

Introduction

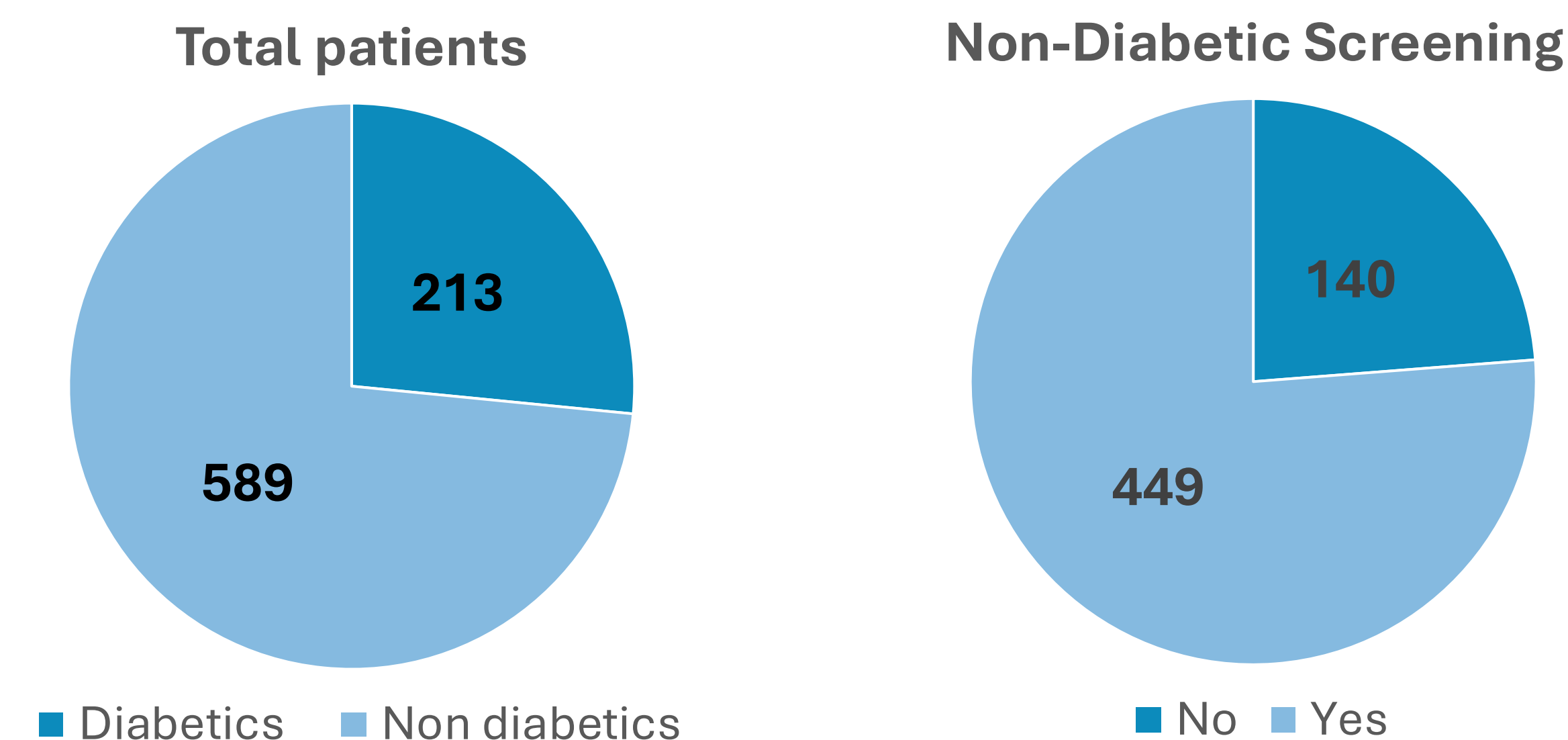
Hyperglycemia in the perioperative period has increased in prevalence with the rise of metabolic syndromes. Perioperative hyperglycemia is associated with postoperative complications, including surgical site infections, delayed wound healing, increased length of stay, and mortality. Multidisciplinary recommendations have been developed in recent decades to screen for hyperglycemia and initiate early glycemic control, with the goal of reducing the burden of these complications on patients and healthcare systems. However, these guidelines are predominately targeted to individuals with diagnosed diabetes, and too often overlook at-risk possible undiagnosed diabetic populations. In this study, we sought to evaluate the effectiveness of a newly implemented preoperative hyperglycemia screening protocol. We hypothesize that this tool will identify patients without a diagnosis of diabetes who are at risk for hyperglycemia during the perioperative period.

