Recurrent Intraoperative Free Flap Thrombosis Despite Systemic and Directed anticoagulation

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ABSTRACT

Objectives: Peri-operative free flap pedice anastamosis thrombosis is a known complication of the procedure. However, recurrent intraoperative thrombosis is a rare complication.

We report the first case, to our knowledge, of recurrent intraoperative thrombosis of multiple attempted free flaps and anastamotic revisions in a patient without identifiable underlying coagulopathy.

Study Design: Case report and literature review

Methods: A case of recurrent intraoperative free flap thrombosis in a 35-year old male is described, and the recent literature is reviewed.

Results: The patient is a 35-year old male with a history of meningioma, radiation, and failed bone flap. Resultant glabellar and frontal defect, with exposed bone and communication of exposed dura with the nasopharynx, necessitated free flap closure. Over the course of six days, he underwent a rectus abdominis free flap, an anastamotic revision, and, after subsequent rectus flap definitive failure, and a latissimus dorsi free flap by a second microsurgeon. Each case was complicated by intraoperative thrombosis of the arterial and venous anastamoses of the pedicles despite vessel irrigation with heparinized lactated ringers after harvest, systemic heparinization, clot clearance with a Fogarty catheter, and catheter directed tissue plasminogen activator (t-PA) infusion to the anastomoses of the arterial pedicle. The latissimus dorsi flap was deemed unsalvageable intraoperatively due to thrombosis and left as a biologic dressing and eventually removed. The brow bone was removed, and the defect was closed with local scalp flaps. The hematology service conducted a coagulopathy workup, which was unremarkable.

Conclusions: Recurrent intra-operative thrombosis in the absence of coagulopathy has been anecdotally noted by our senior surgeons, but never formally reported previously. In this perplexing scenario, proceeding with additional free flaps might not be advisable.

INTRODUCTION

Microvascular free flap reconstructions allow for radical head and neck resections with acceptable functional and esthetic outcomes. The overall reported success rates are in excess of 95%.

Postoperative complications are well documented – including, but not limited to, thrombosis, wound infection, congestion, abscess, necrosis, and flap loss. However, intraoperative complications that lead to flap compromise are much less common.

We report the first case, to our knowledge, of recurrent intraoperative thrombosis of multiple free flap attempts – rectus abdominis free flap, latissimus dorsi free flap, and multiple attempts at anastomotic revisions – in a patient without identifiable underlying coagulopathy.

METHODS AND MATERIALS

Case report and literature review.

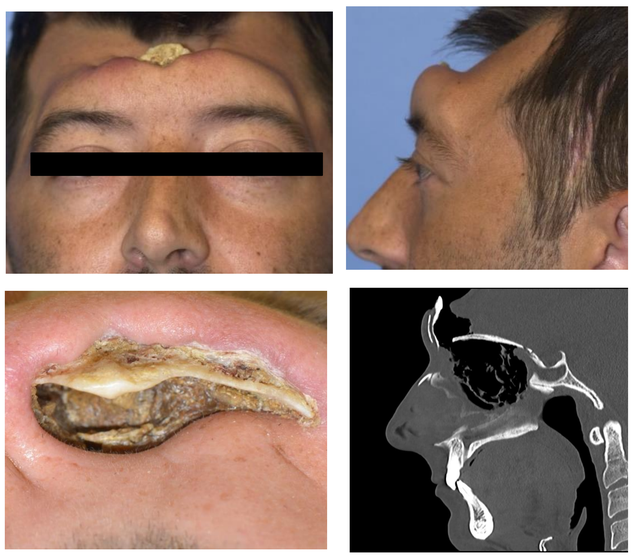
CASE REPORT

The patient is a 35 year old male with a history of an olfactory groove, WHO grade 2, meningioma. Treatment at that time was resection via a subcranial approach.

