

Neuromuscular scoliosis was significantly associated with VEPTR hardware salvage failure ($P = 0.041$; OR = 3.1). Conversely, congenital scoliosis was significantly protective in achieving VEPTR hardware salvage ($P = 0.012$; OR = 4.2) and preventing need for immediate hardware removal ($P = 0.049$; OR = 4.7). Indications for flap coverage were threatened exposure (37.9%) and exposed hardware (62.1%). Exposed hardware was significantly more likely to require immediate removal ($P = 0.045$; OR = 7.0) and resulted in unsuccessful hardware salvage ($P = 0.015$; OR = 4.5).

The majority of patients were malnourished and underweight (65.8%) with BMI of 17.8 kg/m² (95%CI 17.4–18.5). A substantial number of patients were incontinent (79.3%), nonambulatory (48.3%), or ventilator-dependent (46.6%). Nonambulatory status ($P = 0.018$) was significantly implicated in salvage failure.

Hardware complications were successfully salvaged in 62.1% of patients. Latissimus and paraspinous muscle flaps were similarly effective overall ($P = 0.489$) at achieving hardware salvage. Upper back ($P = 0.640$), middle back ($P = 0.086$), and lower back ($P = 0.490$) wound salvage did not significantly differ based on whether latissimus or paraspinous muscle flaps were utilized; however, latissimus flaps were significantly ($P = 0.046$) more likely to achieve hardware salvage than paraspinous muscles at the lower back in the setting of infection.

Hardware salvage with only rib to rib fixation ($P = 0.018$) was significantly likely to lead to hardware salvage (76.7%). Rib to rib fixation had a significantly lower risk of infection ($P = 0.019$; 30.0%) than those with other fixation modalities deployed (60.7%). Locations of wounds were significantly implicated in requiring hardware removal ($P = 0.037$), such that patients with upper back wounds were more likely to need immediate removal (36.0%) than those with middle back wounds (8.8%) and lower back hardware complications (20.0%).

CONCLUSIONS: Local and regional muscle flaps were able to prevent VEPTR hardware removal in the majority of patients, even in the setting of infection, immobility, incontinence, and multiple systemic comorbidities. Patients with neuromuscular scoliosis and nonambulatory status were at increased risk for failure, while those with incontinence and low BMI trended toward increased risk of failure. Threatened exposure was associated with higher rates of salvage than exposed hardware, and thus earlier referral to plastic surgeons for soft tissue salvage may be advised.

Evaluating the Inaccuracy of the NSQIP Surgical Risk Calculator in Predicting 30-day Complications in Plastic Surgery

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BACKGROUND: Preoperative surgical risk assessment is a major component of clinical decision-making. The ability to provide accurate, individualized risks of complications has become critical due to growing emphasis on quality metrics and outcome benchmarks. The ACS NSQIP Universal Risk Calculator was designed to quantify patient-specific risk across various types of surgery. Its applicability to plastic surgery is unclear, however, with multiple studies reporting inaccuracies among certain patient populations.¹ This study utilizes meta-analysis to evaluate the accuracy of the NSQIP Risk Calculator in predicting complications among patients having plastic surgery.

METHODS: OVID Medline and PubMed were searched for all studies evaluating the predictive accuracy of the NSQIP Risk Calculator in plastic/reconstructive surgery, including oncologic defect reconstruction, ventral hernia repair, and body contouring. Only studies directly compared Risk Calculator predicted to observed complication rates were included. The primary outcome was Area Under the Curve (AUC), which measures the ability of the Surgical Risk Calculator to predict 30-day complications, ranging from 0.50 (prediction no better than random chance) to 1.0 (perfect prediction). Risk Calculator accuracy was assessed for each complication via DerSimonian and Laird random-effects analytic model. Data heterogeneity were evaluated with the I² statistic, judged low (I² < 50%) or borderline/unacceptably high (I² > 50%). All analyses were conducted in StataSE 16.1 (StataCorp LP, College Station, Tex.).

