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Developing a Predictive Model for Complications Following Post-Weight Loss Panniculectomy

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Background

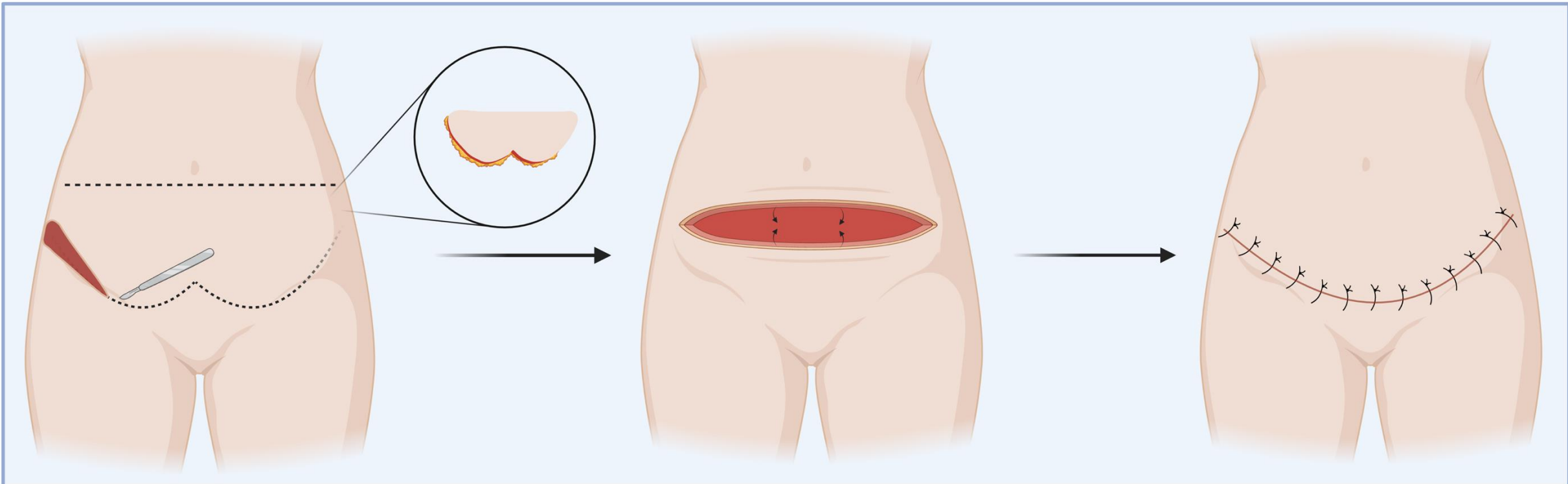
Panniculectomy

After massive weight loss, many patients are left with excess lower abdominal skin that can interfere with daily activities, impair hygiene, and lead to chronic rashes, chafing, and infections. Panniculectomy removes this redundant tissue to relieve symptoms and improve overall quality of life.

