grow in the usual cultures. Because the genus Malassezia cannot synthesize long-chain fatty acids, the culture needs to be plated on a Sabouraud dextrose agar that is supplemented with a source of free fatty acids, such as sterile olive oil. It should be incubated at 34 to 37°C, and it takes 2 to 4 days to grow. It is seen easily on a buffy coat Gram’s stain. Also, samples taken from the indwelling line will likely have a higher yield than those from peripheral draws. If involvement of the endocardium or great central veins is suspected, a transesophageal echocardiogram is the test of choice.

Optimal treatment for *M furfur* sepsis in adults is unclear. Of the cases reported, two had their central lines removed, and both recovered. Three patients whose parenteral lipids were simply discontinued also recovered. Of the three adults who received amphotericin B in addition to stopping the lipid alimentation, one had persistent fungemia and died of a cardiac arrest. Two patients who were treated with amphotericin B while leaving the CVC in place soon died of their underlying diseases. The one patient who did not have an indwelling catheter and did not receive lipid infusions was also treated with amphotericin B and did recover. *M furfur* sepsis is an uncommon infection in adults receiving chronic TPN, and we have presented the first adult to have *M furfur* fungemia complicated by a septic thrombus extending into the right atrium. In the patient with a CVC who is receiving hyperalimentation with lipids, this entity needs to be considered in the fever workup. A buffy coat should be done on peripheral smears, and cultures should be empirically supplemented with olive oil. The treatment should at least include the discontinuation of the IV lipids and possible removal of the line. If either the superior vena cava or endocardium is involved, amphotericin-B therapy and possibly surgical debridement are warranted.

**References**


**Successful Use of Argon Plasma Coagulation and Tranilast To Treat Granulation Tissue Obstructing the Airway After Tracheal Anastomosis**

*Masaaki Sato, MD; Yasuji Terada, MD, FCCP; Tatsuo Nakagawa, MD, Mio Li, MD; and Hiromi Wada, MD, PhD*

**Figure 1.** Transesophageal echocardiogram, four-chamber long-axis view. Note the mass close to the tricuspid valve extending into the right atrium.

**Figure 2.** The excised mass showing clusters of budding yeast within the thrombus (hematoxylin-eosin, original × 20).
We successfully used argon plasma coagulation (APC) and tranilast to treat granulation tissue that had formed on an end-to-end tracheal anastomosis. APC had several advantages over laser in the management of exuberant granulation tissue, and we considered tranilast to be effective in our patient. To our knowledge, this is the first description of the use of APC in the management of anastomotic granulation tissue in the trachea or bronchus.

**CHEST 2000; 118:1829–1831**

**Key words:** argon plasma coagulation; granulation tissue; tracheal anastomosis; tranilast

**Abbreviation:** APC = argon plasma coagulation

Excessive growth of granulation tissue at anastomosis is a common postoperative complication. It can lead to airway stenosis, obstruction, and fatal pulmonary infection. Many treatment methods have been reported, including bronchoscopic debridement, laser therapy, electrocautery, and stent placement. However, controlling and treating the formation of granulation tissue in the airway is difficult.

Argon plasma coagulation (APC) is a special surgical technique that uses high-frequency electric current for thermal coagulation and devitalization of biological tissue. APC gives a controlled, limited penetration into the tissue and good control of bleeding. It has already proved its value in open surgery, and use of it in GI endoscopy began in 1994.

Tranilast, an antiallergic agent, has been used to prevent hypertrophic scars and keloid. We considered that tranilast could help prevent granulation tissue overgrowth in the trachea.

In this report, we describe the successful use of APC and tranilast in the management of exuberant granulation tissue arising from a tracheal anastomosis.

**CASE REPORT**

A 29-year-old woman was admitted to our hospital for tracheoplasty. She had had a traffic accident on June 16, 1990, when she was 21 years old. She had been intubated, and a tracheostomy had later been performed. By October 1990, her respiration had recovered fully, but tracheal stenosis caused by granulation tissue was recognized with MRI and flexible bronchoscopy. Several attempts were made to remove the granulation tissue with a Nd-YAG laser, but it had soon regrown; 7 years after the accident, a T tube had been inserted. In April 1998, the woman came to our hospital for surgical treatment. Tracheal three-dimensional CT demonstrated the stenosis and the stoma (Fig 1).

On June 23 1998, we resected a 3.7-cm-long section of the patient’s trachea, from the second to the ninth tracheal ring, and performed an end-to-end anastomosis. Two weeks later, flexible bronchoscopy revealed a small amount of granulation tissue forming in the cartilaginous portion of the anastomosis (Fig 2, a). The patient was prescribed tranilast, 300 mg/d, not only to stop the surgical scar enlarging, but also to inhibit the growth of granulation tissue. She was discharged 28 days after surgery with no respiratory problems. She was followed-up as an outpatient, and continued to receive tranilast. In August and October of 1998 (at 2 months and 4 months after surgery), we observed excessive growth of anastomotic granulation with a flexible bronchoscope (Fig 2, b and c). On each of these occasions, we resected the granulation tissue with several short bursts of APC. The equipment for APC consists of the APC probe, an argon-gas source, and a high-frequency surgical unit (APC 300, ICC 350; Erbe Elektromedizin; Tuebingen, Germany). To deliver the gas, we used a flexible Teflon tube with an outer diameter of 2.0 mm; this was put into the working channel of the flexible bronchoscope. After the second APC treatment (5 months after the surgery), the anastomotic granulation tissue had completely disappeared (Fig 2, d).

Figure 1. Preoperative three-dimensional CT of the patient’s trachea showed the stenosis (arrow heads) and the stoma (arrow).

Figure 2. Flexible bronchoscopy demonstrated slight granulation-tissue formation in the cartilaginous portion of the anastomosis 2 weeks after surgery (a). Excessive growth of granulation tissue at the anastomosis was observed at 2 months (b) and 4 months (c) after surgery. After the second APC treatment (5 months after surgery), the granulation tissue had completely disappeared (d).

*From the Department of Thoracic Surgery, Kyoto University Hospital, Kyoto, Japan.

Manuscript received February 24, 2000; revision accepted April 26, 2000.

Correspondence to: Masaaki Sato, MD, FCCP, Department of Thoracic Surgery, Kyoto University Hospital, Kawahara-cho 54, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan; e-mail: satoooo@kuhp.kyoto-u.ac.jp
The penetration depth of about 2 mm is constant and accessible and cost-effective compared with platelet-derived wound-healing formula. We believe that APC is an effective and useful treatment for granulation tissue formation at tracheal or bronchial anastomosis.

**REFERENCES**