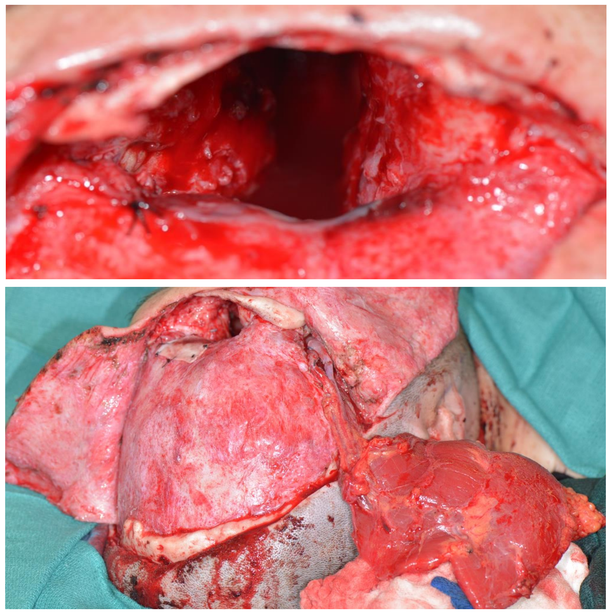
He underwent bifrontal craniotomy for recurrent meningioma in August 2013. He was treated for his tumor recurrence with a bifrontal craniotomy and post-operative IMRT. 4 months post-treatment there were several area that were not healing well in the glabellar region. Ultimately, there was progression of this non-healing wound to an open defect in which the glabellar defect was in continuity with a frontal sinus remnant and ethmoid sinuses.

The failure of the bone flap resulted in a glabellar/frontal defect. There was exposed bone and communication of exposed dura with the nasopharynx.

PRE-OP



INTRA-OP



Top image: Superior view of glabellar to nasopharynx defect
Bottom image: Rectus free flap prior to inset

OPERATIVE COURSE

Primary surgery for recurrence (POD 0):
- Drill down of bilateral supraorbital bar
- Washout and debridement of nasopharynx and communicating defect
- Rectus abdominis free flap, right saphenous vein graft

Salvage Surgery #1 (POD 2)
- Anastomatic revisions of right external carotid to left saphenous vein graft to flap & external jugular to saphenous to flap

Salvage Surgery #2 different surgeon (POD 5)
- Rectus abdominis free flap take down and removal
- Latissimus dorsi free flap – deemed unsalvagable due to thrombosis and no reflow intraoperatively

Recurrent intraoperative thrombosis of venous and arterial pedicles, despite vessel irrigation with heparinized LR, systemic heparinization, mechanical clot removal with Fogarty catheter, and catheter directed t-PA infusion through the arterial pedicle performed during all procedures.

Ultimately, primary closure of the defect was possible by drilling down nearly the entire supraorbital bar.

POST-OP

LIT REVIEW & DISCUSSION

- Overall reported free flap success rate:
  - > 95%
- Overall reported successful salvage rates:
  - 28-87.5%
  - Success decreases 72 hours after initial surgery
- Patient factors associated with free flap failure:
  - Operation for reason other than cancer (OR 5.40)
  - Coronary artery disease (OR 3.60)
  - Increased intraoperative fluid resuscitation
  - Hemoglobin < 11
- Components of flap failure
  - Thrombosis
    - Technical issues
    - Artery size mismatch
    - Calcified vasculature
    - Hematoma
    - Extrinsic compression
    - Vessel kinking, twisting
    - Avulsion of anastomosis
  - Arterial thrombosis
    - Occurs early, less likely to salvage
  - Venous thrombosis
    - Much high salve rate
  - No reflow
  - Microcirculation failure
- No prior reports of recurrent intraoperative thrombosis. Our index patient did not possess any of the known characteristics which increase flap failure. His coagulopathy workup by hematology was negative for abnormalities.

CONCLUSIONS

Recurrent intraoperative thrombosis leading to flap failure has not been previously reported in the literature, particularly in the setting of systemic and catheter directed anticoagulation.

Surgeons at our institution have anecdotally noted this circumstance previously. In this perplexing situation, additional free flap reconstruction might not be advisable given high likelihood of failure.

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