RESULTS: Of the 296 studies identified from initial search, 10 studies with 2416 patients overall met criteria and were included for analysis. Studies were classified as follows: head and neck oncologic/reconstruction (head and neck: N = 5, breast: N = 1, extremity: N = 1), open ventral hernia repair (N = 2), panniculectomy (N = 1).

Sufficient data were reported to meta-analyze eight NSQIP-defined complications. Predictive accuracy was poor for medical complications [pulmonary AUC = 0.67 (0.48–0.87), cardiac AUC = 0.66 (0.20–0.99), venous thromboembolism AUC = 0.55 (0.47–0.63)]. Similarly, predictive accuracy for surgical complications was unsatisfactory [surgical site infection AUC = 0.55 (0.46–0.63), reoperation AUC = 0.54 (0.49–0.58), serious complication AUC = 0.58 (0.43–0.73)]. Finally, any complication was poorly predicted by the NSQIP Risk Calculator [AUC = 0.60 (0.57–0.64)]. Although mortality was accurately predicted in two studies [AUC = 0.87 (0.54–0.99)], heterogeneity was high with $I^2 = 68\%$. Otherwise, heterogeneity was minimal ($I^2 = 0\%$) or acceptably low ($I^2 < 50\%$) for all other outcomes.

CONCLUSIONS: The NSQIP Universal Surgical Risk Calculator aimed at offering individualized quantifiable risk estimates for surgical complications, consistently demonstrated poor risk discrimination in this plastic surgery-focused meta-analysis. The limitations of the Risk Calculator are perhaps most pronounced where complex, multidisciplinary reconstructions are needed². Future efforts should identify targets for improving Risk Calculator reliability in order to better counsel patients in the perioperative setting and guide appropriate healthcare resource allocation.

REFERENCES:

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The Effect of Variation in Intraoperative Technique on Outcomes in Lower Extremity Free Flap Reconstruction

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BACKGROUND: Free flap failure rates are higher in the lower extremity than other areas of the body. Although many studies have investigated the effect of particular intraoperative technical variables, these studies include small case series or are not contemporary cohorts, more closely reflecting current practice with wide availability and acceptance of instruments such as venous couplers and perforator flap techniques.

PURPOSE: Investigate the effect of variation in intraoperative techniques and flap selection on flap outcomes in a diverse cohort of patients requiring lower extremity free flap coverage at multiple institutions.

METHODS: Consecutive patients undergoing free flap reconstruction of the lower extremity distal to the hip at two level-1 trauma centers from January 1, 2002 to January 1, 2020 were identified using CPT codes followed by review of electronic medical records to collect patient and treatment characteristics. Data were collected regarding patient demographics and comorbidities, indication for operation, intraoperative technical details (including recipient artery and vein, number of venous anastomoses, superficial or deep venous system, coupler use and coupler size, end-to-end and end-to-side anastomosis techniques, use of vein grafts or AV loops), and complications. The primary outcome of interest was flap failure, and secondary outcomes included unplanned return to the operating room, arterial thrombosis, venous thrombosis, and partial flap failure. Bivariate analysis and multivariable logistic regression were performed.

RESULTS: 410 patients underwent 420 free tissue transfers to the lower extremity distal to the hip. Median follow up time was 17 months (IQR 8.0–37). Overall, total flap failure occurred in 5.0% (n = 21), partial flap failure in 5.7% (n = 24), and unplanned reoperation in 9.0% (n = 37), arterial thrombosis 3.2% (n = 13), and venous thrombosis 5.4% (n = 22). Regarding intraoperative variables, on bivariate analysis, ALT donor site ($P = 0.049$) was associated with arterial thrombosis, ankle recipient site ($P = 0.046$) and prior failed reconstruction ($P = 0.003$) with partial flap failure, and arterial revision with total flap failure ($P = 0.035$). Recipient artery, recipient vein, venous system, number of venous anastomoses, and arterial and venous anastomotic technique were not associated with any of the outcomes. On multivariate analysis, only the relationship between intraoperative arterial revision and total flap failure [OR: 4.54, p 0.016, 95% CI (1.3–16)] and prior failed reconstruction and partial flap failure [OR 2.79, p 0.020, 95% CI (1.2–6.7)] remained significant.