

Case Report

Successful Salvage of an Anterolateral Thigh Free Flap in a Septic Patient Under Noradrenaline Support

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Abstract

Perioperative hemodynamic instability and sepsis pose major challenges to microvascular free tissue transfer. Traditionally, vasopressors have been avoided during free flap reconstruction due to concerns of vasoconstriction and flap ischemia. However, emerging evidence suggests that norepinephrine may safely maintain systemic perfusion without compromising flap viability. We report a case of successful salvage of an anterolateral thigh (ALT) free flap in a septic, hypotensive patient who required continuous perioperative norepinephrine infusion. This case reinforces the evolving paradigm that controlled vasopressor use can be compatible with free flap survival, even in critically ill patients.

Introduction

Free tissue transfer is a cornerstone of modern reconstructive surgery, providing durable coverage for extensive scalp and cranial defects. The success of such procedures depends on stable systemic perfusion and uncompromised microcirculatory flow. Sepsis and hypotension, however, complicate intraoperative management and may jeopardize flap survival.

Historically, the intraoperative use of vasopressors was discouraged due to fear of vasoconstriction-induced ischemia. Recent clinical studies, however, have challenged this dogma, demonstrating that norepinephrine can maintain adequate mean arterial pressure (MAP) and even enhance flap perfusion when used judiciously. Randomized and observational studies have shown that norepinephrine neither increases the risk of flap failure nor reduces microvascular blood flow [(Eley et al., 2012); (Rajan et al., 2019); (Gardner et al., 2021); (Lee et al., 2023); (Ehrl et al., 2024); (Anker et al., 2019)].

This report presents a complex case of successful ALT free flap salvage in a patient with recurrent meningioma and perioperative sepsis managed with continuous norepinephrine infusion.

Case Presentation

A 44-year-old female with a history of multiple meningiomas underwent excision of an en-plaque meningioma in 2012 involving the left zygomatic and frontoparietal regions. On 12 February 2025, she underwent re-excision of a recurrent meningioma with cranioplasty using a PEEK prosthesis.

Her postoperative course was complicated by a surgical site infection initially due to Methicillin-resistant *Staphylococcus aureus* (MRSA), later superinfected with *Pseudomonas aeruginosa*, resulting in prosthesis exposure. On 23 July 2025, the infected PEEK plate was removed and the wound debrided, leaving a large scalp and calvarial defect.

Subsequently, on 31 July 2025, an anterolateral thigh (ALT) free flap with an interpositional saphenous vein graft was performed for scalp and calvarial coverage. The procedure lasted approximately 13 hours with an estimated blood loss of 600 mL.

Perioperative Hemodynamics:

The patient presented with early sepsis and persistent hypotension, along with T-wave inversions on ECG. Despite aggressive fluid resuscitation, blood pressure remained low, prompting initiation of continuous low-dose intravenous norepinephrine intraoperatively, which was continued postoperatively. Mean arterial pressure was maintained around 100 mmHg throughout surgery and recovery.

Postoperative Course:

The patient was extubated on postoperative day (POD) 2 with gradual hemodynamic stabilization. On POD 4, she developed *Klebsiella pneumoniae* septicemia (carbapenemase-producing strain), necessitating escalation of antibiotic therapy. Norepinephrine was tapered and discontinued by the end of the second postoperative week. The flap remained viable with excellent capillary refill and no evidence of venous congestion or necrosis. At two weeks postoperatively, the patient was alert (GCS 15/15), hemodynamically stable, and had healthy flap coverage.

Discussion

This case highlights the successful use of norepinephrine during free flap reconstruction in a patient with sepsis and hemodynamic instability.

Traditional teaching cautioned against vasopressor use due to concerns of vasoconstriction, compromised pedicle flow, and increased risk of thrombosis. However, contemporary evidence suggests otherwise.

In a randomized controlled trial, Eley et al. (2012) demonstrated that norepinephrine increased free flap blood flow compared with epinephrine and dopexamine. Rajan et al. (2019) similarly reported no adverse outcomes in 120 free flap cases involving perioperative norepinephrine. Gardner et al. (2021), in a large cohort study, confirmed that intraoperative vasopressor use did not increase reoperation or flap failure rates.

Further supporting evidence comes from controlled trials and physiologic studies. Lee et al. (2023) found that norepinephrine preserved perfusion more effectively than phenylephrine in breast free flaps, while Ehrl et al. (2024) prospectively demonstrated that postoperative norepinephrine infusion did not impair microvascular flow in 105 patients. Anker et al. (2019) showed through indocyanine green perfusion imaging that vasopressor-dominated hemodynamic support resulted in

comparable flap perfusion to fluid-heavy strategies in DIEP flap surgery, and excessive fluid administration was more detrimental.

These findings align with the current trend toward balanced hemodynamic management — emphasizing moderate fluid restriction with controlled vasopressor support to avoid interstitial edema and venous congestion, both of which can compromise flap perfusion. Our patient's excellent flap survival under continuous norepinephrine support, despite systemic

sepsis, supports this evolving paradigm. Judicious vasopressor use appears not only safe but essential to maintaining adequate perfusion pressure in critically ill reconstructive patients.

Conclusion

This case illustrates that norepinephrine can be safely administered during free flap surgery even in septic and hemodynamically unstable patients. When used within a controlled hemodynamic framework, norepinephrine ensures stable perfusion without compromising flap viability. Along with meticulous surgical technique, infection control, and fluid balance, vasopressors such as norepinephrine should be considered a vital component of perioperative management in complex free flap reconstruction.

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Authors' Contributions

The first author conceived the study and wrote the manuscript. All authors contributed to the literature review, clinical data analysis, and approved the final version.

Ethics and Consent

Consent from next-of-kin could not be secured; however, all identifying details have been removed.

Competing Interests

The authors declare no competing interests.

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