Postoperative Controversies in the Management of Free Flap Surgery in the Head and Neck

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KEYWORDS

• Free flap • Head and neck defect • Anticoagulation • Fluid management • Flap monitoring

KEY POINTS

- A variety of postoperative anticoagulation protocols exist in the literature and in practice, yet few data suggest that one is superior to another.
- Anticoagulation protocols to manage underlying hypercoagulable risk or prevent secondary or primary clotting events are becoming standardized with known increases in bleeding complication rates.
- Fluid overload is a known risk factor for flap failure and literature supports conservative fluid use with preference for medication-based blood pressure management if physiologically appropriate.
- Flap monitoring methods vary. With changing training program work hour constraints, frequent monitoring by resident physicians may not afford benefit to flap survival.
- With high success rates in free flap surgery becoming standard, detecting significant changes based on subtly different postoperative protocols is increasingly difficult to power.

INTRODUCTION

With centers now reporting excellent free flap success rates that approach the 90% to 99% range, surgeons strive to pursue methods to ensure the survival of free tissue transfers.[1] There is morbidity for the patients undergoing free tissue transfer both at the donor site, and potentially the defect, especially if a free flap fails. Success of secondary transfers after failed first attempts is less than if the initial flap is viable, making the first attempt the best chance for optimal outcome for the patient.[2] Ross and colleagues[2] reported that second free flaps for head and neck defects had 73% success rate after failed first flap compared with 96% for second flap for recurrence or wound complications. Head and neck cancer patients and others undergoing flap surgery have oncologic and medical considerations that may affect the success of surgery, or even cancer treatment pathway.[3–5] After preoperative optimization, the survival of free tissue depends on a technically successful surgery, and postoperative management.

Although intraoperative management is paramount for the successful completion of flap surgery, postoperative management is increasingly a focus of surgeons attempting to manage risk of flap failure. That preoperative assessment is important to patient selection is clear, but controversy

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Facial Plast Surg Clin N Am 24 (2016) 309–314
http://dx.doi.org/10.1016/j.fsc.2016.03.007
1064-7406/16/$ – see front matter

exists within the management of the flap and patient in the postoperative timeframe. Substantial literature has been produced regarding anticoagulation, fluid management, and flap monitoring and is of clear importance in success, and ability to salvage flap problems.

As guidelines are increasingly provided to head and neck surgeons regarding the proper perioperative management of anticoagulation for both high-risk and low-risk patients, the effect of these recommendations and how they interface with flap-based anticoagulation protocols remains controversial.[6–8] The risk of hematoma, or bleeding complications, and their impact on flap survival within the guidelines suggested is a topic of recent debate. Bahl and colleagues[8] demonstrated in a large cohort of patients undergoing otolaryngologic surgery that venous thromboembolism (VTE) carries a low likelihood overall, but a subset of patients with high Caprini risk score had a higher rate of VTE. This was offset by the increased risk of bleeding complications in groups on VTE chemoprophylaxis. The study further outlined patients undergoing free tissue reduced their risk of VTE from 7.7% to 2.1% and increased risk of bleeding from 4.5% to 11.9% when treated with chemoprophylaxis.

Furthermore, patients undergoing major head and neck reconstruction are typically devoid of oral intake for substantial periods postoperatively. As such, intravenous or enteral feedings provide sustenance and fluid balance in the postoperative timeframe. The literature supports that intraoperative fluid administration is an important predictor of flap complications and argues that the postoperative course may be affected by choice of fluid volume in the postoperative timeframe.[9] Poor nutrition, cancer pathology, cachexia, and electrolyte imbalance can all be found in the reconstructive candidate and may result in fluid shifts that affect intravascular/extravascular fluid balance. The result can dictate intravascular fluid, oxygen, and nutrient delivery to the newly placed free flap, or create surrounding tissue edema and pressure on the vascular pedicle and microvascular environment. Inherent to flap surgery is disruption of lymphatic drainage, which may compound edema further; fluid shift impacts the local and regional flap environment.

Early flap problem diagnosis is critical to the salvage and survival of free tissue. Some reports suggest that 80% of flaps can be salvaged if diagnosed early in the process of failure. In addition, it is known that the majority of vascular compromise occurs within the first 72 hours after anastamosis.[10] Monitoring methods in the early and late hospitalization periods should be tailored to allow the care team to identify problems early in their course, and return a patient to the operating room or medical intervention that may save the flap from failing. Multiple monitoring methods exist, and the low likelihood of failure makes the use of potentially costly monitoring controversial.[11]

Within this review, these controversies are explored in more detail with an effort to more clearly delineate the literature, controversies, and future of managing these important, controllable factors in flap survival.

ANTICOAGULATION FOR THE PREVENTION OF VENOUS THROMBOEMBOLISM

Single-center reports and reviews have demonstrated that postoperative anticoagulation protocols after flap surgery vary. The benefit to the patient is largely in the prevention of secondary events during at-risk time periods such as surgery and hospitalization. The Caprini risk score has been applied to head and neck patients and is noted to stratify risk in head and neck surgery patients.[12] Patients with head and neck cancer are at risk for vasculopathology and postoperative clotting events.[8] Newer guidelines suggest that these patients should be maintained on anticoagulation whenever feasible, unless bleeding complications would be catastrophic. In the head and neck, procedures with high bleeding risk or major sequelae of bleeding may warrant cessation of anticoagulation; these are summarized in **Table 1**.[13] These newer guidelines represent a significant paradigm shift from previous common practice to cease the use of anticoagulation before surgery. Coincidently, the cardiac literature suggests that cessation of medications may result in a hypercoagulability increase that would put the patient at risk for secondary clotting events such as myocardial infarction, stroke, deep venous thrombosis, or pulmonary embolus, yet it remains unanswered whether this would also affect flap survival.[6]

Taken in aggregate, the need for adequate prophylaxis and secondary clot prevention with the risk of hematoma or bleeding event create a controversial issue surrounding flap management in the postoperative period. Continuing anticoagulation in the perioperative period results in increased levels of bleeding complications and an inferred decrease in secondary clotting event risk.[8] The risk of secondary clotting event is low in the head and neck population at large, but when examined closely, is substantial in the at-risk patient. In addition, free flap surgery has been identified as an independent risk factor for thromboembolism. It is understood empirically that, if a patient has a major clotting event that is life threatening, that flap preservation is of little