



Using Alanine Aminotransferase Value as Predictor for Increased Risk of Complications after Total Joint Arthroplasty

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Background

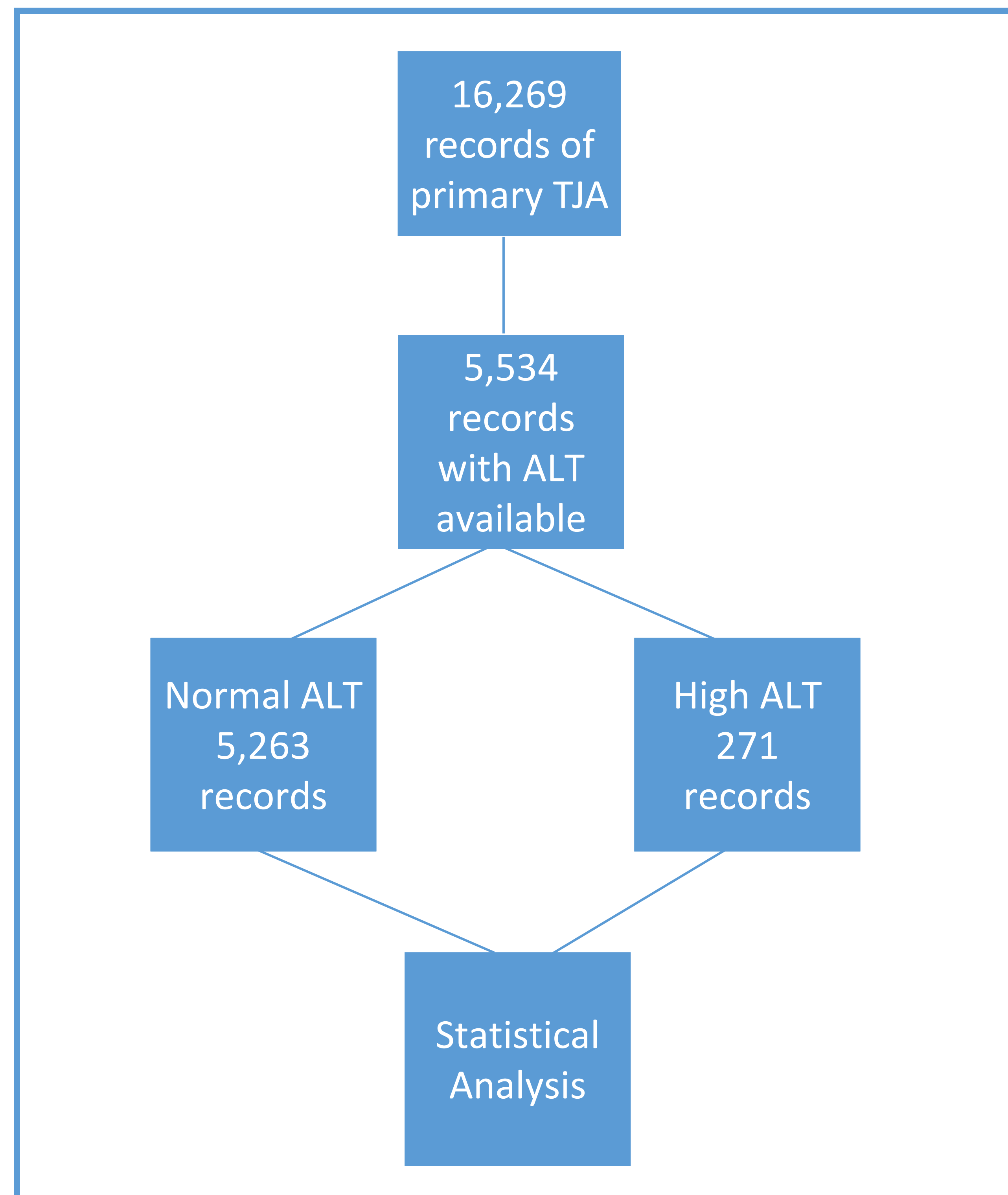
- Total joint arthroplasty (TJA) is one of the most successful interventions for joint conditions such as osteoarthritis, which is relatively common in the older population.
- Patients undergoing TJA are at risk of developing complications of varying degree of severity after surgery.
- Several risk factors have been reported, including metabolic syndrome and liver diseases.
- There is limited literature on the effect of elevated Alanine Aminotransferase (ALT) values on outcomes post TJA.
- Normal reference range of ALT vary among laboratories, and may not be optimal in some cases¹.
- Upper limit of normal range (ULN) for ALT is generally considered to be 40 U/L.

Objectives

- Evaluate whether ALT value ≥ 40 U/L could be used as a predictor for increased risk of complications after TJA.
- Evaluate the potential of using this cut-off value of ALT in eligibility screening for TJA, thus reducing complications after surgery.

Methods

- Retrospective analysis of TJA records from April 2012 to June 2020.
- Cases were divided into two groups: high ALT group (ALT ≥ 40 U/L) and normal ALT group (ALT < 40 U/L).
- Statistical analysis:
 - Independent samples T-test
 - Multiple linear regression



Results

Table 1: Comparison between Normal ALT and High ALT Groups

	Normal ALT	High ALT	P-value
BMI	30.6 (5.9)	31.9 (5.6)	<0.001*
Pre-op HbA1c	5.65 (0.56)	5.73 (0.56)	0.030*
Pre-op Glucose	100.1 (21.7)	105.3 (22.7)	<0.001*
Post-op Glucose	127.5 (30.6)	132.3 (29.0)	0.021*

Values were reported as mean (standard deviation). P-values were calculated using independent samples T-test
*: p<0.05

Table 2: Post-op Glucose between Normal and High ALT Groups

	Unstandardized Coefficient		p-value
	B	Standard Error	
ALT Group	5.61	2.08	0.007*
Gender	1.30	0.95	0.17
Alcohol Use	-4.32	0.99	<0.001*
Age	0.22	0.47	<0.001*

Multiple linear regression analysis. Dependent variable: post-op glucose. Independent variable: ALT group. Co-variates: gender, alcohol use, age. *: p<0.05

Conclusions

- High ALT group differed significantly from normal ALT group on BMI, pre-op HbA1c, and pre-op glucose, which are known risk factors for complications after TJA.
- Higher degree of hyperglycemia after surgery was reported to be associated with complications. After controlling for age, gender, and alcohol use, high ALT group was more likely to have higher post-op glucose compared to normal ALT group.
- Given the results, ALT ≥ 40 U/L can potentially be used as a predictor for increased risk of complications after TJA, and decreasing ULN for ALT in diagnostic test to lower than 40 U/L may be necessary.

Reference

1. Neuschwander-Tetri, Brent A et al. "Influence of local reference populations on upper limits of normal for serum alanine aminotransferase levels." Archives of internal medicine vol. 168,6 (2008): 663-6.

Acknowledgement

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