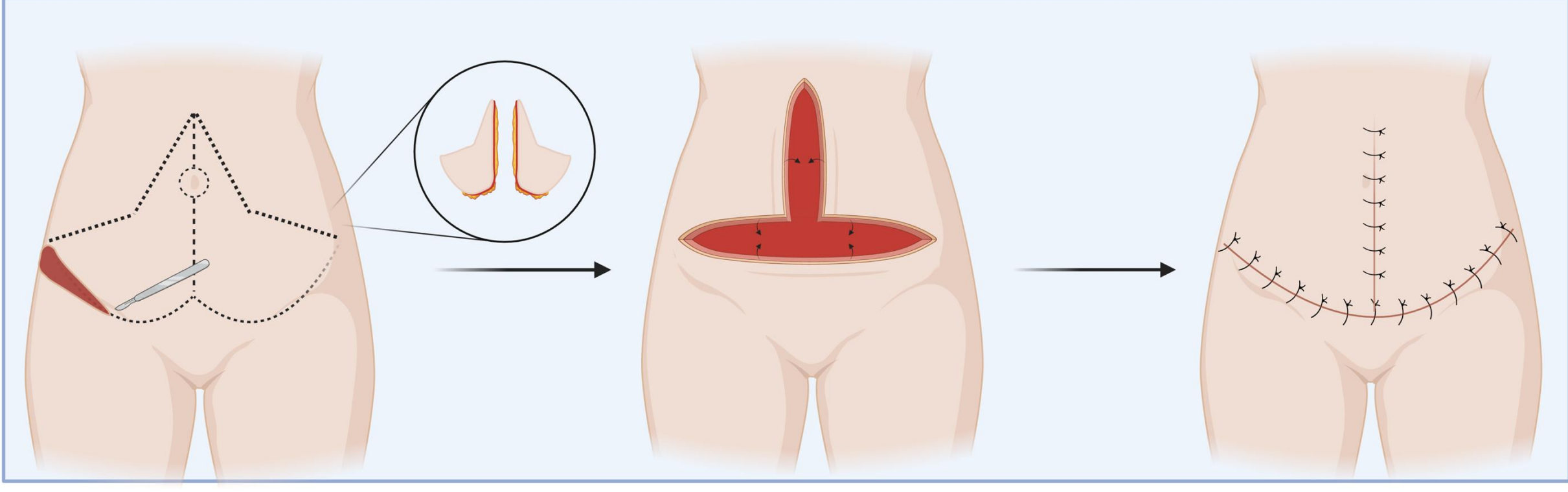
Current Techniques

Transverse vs Fleur-de-Lis

Transverse Incision



Fleur-de-Lis



Post-Operative Risks Common Complications

Risk Factors

- Higher BMI and massive weight loss
- Diabetes and impaired wound healing
- Smoking
- Anticoagulant use / bleeding risk
- More extensive surgical techniques (e.g., Fleur-de-Lis)

Common Postoperative Complications

- Soft tissue infection
 - Wound dehiscence
 - Seroma / hematoma formation
 - Delayed wound healing
 - Reoperation / ED visits
- Less common: umbilical necrosis, transfusion requirement

Objective

Objective:

To evaluate whether a modified fascial closure technique in Fleur-de-Lis panniculectomy reduces postoperative complications compared with the standard closure technique.

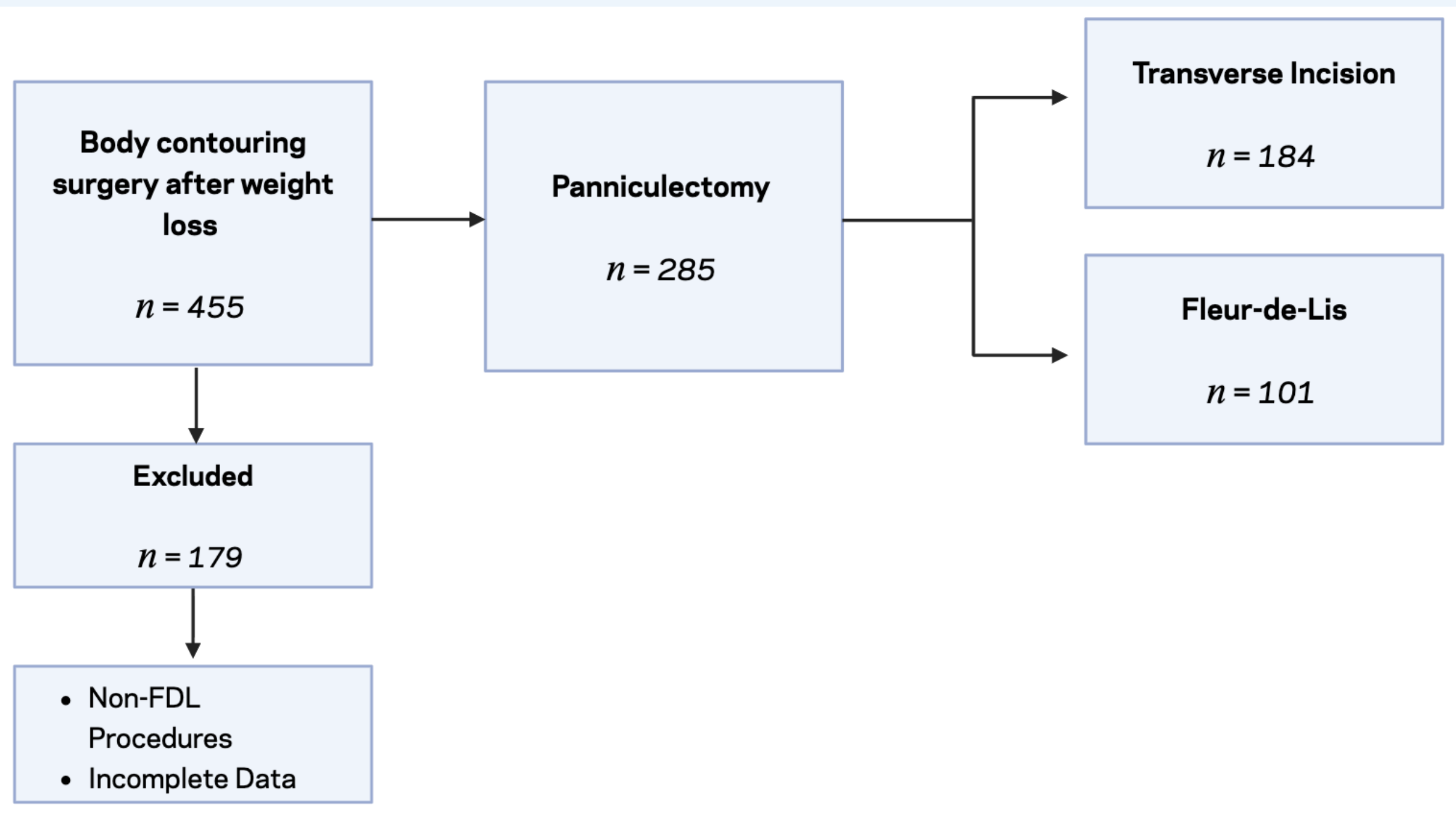
Methods

Study Design & Population

A retrospective chart review was conducted of patients who underwent body contouring surgery following massive weight loss between 2019 and 2023.