Methodology

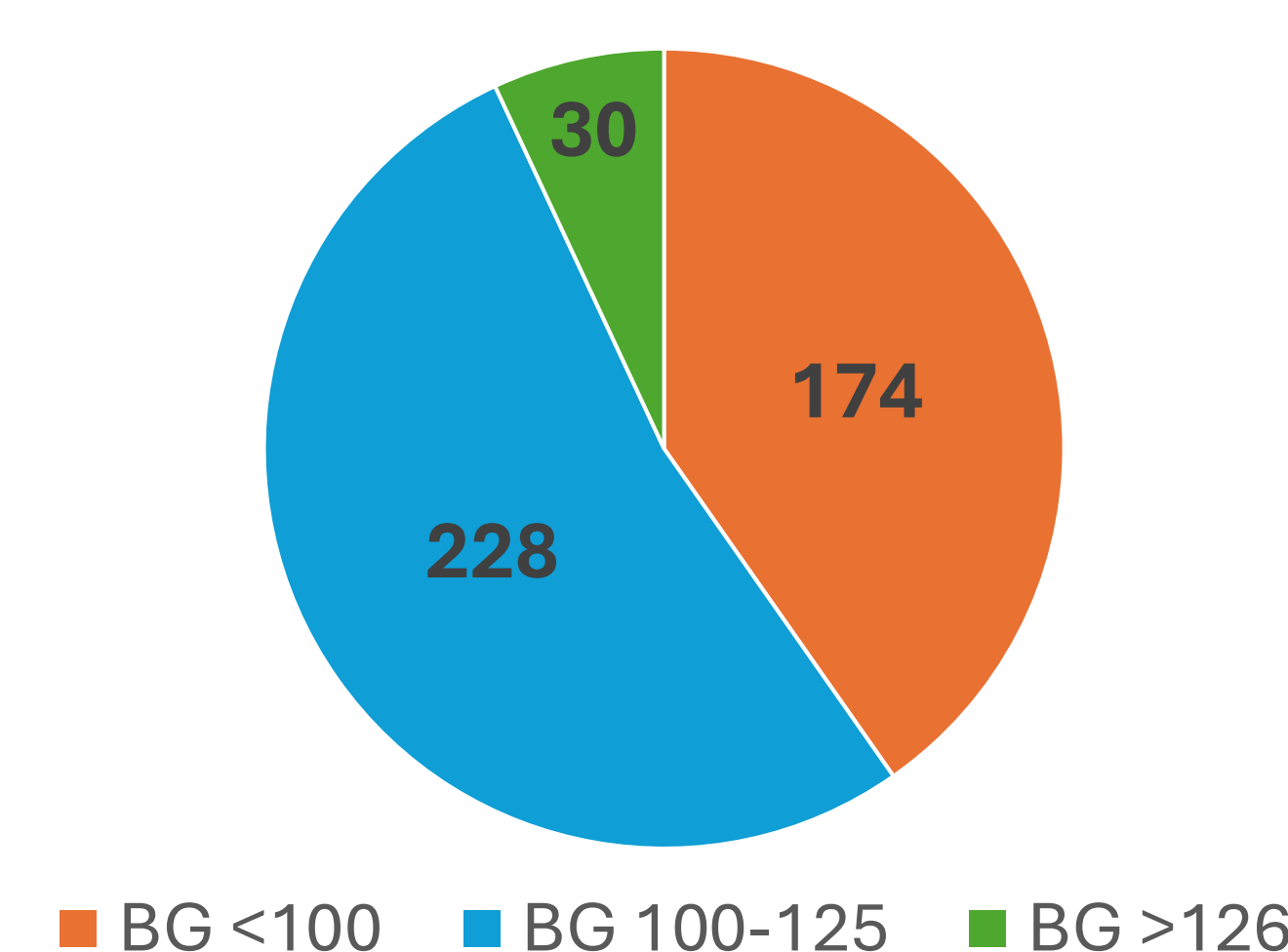
All patients who underwent elective non cardiac surgery at a tertiary urban hospital were screened in the preoperative ward to determine risk of developing hyperglycemia perioperatively. Patients who screened positive had perioperative blood glucose measurements and insulin management data recorded to evaluate the correlation between blood glucose level and administration of insulin in the perioperative window. Insulin was administered according to standard protocol. Patients were characterized by the presence or absence of an existing diagnosis of diabetes or prediabetes. Patients without a prior diabetes or prediabetes diagnosis were further stratified into groups by preoperative blood glucose level (<100 mg/dl, 100-125 mg/dl, and >126 mg/dl). Further analysis was conducted to assess the number of patients who screened at risk and required treatment, as well as those who developed a blood glucose greater than 180 mg/dl.

