ASSOCIATION BETWEEN DIABETES AND ADVERSE SURGERY OUTCOME AMONG LUMBAR PATIENTS

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Association between Diabetes/HbA1c and Surgical Outcomes

• More than 20% of patients undergoing spinal surgery have diabetes.

• Diabetes is found to be associated with poor postoperative outcomes:
  - Infection
  - Perioperative complications
  - Longer length of stay (LOS)
  - 30-day readmission

• HbA1c test is a common blood test used to diagnose diabetes and to monitor the condition of diabetes. Higher preoperative HbA1c found among patients who had surgical site infection.

Reference:
O’Sullivan et al., 2006; Browne, et al., 2007; Lamloum et al., 2009; Pullter Gunne and Cohen, 2009; Golinvaux, et al., 2014; Guzman et al. 2014; Hikata et al., 2014; Yong et al., 2018; Ali et al., 2018
However………..

• Not all Americans know they have diabetes.
• The association between HbA1c and postoperative surgical outcomes is still unclear among patients with spine surgery.
Diagnosis of Diabetes

One third of diabetes in the US is undiagnosed.

Reference:
Recommendation of the threshold for HbA1c

• Han and Kang reported that a preoperative HbA1c level greater than 8% was an independent risk factor for wound complications in patients with diabetes undergoing total knee arthroplasty (Han & Kang, 2013).

• The increase in HbA1c is associated with the increased risk of complications and surgical infection. An HbA1c level of 8% could serve as a threshold for a markedly increased risk of infection among patients who underwent primary shoulder arthroplasty (Cancienne et al., 2018).

• Ali et al. proposed that patients with known diabetes and HbA1c > 8% should undergo specialty consultation with an endocrinologist prior to spinal surgery following by ERAS protocol (Ali et al., 2018).
Diabetes has been shown to be associated with postoperative adverse outcomes. However, the association between HbA1c and postoperative outcomes is unclear among patients with spine surgery.

This study aims to investigate the association between HbA1c and surgical outcomes among lumbar patients includes:

- SSI
- SSH
- Readmission within 30 days
- Readmission within 90 days
- Return to OR
- Any complication
- Length of stay
- Urinary Retention
Logistic regression models were used in the analysis

All multivariate models were adjusted for:

- Age, Gender, BMI, Race, Education, Depression, Smoking status,
- Fusion, and Surgical levels.

Analyses are also ran on two cohorts separately:

- All patients & Diabetic patients
Flow Chart of Study Sample
Inclusion and Exclusion criteria

20,859
Patients had surgery

14,713
Patients with lumbar surgery

6,146 patients excluded
• Cervical surgery or both

3,545
Patients with diagnosed diabetes

11,167
Patients without diagnosed diabetes

2,258
Patients with diagnosed diabetes had recorded HbA1C

1,287
Patients with diagnosed diabetes had no recorded HbA1C

2,520
Patients without diagnosed diabetes had recorded HbA1C

8,647
Patients without diagnosed diabetes had no recorded HbA1C

2,258
Patients with diagnosed diabetes had recorded HbA1C

1,287
Patients with diagnosed diabetes had no recorded HbA1C

618
Patients excluded
• Diagnosis of diabetes is not available

2,520
Patients without diagnosed diabetes had recorded HbA1C

8,647
Patients without diagnosed diabetes had no recorded HbA1C
Comorbidity and Surgery Type among Lumbar Patients after Jan. 2018 (n=14,713)
Patients had lumbar surgery since 2018 (n=14,713)
Difference in HbA1c Among Patients With and Without Diagnosed Diabetes

Type of Diabetes
- No diabetes
- Type I
- Type II insulin-dependent
- Type II non-insulin-dependent

Sample sizes:
- n=2,520
- n=54
- n=747
- n=1,457
HbA1c in Diabetic Patients
Diabetic patients with HbA1c available (n= 2,258)

Adjusted Odds Ratios for HbA1c >8% as a Risk Factor

- SSI
- SS-Hematoma
- Readmission within 30 days
- Readmission within 90 days
- Return to OR
- Any Complication
- Length of stay (>3 days)
- Urinary Retention

Odds Ratio on Log Scale
HbA1c in All Patients
All patients with HbA1c available (n= 4,778) (including diabetic and non-diabetic patients)

Multivariate Analysis

Adjusted Odds Ratios for HbA1c >8% as a Risk Factor

- SSI
- SS-Hematoma
- Readmission within 30 days
- Readmission within 90 days
- Return to OR
- Any Complication
- Length of stay (>3 days)
- Urinary Retention

Odds Ratio on Log Scale
Availability of HbA1c by Site
Availability of HbA1c by Site
(Among Diabetic patients after Jan. 2018)
Availability of HbA1c by Site
(Among All patients after Jan. 2018)
Discussions

- Diabetes is a risk for bad outcomes
- HbA1c > 8 is significantly correlated with having any complication, readmission, and increased length of stay
- Proper glycemic control may be an avenue to decrease the risk of adverse outcomes with diabetes
Questions?