Study Cohort

Of 455 patients who underwent body contouring after weight loss, 285 who underwent panniculectomy included and stratified by closure technique (Transverse incision, n = 184; Fleur-de-Lis n = 101)



Data Collected

- Patient demographics:** age, sex, ethnicity
- Clinical variables:** preoperative BMI, smoking status, comorbidities (diabetes, hypertension, dyslipidemia), anticoagulant use, and prior surgical history
- Procedure details:** incision type (transverse vs Fleur-de-Lis) and concomitant procedures
- Postoperative complications:** infection, dehiscence, seroma, hematoma, reoperation, emergency department visits, painful scarring, transfusion, and other complications

Statistical Analysis

- Chi-square and Fisher's exact tests were used to compare complication rates between surgical groups
- Multivariate logistic regression was performed to identify independent predictors of postoperative complications
- Variables demonstrating significance or trend-level association were included in a predictive model
- Statistical significance was defined as **p < 0.05**

Results

Complications and Risk Factor Analysis

Postoperative Complications Following Panniculectomy (n=278)	
Complication Type	Patients, n (%)
Dehiscence	27 (9.5)
ED Visits	46 (16.1)
Seroma	24 (8.4)
Reoperation	23 (8.1)
Hematoma	3 (1.1)
Soft Tissue Infection	54 (18.9)
Umbilical Necrosis	3 (1.1)
Painful Scarring	21 (7.4)
DVT/PE	0 (0.0)
Need for Blood Transfusion	5 (1.8)
Viral Symptoms	7 (2.5)
Other Complications	24 (8.4)

Multivariate Logistic Regression Analysis

Variable	p-value	Odds ratio
Surgery type	0.025	1.852
Smoking	0.318	0.764
Diabetes	0.116	1.599
Anticoagulant Use	0.055	2.921
Age	0.034	0.976
Ethnicity	0.303	0.35
BMI	0.151	0.969
Prior Weight Loss Surgery	0.745	0.898
Prior Weight Loss Medication	0.367	0.668
Prior Diet Use	0.797	1.081
Concomitant Procedure	0.614	0.817

- Most common complications:** soft tissue infection (18.9%), ED visits (16.1%), dehiscence (9.5%)
- No cases of DVT/PE were observed**
- FDL incision** was associated with increased complication risk (OR 1.85, p = 0.025)
- Younger age** was associated with higher risk (OR 0.98 per year, p = 0.034)
- Anticoagulant use** showed a trend toward increased risk (OR 2.92, p = 0.055)

Predictive Model

Predictive Model Equation

$\text{logit}(p) = 2.952 - 0.024(\text{Age}) - 1.192(\text{Ethnicity}) - 0.107(\text{Weight Loss Surgery}) - 0.404(\text{Weight Loss Meds}) - 0.031(\text{BMI}) + 0.078(\text{Diet Use}) + 0.469(\text{Diabetes}) + 0.157(\text{Prior Abdominal Surgery}) + 1.072(\text{Anticoagulant Use}) - 0.269(\text{Smoking}) - 0.138(\text{Concomitant Procedure}) + 0.616(\text{Incision Type})$

Probability

$$p = \frac{e^{\text{that number}}}{1 + e^{\text{that number}}}$$

Coding Scheme for Using the Predictive Model

Variable	What to Enter in the Predictive Calculator
Surgery Type	Transverse = 0; Fleur-de-lis (FDL) = 1
Smoking Status	Non-smoker = 0; Smoker (previous or current) = 1
Diabetes	No = 0; Yes = 1
Anticoagulant Use	No = 0; Yes = 1
Age	Enter patient's age in years
Ethnicity	Non-Hispanic = 0; Hispanic = 1
BMI	Enter patient's BMI
Prior Weight Loss Surgery	No = 0; Yes = 1
Prior Weight Loss Medication Use	No = 0; Yes = 1
Prior Diet Use	No = 0; Yes = 1
Concomitant Procedure	No = 0; Yes = 1

How to Use the Equation:

- Enter patient variables using coding in Table 3
- Calculate $\text{logit}(p)$ using the equation
- Convert to probability

Final model:

- significant (**p = 0.041**)
- Good model fit (**Hosmer–Lemeshow p = 0.386**)
- Accuracy:** 64.5%
- Specificity:** 73.6%
- Sensitivity:** 54.5%
- AUC:** 0.661

Conclusions

Incision type (FDL), younger age, and anticoagulant use are associated with increased risk of postoperative complication risk. Careful preoperative evaluation of these factors may help optimize patient selection and reduce postoperative morbidity.

The proposed predictive model may serve as a useful adjunct for preoperative risk stratification and shared decision-making.