

## LETTER TO THE EDITOR

### Caution with Regard to Use of the Implantable Doppler Probe on the Internal Mammary Vein

We have extensive experience using the implantable Doppler probe for monitoring of microvascular flaps.<sup>1</sup> We have found it to be of great assistance in providing real-time information and direct assessment of anastomotic patency. Swartz showed that placing the probe on the venous side of the flap optimized the monitoring of microvascular flow, as arterial monitoring does not allow for rapid detection of venous thrombosis, and an arterial pulse will persist for several hours after venous thrombosis.<sup>2,3</sup> In our experience, there has been a very low rate of false-positive (loss of Doppler signal with normal flow) or false-negative (normal Doppler signal with loss of flow) signals. However, we have independently observed the occurrence of false-negative Doppler signals with use of the Doppler probe on the internal mammary vein.

A 53-year-old woman underwent left breast reconstruction with a superficial inferior epigastric artery microvascular flap. The implantable Doppler probe was placed on the internal mammary vein just distal to the anastomosis. On the second postoperative day, the skin paddle appeared pale. The Doppler signal was unchanged. The patient was taken to the operating room where arterial thrombosis was found. Thrombectomy was performed, and the arterial system was reconstructed with a vein graft.

A 47-year-old woman underwent a delayed left breast reconstruction with a deep inferior epigastric artery perforator microvascular flap. The implantable Doppler probe was placed on the internal mammary vein just distal to the anastomosis. On the first postoperative day, the skin paddle appeared congested. The Doppler signal was unchanged and sounded like a strong venous signal. The patient was taken to the operating room where venous thrombosis was found. Thrombectomy was performed, and the venous system was reconstructed with a vein graft. Of note is that at the time of exploration, there continued to be a strong venous signal even while the venous anastomosis was completely thrombosed. The flap survived, but the

distal-most edge of the flap suffered some induration and fat necrosis.

The frequency of microvascular breast reconstruction has increased in our practices in recent years, with the concurrent increased use of the internal mammary system as the recipient vessels. In more than 300 cases, we have identified three cases of a false-negative interpretation of a Doppler signal. We believe this is most likely attributable to the back-and-forth motion of blood in the internal mammary vein even in the absence of true flow, due to the effect of the thoracic cavity. In all of the cases where this has been observed, there has been another indication for reexploration, namely a change in the appearance of the skin paddle.

Based on this experience, we suggest the following:

1. Caution should be used when interpreting implantable Doppler signals from the internal mammary vein. Loss of the signal very likely indicates loss of flow, but the presence of a signal, especially a weak signal that varies strongly with respiration, does not necessarily indicate venous flow. After the venous Doppler probe is applied, a Biemer clamp should be placed momentarily on the internal mammary artery. The venous signal should cease after a few seconds. If the venous signal continues, despite complete occlusion of the arterial inflow, then this indicates that the venous Doppler signal is indeed coming from back-and-forth motion of blood from the internal mammary vein across the venous anastomosis and not from true venous flow from the flap. In such a situation, the venous Doppler alone cannot be trusted to monitor the arterial anastomosis. One option is to place a second Doppler probe on the flap artery distal to its anastomosis with the internal mammary artery.
2. The appearance of the skin paddle may be a better indicator of flap status. Therefore, a skin paddle

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should be preserved and monitored whenever possible. A change in appearance of the skin paddle demands reexploration.

As always, clinical observations should not be superseded by mechanical data. We wanted to share our observation that in this instance, the axiom “the Doppler never lies” is not quite accurate.

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## REFERENCES

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