



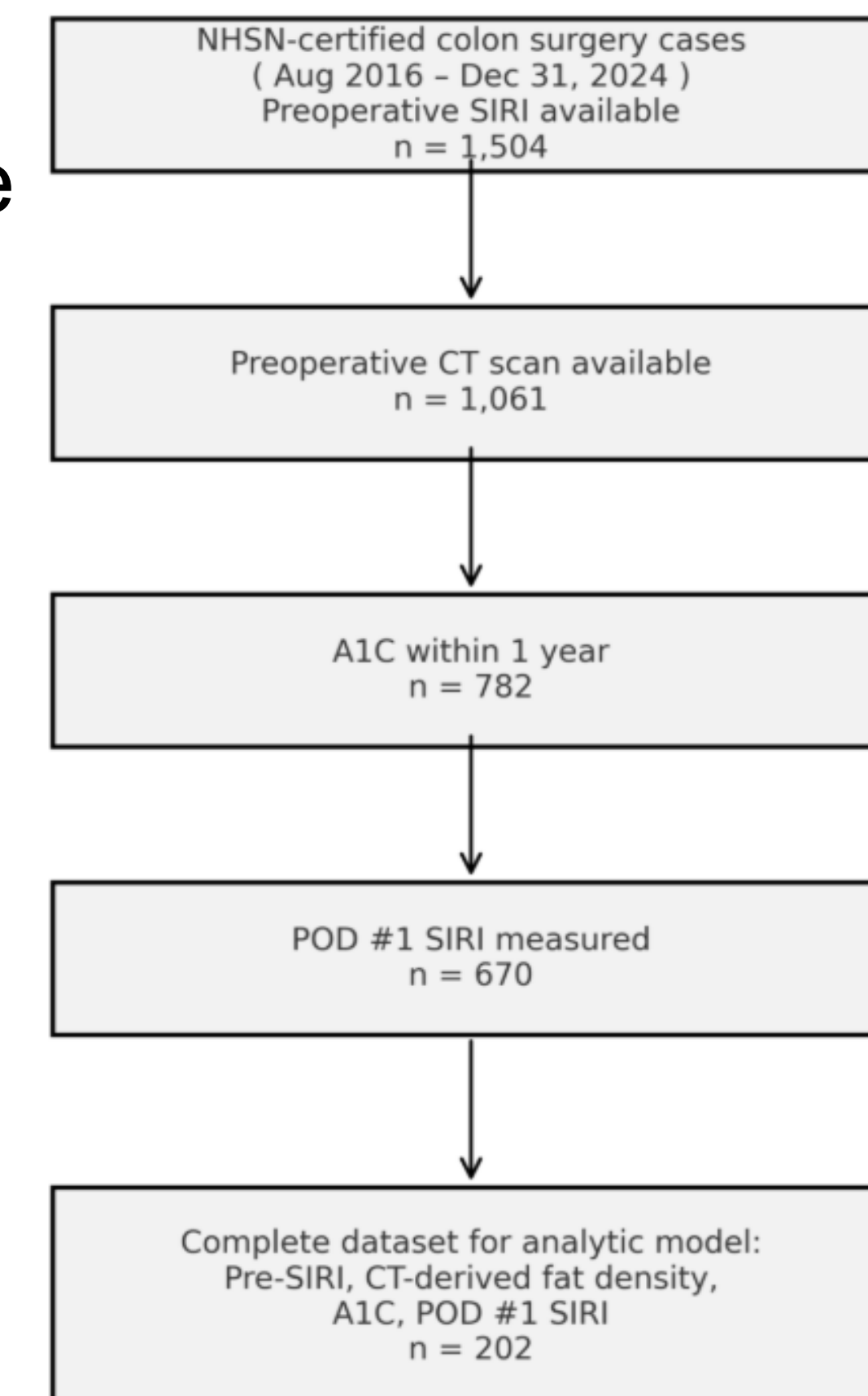
Impact of Visceral and Subcutaneous Fat on Postoperative Complications Depends on a Patient's Metabolic State

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Introduction

Inflammation and hyperglycemia contribute to adverse events after colorectal surgery. We hypothesized that visceral (VF) and subcutaneous fat (SF) could influence these mediators depending on the quality of the fat stores and the patient's glucose regulatory state.



Methods

- VF and SF were measured at L3 in CT scans of patients undergoing colorectal surgery
- HbA1c defined patients with diabetes, prediabetes, or normal glucose regulation. Inflammation was measured with the systemic inflammatory response index (SIRI) and neutrophil/lymphocyte ratio (NLR)
- Severe hyperglycemia was defined as glucose ≥ 180 mg/dl within the first 48 hours
- Fat density expressed in Hounsfield Units (HU) was used to reflect fat quality
- Logistic and linear regression analyses assessed the relationship between fat stores, other predictors, and complications.

