin infections after PEG placement are rarely described, a mucosal colonization or infection of the upper GI tract with *Candida* species is very common, especially in severely ill patients such as those requiring artificial nutrition.

The authors report a rare and lethal case of a necrotizing PEG site infection with *Candida albicans* in a patient with diabetes with multiple comorbidities, presenting like gas gangrene. In patients with probable immunodeficiency or visible candidiasis of the skin, oropharynx, or esophagus, a *Candida* infection should be considered in case of a gastrostomy site infection. (*JPEN J Parenter Enteral Nutr.* 2008;32:285-287)

Keywords: Candida; elderly; infection; necrotizing; PEG; percutaneous endoscopic gastrostomy

Case Report

A 77-year-old woman was referred from the department of vascular surgery to our geriatric department. She was diabetic, was nearly blind, and had permanent atrial fibrillation. Before the primary hospital admission, she had normal orientation and was walking without aid. In previous hospital reports, she was diagnosed as obese. Because of severe arteriosclerosis with necrosis of the left fifth toe, a revascularization procedure with venous bypass and amputation of the fifth toe was performed. After the operation, the inguinal wound did not heal. Even a split-thickness skin graft and a cutaneous flap failed. In addition, the patient became delirious with confusion and agitation.

At the time of admission in the geriatric department, we saw a delirious patient, unable to drink or eat reasonable amounts of food, with a body mass index of 22 kg/m².

From the ¹Clinic for Internal Medicine and Geriatrics, St Marien-Hospital Borken, Borken, Germany, and ²Friedrich-Alexander-Universität Erlangen-Nuremberg, Clinic for Internal Medicine II, Nuremberg Hospital, Nuremberg, Germany. Rainer Wirth provided the case treatment and preparation of the article; Jürgen Bauer and Cornel Sieber provided the critical review.

Received for publication May 30, 2007; accepted for publication January 9, 2008.

Address correspondence to: Rainer Wirth, MD, Klinik für Innere Medizin—Geriatric, St Marien-Hospital Borken, D-46322 Borken, Germany; e-mail: rainer.wirth@hospital-borken.de.

It was unrecognized that she had lost about 10 kg of body weight in the past weeks in the hospital and another 10 kg in the months before hospital admission. Because of her agitation and restlessness, she pulled out every catheter, even though she was treated with neuroleptics. Hence, we were unable to give her sufficient enteral feeding through a nasogastric tube. That is why we performed a percutaneous endoscopic gastrostomy on the fifth day of stay in our department. The esophagus and stomach were without any endoscopic pathological findings. The uneventful procedure was done with an 18 Fr catheter using the pull-through method. The abdominal wall was disinfected carefully and draped with sterile towels. The oral pharynx was not disinfected. No antibiotics were given prior to the procedure. Enteral nutrition was initiated 3 hours after percutaneous endoscopic gastrostomy (PEG) placement with fluid, and after another 3 hours, small amounts of a standard formula were given. The amount of enteral nutrition was increased over the following days and was well tolerated.

The patient first complained of abdominal pain on the fifth day after PEG placement, but the abdominal examination and PEG site appeared normal. Because of probable food intolerance, the amount of enteral feeding was reduced. The next day, the patient complained of increasing abdominal pain, and abdominal examination revealed a cold, black-grey area of 7-cm diameter within a huge red area next to the PEG (see Figure 1). The external bolster was positioned 1 cm off the abdominal wall without any pressure on the skin. Palpation showed a soft

Figure 1. Necrotizing percutaneous endoscopic gastrostomy site infection with *Candida*.

abdominal wall with a localized subcutaneous emphysema within the necrotic area at the PEG site. Bowel sounds were normal. The patient had a low-grade fever and was hypotensive. An abdominal ultrasound was performed to look for signs of acute cholecystitis and to exclude intra-abdominal or subcutaneous abscess or fluid collection. The ultrasound examination was normal except for gas bubbles in the subcutaneous adipose tissue and a reticular fluid formation in the areas of the discolored skin.