Table 1. Criteria for Hyperglycemia Screening^{2,3,5,10,12}

Point of care fasting glucose testing for hyperglycemia screening should be performed on:	
1.	All patients 45 years & older
2.	All patients with a BMI ≥ 30 kg/m ²
3.	Any adult patient with a BMI ≥ 25 kg/m ² (≥ 23 kg/m ² in patients of Asian Descent) & who have one or more of the following risk factors:
☐	1 st Degree relative with diabetes
☐	History of cardiovascular disease
☐	Hypertension ($\geq 140/90$ mmHg or being treated for hypertension)
☐	Hyperlipidemia
☐	Diagnosis of Polycystic Ovarian Syndrome (PCOS)
o Patients with fasting glucose of ≥ 100 mg/dL to 125mg/dL or HbA1C $\geq 5.7\%$ to 6.4% are considered prediabetic & should be monitored for hyperglycemia during surgery	
o Patients with a postprandial glucose of ≥ 140 mg/dL 2 hours after oral intake should be monitored for hyperglycemia during surgery	



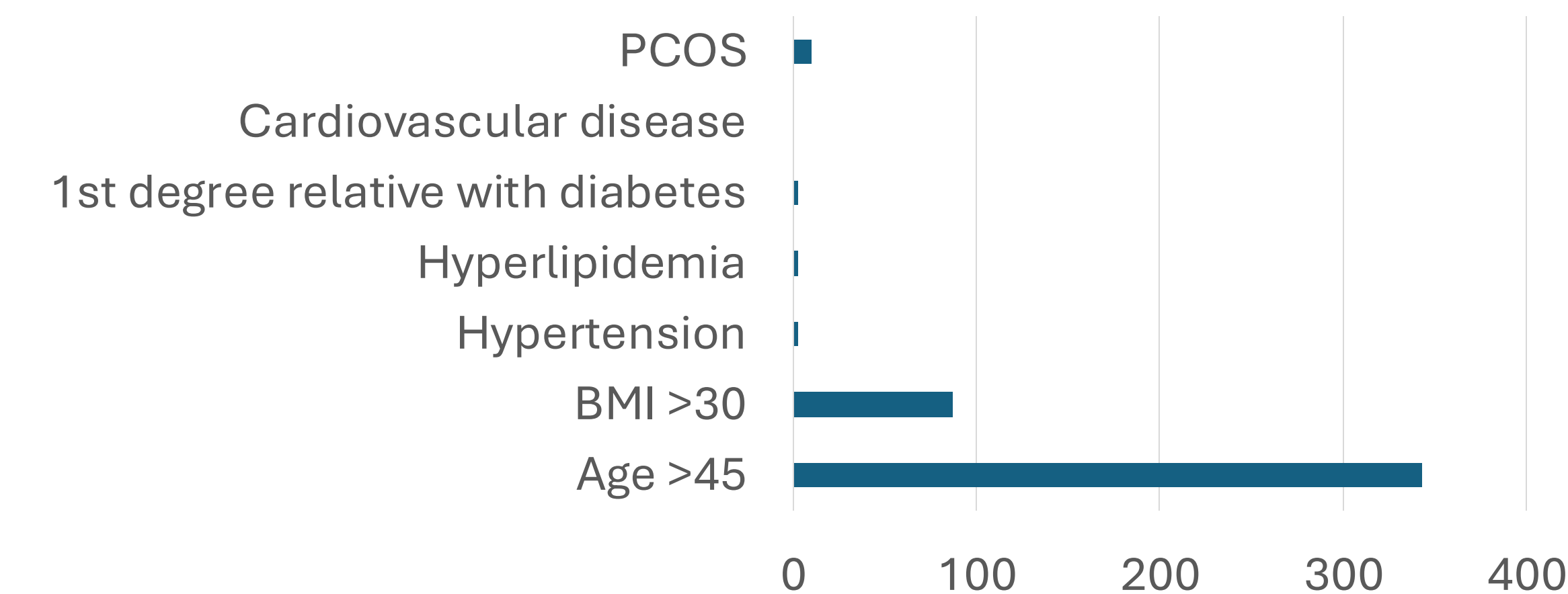
Preoperative Blood Glucose Measurements of Non-Diabetic Patients



