

# Free Flap Anastomosis Leak after Implantable Doppler Removal

Véronique Anctil<sup>1</sup>, Simon Brisebois, MD, MSc, FRCSC<sup>1</sup>, and Pierre-Hugues Fortier, MD, FRCSC<sup>1</sup>

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## Keywords

free flap, implantable Doppler, complications, monitoring, anastomotic leak

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A 74-year-old woman was referred to our center for osteoradionecrosis of the right mandible occurring after dental extraction despite preventive hyperbaric therapy. The patient had been treated by concurrent chemoradiation for a squamous cell carcinoma of the base of tongue >10 years ago. Given the severity of the osteoradionecrosis, a right segmental mandibulectomy with reconstruction via a “tip of the scapula” osseous free flap was planned. During surgery, an implantable Cook-Swartz Doppler probe (Cook Medical, Bloomington, Indiana) was installed 3 cm above the anastomosis on the subscapular artery for postoperative monitoring of the flap. A prophylactic tracheostomy was installed and then weaned postoperatively.

The Doppler probe was removed on postoperative day 7. Immediately following withdrawal, the patient developed a left cervical hematoma. An urgent exploration in the operating room revealed a large hematoma originating from a leak in the arterial anastomosis, which was fixed. Complete vessel occlusion occurred minutes later, and the arterial anastomosis was taken down and redone. Less than 24 hours later, the patient needed a second exploration to revise the anastomosis due to an arterial and venous occlusion. Intravenous heparin was immediately started. The next day, an active wound bleeding required drainage at the bedside on 2 separate occasions; therefore, the heparin was stopped.

Following this, the patient presented multiple complications. Due to the reinstallation of a tracheostomy and her deconditioned state, she suffered persistent dysphagia despite speech therapy. A feeding gastrostomy was installed. One last intervention was performed 3 weeks later given the persistent wound dehiscence. A surgical debridement with a

pectoralis major flap reconstruction and a skin graft was necessary. The tracheostomy was weaned 58 days after the initial surgery. Finally, the patient was transferred back to the referral center for her rehabilitation.

## Discussion

The Cook-Swartz probe is a 20-MHz probe that can be installed on any vessels after a free flap reconstruction for direct and continuous blood flow monitoring. Recent systematic reviews comparing the Doppler probe with the conventional clinical evaluation showed that the flap salvage rate was improved through this technology. As a drawback, an increase in the false-positive rate of vascular occlusion diagnosis was also noted.<sup>1,2</sup> After use, the cord can be disengaged from the Doppler crystal by a traction force of 0.4 N (0.1 lbf). The manufacturer instructs us about potential adverse events, such as a vascular anastomosis avulsion, but few of these, as in the case for our complication, have actually been reported in the literature.<sup>3</sup> This serious complication can lead to flap loss, but it also exposes the patient to complications that potentially require medical and surgical interventions that would not have otherwise been required.

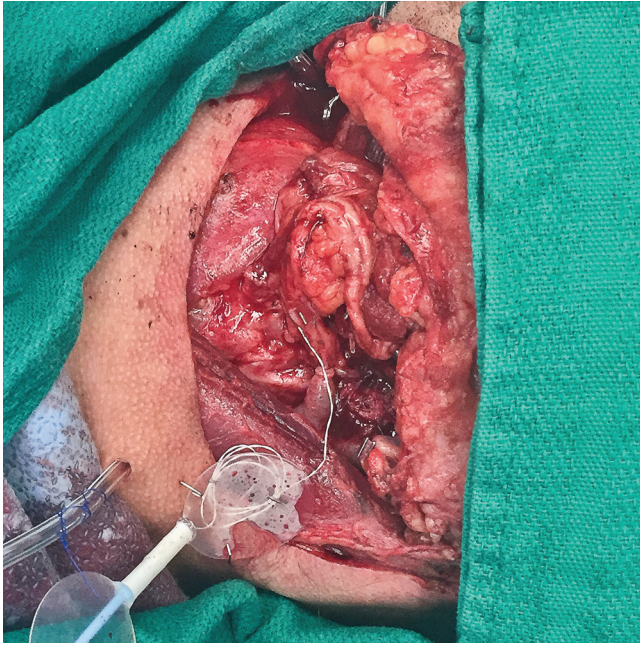
Two hypotheses could explain this adverse event. First, the partial avulsion of the anastomosis at the time of the withdrawal of the Doppler probe could have been caused by a high rigidity of the connection between the wire and the probe. The detachment of the probe from the silastic collar might not have occurred as planned, causing undue traction on the artery and avulsion of the sutures at the anastomosis. Another possibility is that the wire could have been coiled up near the anastomosis, thus creating a friction or shearing, which could have led to anastomotic rupture. In addition,

<sup>1</sup>Otolaryngology and Head and Neck Surgery Division, Department of Surgery, Centre Hospitalier Universitaire de Sherbrooke, Sherbrooke, Canada

## Corresponding Author:

Simon Brisebois, MD, MSc, FRCSC, Otolaryngology and Head and Neck Surgery Division, Department of Surgery, Centre Hospitalier Universitaire de Sherbrooke, 580, rue Bowen Sud, Sherbrooke, Québec J1G 2E8, Canada.  
Email: Simon.Brisebois@USherbrooke.ca





**Figure 1.** Correct placement of the Cook-Swartz Doppler probe on the arterial anastomosis. The probe is placed 3 cm from the anastomosis, with the wire directed toward the anastomosis.

weakening of the tissues secondary to chemoradiation may have contributed to the process in all cases.

Several technical details are of importance to prevent an anastomotic rupture with probe wire removal. First, the surgeon should ensure that the probe is positioned at least 3 cm away from the vascular anastomosis, with the wire directed toward the anastomosis, as recommended by the manufacturer (**Figure 1**). Finally, even if the manufacturer does not recommend doing so, the option to cut the wire and leave the proximal portion in the surgical site remains possible as a last-resort measure if any unusual amount of resistance is felt at the time of probe removal.

In conclusion, the avulsion of vascular anastomosis at the time of probe removal remains a rare occurrence but may lead to a series of unfortunate complications for the patient. Judicious use of this technology and proper installation technique are paramount to prevent occurrence of these complications.

This report was approved by the Ethics Committee on Human Health Research at the Centre Hospitalier Universitaire de Sherbrooke.

### Author Contributions

**Véronique Anctil**, review of literature, writing of the manuscript; **Simon Brisebois**, review of literature, writing and preparation of manuscript; **Pierre-Hugues Fortier**, review of the manuscript.

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