The PEG site was cultured, and antibiotic treatment with intravenous penicillin was started. Because gas gangrene was suspected, an emergent extensive wound debridement was performed. An area of 50 × 30 cm with skin, subcutaneous fat, and anterior rectus sheath was resected. The muscle below the fascia showed no typical signs of gas gangrene. The PEG tube was removed, and the gastric fistula was surgically closed. A wound closure with sponge and vacuum treatment was performed. The patient was mechanically ventilated, the antibiotic regimen was continued, and nutrition was given parenterally. Two days later, the patient died in a septic state, despite continued and extended parenteral antibiotic treatment. Postmortem, the PEG site and tissue cultures grew large amounts of *Candida albicans* while the blood cultures remained sterile. All anaerobic cultures from peristomal swab, resection material, and blood remained sterile as well.

Discussion

Gastrostomy site infections following PEG are the most common complication after PEG placement and are reported in 3%-36% of the procedures.¹⁻³ Although

antimicrobial prophylaxis before PEG insertion is performed in many hospitals in Europe, routine systemic antimicrobial prophylaxis is not recommended as mandatory in present European PEG guidelines.⁴ Antibiotic prophylaxis before PEG insertion is the standard of care in the United States and is recommended by corresponding guidelines.⁵ In accordance with European guidelines, antimicrobial prophylaxis was not performed in this patient. Recent meta-analyses, however, were able to show that PEG site infections can be reduced significantly with a systemic antimicrobial prophylaxis.^{6,7} Based on this information, our current departmental policy is now to routinely administer prophylactic antibiotics before PEG.

Here, we experienced a very unusual case of PEG site infection. First, we never experienced a visible skin necrosis after PEG placement before, and no previous cases have been reported in the literature. Second, an infection with gas-producing microbes following PEG placement has not been described before, although PEG site infections with *Candida* species have been reported.⁸⁻¹⁰ Theoretically, the emphysema of the abdominal wall could be a consequence of the pneumoperitoneum, which is regularly seen after PEG insertion. But in this patient, the emphysema could be detected only within the necrotic skin area. In view of the fact that *Candida* belongs to the yeast group of fungal microbes, which produce carbon dioxide from glucose,¹¹ we presume that the *Candida* infection itself might be the cause of the skin emphysema in the necrotic area. Although emphysematous skin infections due to *Candida* are rarely described,¹² there are several case reports of other emphysematous infections caused by *Candida*, such as emphysematous pyelonephritis.¹³ Several studies have suggested that transfer of oral microbial colonization into the puncture wound is a common source of PEG site infections.^{14,15} Especially diabetics and patients with poor oral hygiene show higher rates of *Candida* colonization and infections.¹⁶ In our case, no obvious infection of the oral and esophageal mucosa or the skin of the trunk was detected, even though diabetes and heavy weight loss might have induced immunosuppression with an increased likelihood of a mycotic colonization or infection. Nevertheless, in our case, either transfer of oral microbial colonization or local skin microbial colonization at the PEG site are the most likely etiologies of the infection. Another potential contributing factor to PEG site infections and skin necrosis is excessive compression of the abdominal wall skin with the external bolster.¹⁷ The standard of care in our department is the fixation of the external bolster without pressure and at a distance of 0.5 to 1.0 cm from the abdominal wall. In addition, the compression would hardly explain a necrosis developing on the sixth day after PEG placement. Thus, tissue compression is not a probable cause of skin necrosis in this patient. As some other

studies reported necrotizing infections in connection with *Candida* in different regions of the body,^{18,19} we suspect a necrotizing candidiasis also in this case.

In conclusion, we learned from this case that PEG site infections can be lethal and that in the case of a PEG site infection not responding to current antimicrobial treatment, a *Candida* infection should also be considered.