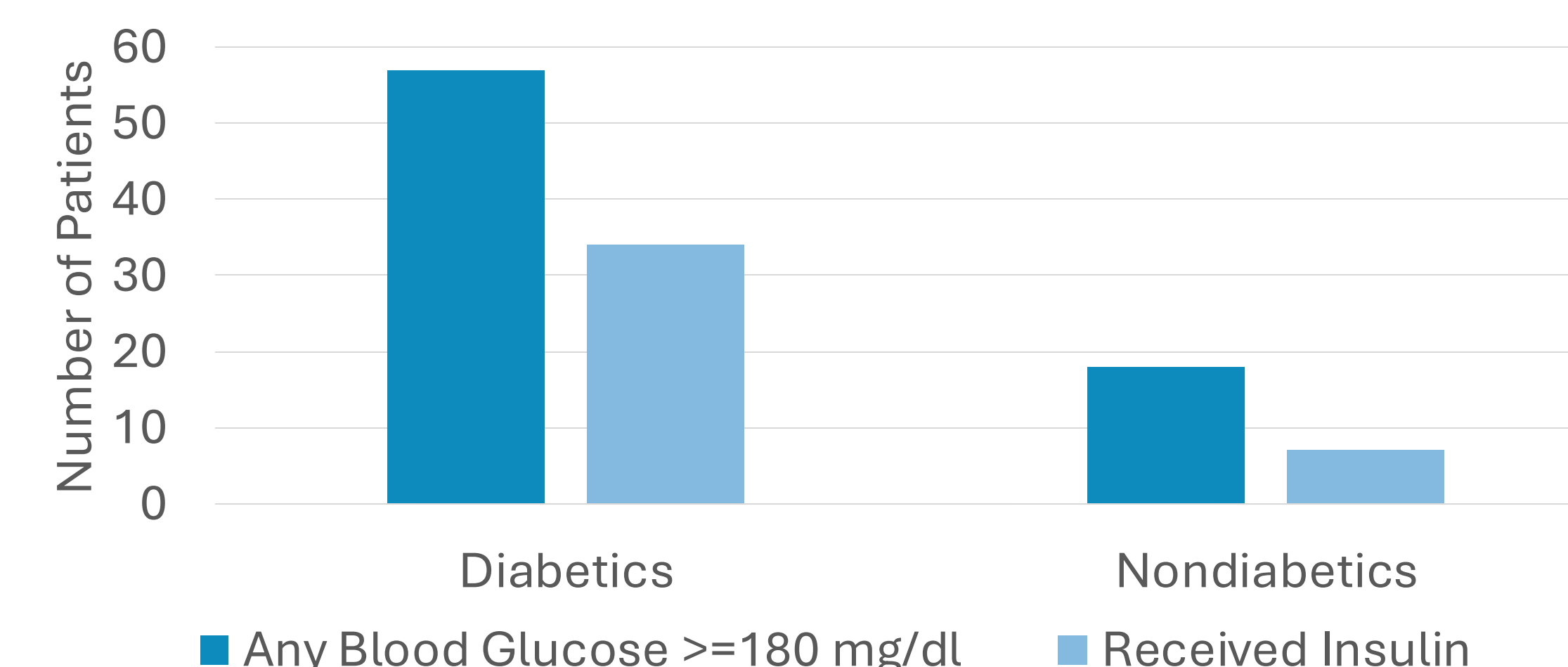
Results

802 patients were evaluated preoperatively, 26.6% with a history of diabetes or prediabetes and 73.4% without. In patients without diabetes, 76.2% met criteria for screening on the day of surgery. Of these, 6.9% had blood glucose ≥ 126 mg/dl (Mean: 141.6 mg/dl), 52.8% had blood glucose 100-125 mg/dl (Mean: 109.1 mg/dl), and 40.1% had blood glucose <100 mg/dl (Mean: 90.5 mg/dl). Clinically significant hyperglycemia (≥ 180 mg/dl) was documented in 26.8% of diabetics and 4.2% of nondiabetics. Insulin management was required in 16.0% of diabetics and 1.6% of nondiabetics.

Primary Positive Screening Criteria for Non-Diabetic Patients



Monitoring Glycemic Control in Diabetic and Non-Diabetic Patients



Conclusion

Hyperglycemia in the perioperative period is known to increase the risk for postoperative complications. Improvements in perioperative screening and early initiation of glycemic control has significantly reduced the incidence of these complications. Here, we utilize a screening protocol specifically aimed at identifying patients without a prior history of diabetes who are at risk for hyperglycemia in the perioperative window. In this demographic, we discovered a significant population of patients with blood glucose levels suggestive of diabetes or prediabetes that warrant further follow-up. Additional investigation into the correlation between blood glucose levels and postoperative complications may provide further justification for the widespread implementation of perioperative blood glucose testing. This study highlights the benefit of expanding blood glucose screening to include nondiabetic patients who are at increased risk for hyperglycemia and subsequent complications. Furthermore, utilizing the perioperative period as a clinical touchpoint, this screening may also reveal underlying disease and offer patients therapeutics to prevent long term complications, improving population health.

References

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