Results

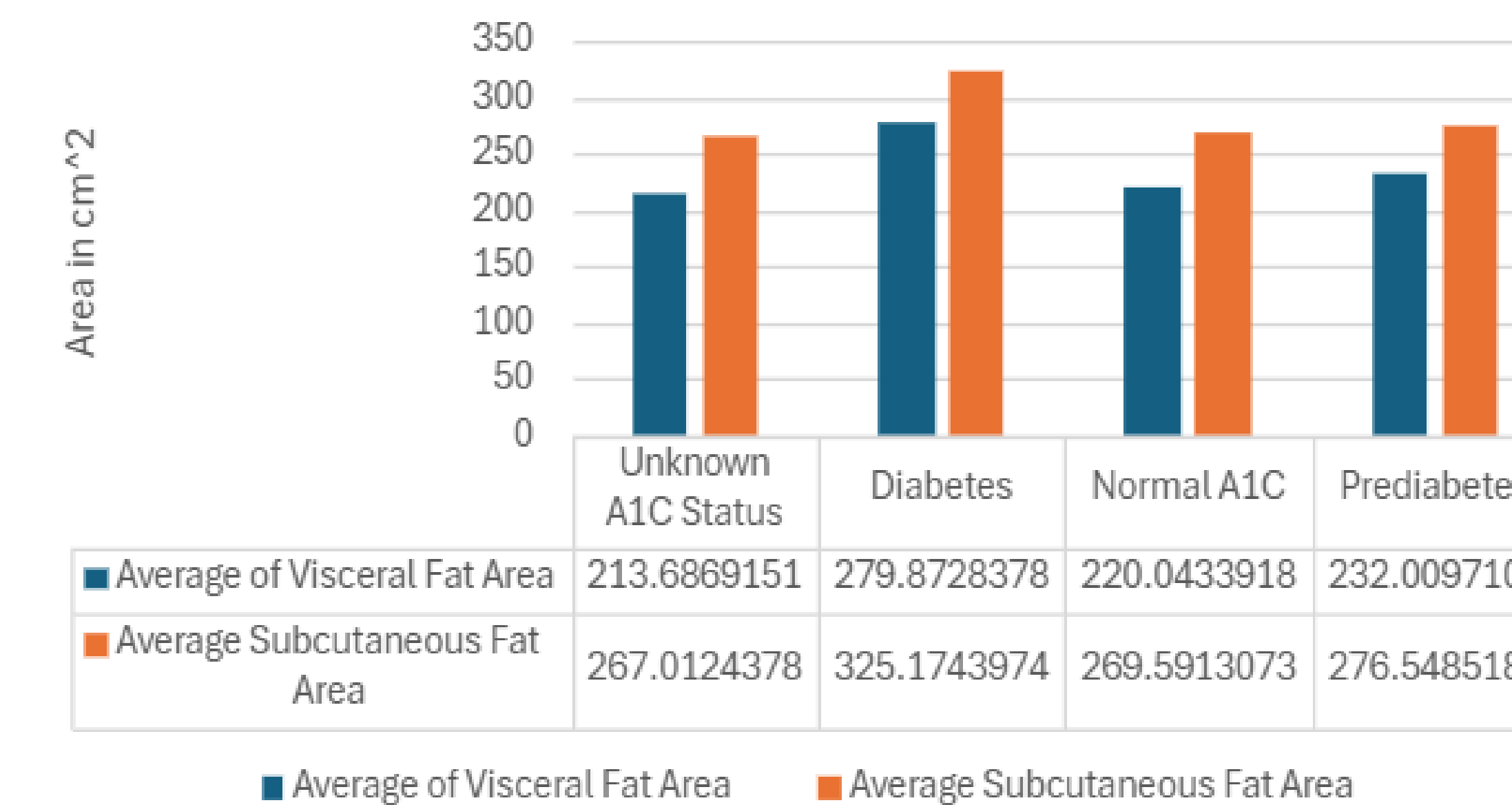
- Patients with diabetes had significantly higher VF and SF areas (280 cm², 325 cm²) than patients with prediabetes (232 cm², 277 cm²) or normal glucose regulation (220 cm², 269 cm²) (ANOVA P = 0.006, P = 0.019 for diabetes)
- In a cohort of 394 patients with adequate CT scans and any glucose regulatory state, VF and SF areas were associated with:
 - Increased occurrence of severe hyperglycemia (P = 0.0001, P = 0.000)
 - Acute kidney injury (P = 0.002, P = 0.027), and infections (P = 0.051 for SF)
 - There was no evidence of increased postoperative inflammation with increasing VF or SF areas: SIRI (P = 0.586, P = 0.179, respectively)
- When analyzed by glucose regulatory state, the effects of fat stores were detrimental in patients with diabetes: VF area was associated with severe hyperglycemia (P = 0.030) and AKI (P = 0.012)
- There was no association between fat area or quality for patients with prediabetes.
- In contrast, in patients with normal glucose regulation, increasing fat quality in both the visceral and subcutaneous compartments was associated with decreasing postoperative inflammation (SIRI levels, P = 0.025, P = 0.067). However, the decrease in inflammation was seen only in the marker incorporating monocytes (SIRI) and not NLR (P = 0.574, P = 0.648).