References

1. Wijdsicks EF, McMahon MM. Percutaneous endoscopic gastrostomy after acute stroke: complications and outcome. *Cerebrovasc Dis.* 1999;9:109-111.
2. Dormann AJ, Wigglinghaus B, Risius H, et al. Antibiotic prophylaxis in percutaneous endoscopic gastrostomy (PEG)—results from a prospective randomized multicenter trial. *Z Gastroenterol.* 2000;38:229-234.
3. Zalar AE, Guedon C, Piskorz EL, Sanchez Basso A, Ducrotte P. Percutaneous endoscopic gastrostomy in patients with neurological diseases: results of a prospective multicenter and international study. *Acta Gastroenterol Latinoam.* 2004;34:127-132.
4. Löser C, Aschl G, Hébuterne X, et al. ESPEN guidelines on artificial enteral nutrition—percutaneous endoscopic gastrostomy (PEG). *Clin Nutr.* 2005;24:848-861.
5. Hirota WK, Petersen K, Baron TH, et al. Guidelines for antibiotic prophylaxis for GI endoscopy. *Gastrointest Endosc.* 2003;58:475-482.
6. Lipp A, Lusardi G. Systemic antimicrobial prophylaxis for percutaneous endoscopic gastrostomy. *Cochrane Database Syst Rev.* 2006;4:CD005571.
7. Jafri NS, Mahid SS, Minor KS, Idstein SR, Hornung CA, Galandiuk S. Meta-analysis: antibiotic prophylaxis to prevent peristomal infection following percutaneous endoscopic gastrostomy. *Aliment Pharmacol Ther.* 2007;25:647-656.
8. Patel AS, DeRidder PH, Alexander TJ, Veneri RJ, Lauter CB. Candida cellulitis: a complication of percutaneous endoscopic gastrostomy. *Gastrointest Endosc.* 1989;35:571-572.
9. Murugasu B, Conley SB, Lemire JM, Portman RJ. Fungal peritonitis in children treated with peritoneal dialysis and gastrostomy feeding. *Pediatr Nephrol.* 1991;5:620-621.
10. Gillanders IA, Davda NS, Danesh BJ. *Candida albicans* infection complicating percutaneous endoscopic gastrostomy. *Endoscopy.* 1992;24:733.
11. Land GA, McDonald WC, Stjernholm RL, Friedmann L. Factors affecting filamentation in *Candida albicans*: changes in respiratory activity of *Candida albicans* during filamentation. *Infect Immun.* 1975;12:119-127.
12. Hamayun H, Maliwan N. Emphysematous genital infection caused by *Candida albicans*. *J Urol.* 1982;128:1049-1050.
13. Hildebrand TS, Nibbe L, Frei U, Schindler R. Bilateral emphysematous pyelonephritis caused by *Candida* infection. *Am J Kidney Dis.* 1999;33:E10.
14. Faias S, Cravo M, Claro I, Lage P, Nobre-Leitao C. High rate of percutaneous endoscopic gastrostomy site infections due to oropharyngeal colonization. *Dig Dis Sci.* 2006;51:2384-2388.
15. Thomas S, Cantrill S, Waghorn DJ, McIntyre A. The role of screening and antibiotic prophylaxis in the prevention of percutaneous gastrostomy site infection caused by methicillin-resistant *Staphylococcus aureus*. *Aliment Pharmacol Ther.* 2007;25:593-597.
16. Belazi M, Velegraki A, Fleva A, et al. Candidal overgrowth in diabetic patients: potential predisposing factors. *Mycoses.* 2005;48:192-196.
17. DeLegge M, DeLeggeR, Brady C. External bolster placement after percutaneous endoscopic gastrostomy tube insertion: is looser better? *JPEN J Parenter Enteral Nutr.* 2006;30:16-20.
18. Cabrera H, Skoczko L, Marini M, Giovanna PD, Saponaro A, Echeverria C. Necrotizing gangrene of the genitalia and perineum. *Int J Dermatol.* 2002;41:847-851.
19. Grudell AB, Mueller PS, Viggiano TR. Black esophagus: report of six cases and review of the literature, 1963-2003. *Dis Esophagus.* 2006;19:105-110.