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Background

- Poor glycemic control can be devastating for surgical outcomes in the orthopaedic setting, and medical optimization is key to minimize risks.
- Elevated HbA1c has been associated with wound dehiscence, delayed wound healing, venous thromboembolism, surgical site infection and prosthetic joint infection.
- This study aimed to understand the relationship between preoperative HbA1c, prealbumin, and fructosamine on postoperative complications in patients undergoing total knee arthroplasty and total hip arthroplasty.

Objectives

- Determine the impact of a preoperative screening protocol on complications rates (HbA1c **<8.0%**, Prealbumin **>16.0mg/dL**, and Fructosamine **<300mmol/L**).
- Understand the relationship between HbA1c, prealbumin, and fructosamine and ED visits and readmissions.

Methods

- Retrospective chart review was conducted using a dataset of 1,004 primary total joint replacements
- Patients were grouped by **high-risk (n=808)** and **low-risk status (n=196)**. High-risk included BMI >30, current smokers, CCI>3, prior MI or CVA, CKD, DM and CHF and PAD.
- 30- and 90-day ED and readmission rates were compared between groups as well as complications and revisions

Complication	Low-risk N=196	High-risk N=808	p-value (CI)
PJI (%)	1(0.51%)	20 (2.48%)	0.086 (-0.042- 0.003)
Superficial Infection (%)	0 (0%)	0 (0%)	1.00
Delayed Wound Healing (%)	2 (1.02%)	5 (0.62%)	0.541 (-0.009- 0.017)
Wound Dehiscence (%)	3 (1.53%)	25 (3.09%)	0.237 (-0.041- 0.10)
DVT (%)	2 (1.02%)	14 (1.73%)	0.480 (-0.027- 0.013)
3-year Revision (%)	7 (3.57%)	68 (8.42%)	0.02 (-0.092- -0.008)

Table 1. Complication breakdown between low-risk and high-risk groups.

	Low-risk N=196	High-risk N=808	p-value
30-day ED Visit	23 (11.73%)	100 (12.38%)	0.811 (-0.058-0.045)
90-day ED Visit	5 (2.55%)	44 (5.44%)	0.018 (-0.061- -0.006)
30-day Readmission	3 (1.53%)	14 (1.73%)	0.848 (-0.022- 0.018)
90-day Readmission	2 (1.02%)	16 (1.98%)	0.488 (-0.421- 201)

Table 2. 30- and 90-day postoperative ED and readmission rates.

Lab collection period	Low-risk	High-risk	p-value
Overall Complication Rate			
HbA1c	26.7%	22.2%	0.710
HbA1c + Prealb.	11.6%	16.5%	0.422
HbA1c, Prealb., Fruc.	13.9%	14.9%	0.760
PJI Rate			
HbA1c	0%	1.23%	0.669
HbA1c + Prealb.	2.32%	1.79%	0.812
HbA1c, Prealb., Fruc.	0%	2.98%	0.041
Revision Rate			
HbA1c	6.67%	17.28%	0.303
HbA1c + Prealb.	6.98%	10.71%	0.458
HbA1c, Prealb., Fruc.	2.16%	5.96	0.075

Table 3. Reduction in complications rates over the study period after implementation of the protocol.

Results

- Average age of 65.21+/-9.90, 70.5% female, 34.36% diabetic, 9.56% current smokers, BMI 33.02+/-8.78, ASA 2.53+/-0.52, CCI 2.91+/-1.57, HbA1c 5.92+/-0.86, fructosamine 253.01+/-33.78, prealbumin 25.10+/-5.61.
- The high-risk group was more likely to require a revision within 3 years, OR=2.52 (**p=0.02**) and return to ED in 90 days (OR=2.2, **p=0.018**). **HbA1c >8.0%** was a statistically significant predictor of complications (**p=0.025**), and **PJI (p=0.016)**.
- The overall complication rate dropped from 26.7% and 22.2% (p=0.710) to 13.9% and 14.9% (p=760) in low and high-risk groups after implemented HbA1c, fructosamine, and prealbumin screening.
- Logistic regression revealed in the **high-risk group male sex** OR=2.282, B=0.825, **p=0.012**, and **preoperative fructosamine** OR=1.012, B=0.011, **p=0.038** were significantly correlated with complications. While in the **low-risk group HbA1c** OR=3.608, B=1.283 and **p=0.046** was correlated with adverse events.

Conclusions

- In two **different populations**, post-operative complications were **decreased and comparable** between both groups.
- Medical optimization is an important tool that should be utilized for proper patient selection in primary total knee arthroplasty.
- With proper implementation of standardized preoperative protocol the risk of adverse events occurring postoperatively can be minimized despite patient comorbidities.



Figure 1: Primary TKA