Contact

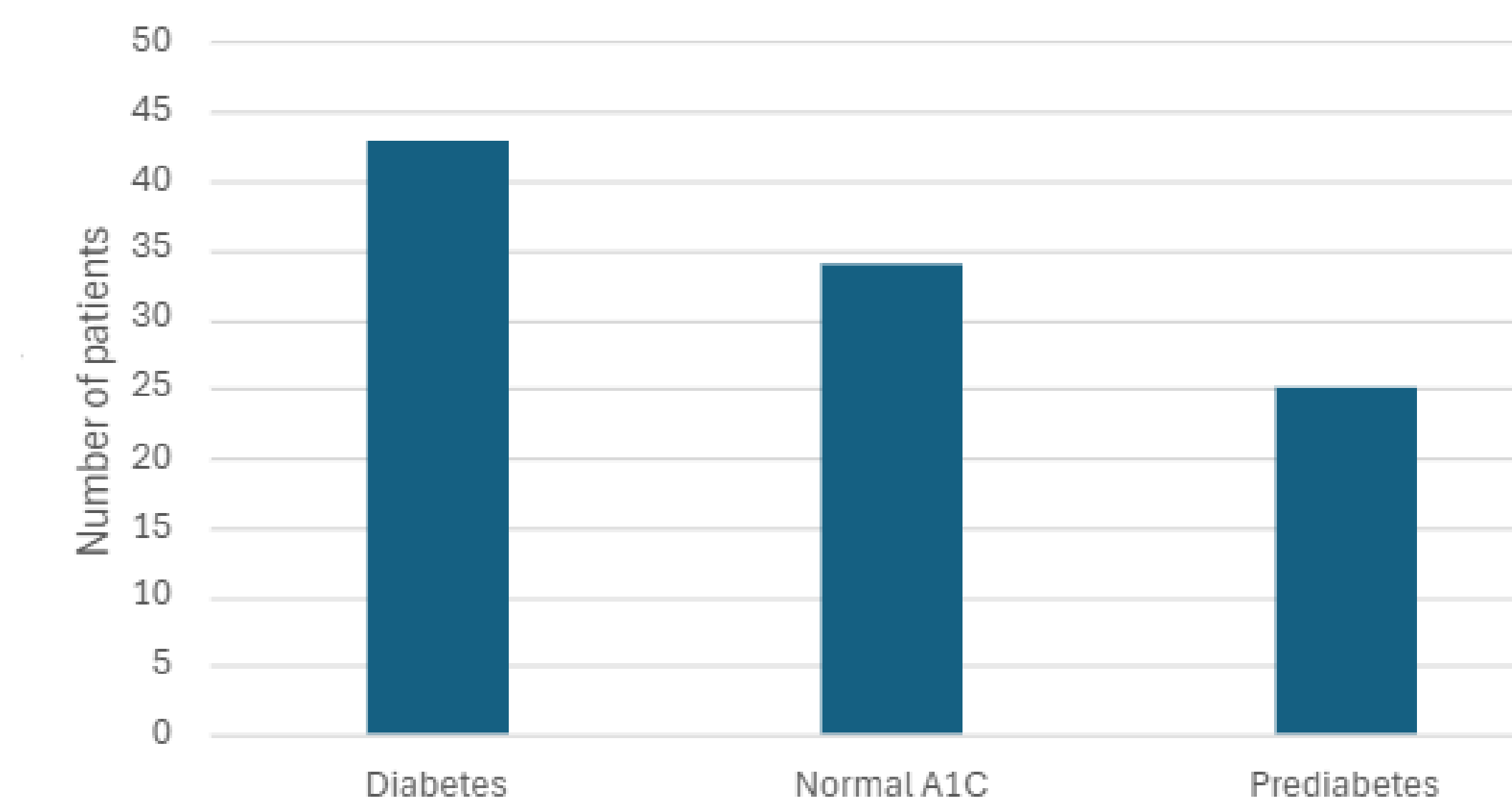
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Tables

Visceral Fat vs. Subcutaneous Fat



Sum of AKI within 1 week of Surgery



Conclusion and Future Directions

VF and SF quantity and quality effect postoperative complications depending on a patient's metabolic state. Fat stores in patients with diabetes are associated with severe hyperglycemia and acute kidney injury. Better quality fat stores in patients with normal glucose regulation may have a protective function by lowering inflammation through an interaction with monocytes. The increase in unhealthy fat and loss of healthy fat may worsen surgical outcomes.