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The Nutritional Parameters as Predictor of Postoperative Complications in Elective Posterior Lumbar Interbody Fusion : *A single institution experiences with 776 patients*

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Introduction (I)

- The impact of **patient factors** as the risk of **mortality** and **complications** after lumbar fusion or joint arthroplasty surgery: **older age, pulmonary conditions, as well as, nutritional parameters (serum albumin, total lymphocyte count, & transferrin level.)**

Schoenfeld AJ, et al. , Spine J 2013;13(10):1171-9.

- In particular, the prevalence rate of subclinical and clinical malnutrition is reported to vary in 8% to 50% of patients undergoing total joint arthroplasty.
- The evaluation and management of **malnutrition is not well understood**, because **the golden standard tool or guideline for malnutrition are not clear.**

Cross MB, et al., J Am Acad Orthop Surg 2014;22.

Introduction (II)

- **Prognostic Nutritional Index (PNI)**

- Tool for predicting short-term and long-term postoperative outcome in patients undergoing cancer surgery.
- Independent predictor of postoperative delirium & SSI in patients undergoing spine surgery
- Formula: **$10 \times \text{serum albumin (g/dl)} + 0.005 \times \text{total lymphocyte count (per mm}^3\text{)}$**

- **Nutritional Risk Index (NRI)**

- Tool for assessing patients with total parenteral nutrition & identifying patients with a risk of complications after surgery
- Formula: **$(1.519 \times \text{serum albumin, g/dl}) + (41.7 \times \text{weight, kg}) / \text{ideal body weight, kg}$**

*Oe S, et al. J Neurosurg Spine 2020;27:1-6.
Ushirozako H, et al. Eur Spine J 2020 Oct 9.
Bouillanne O, et al, Am J Clin Nur 2005;82:777-783.*

Purpose

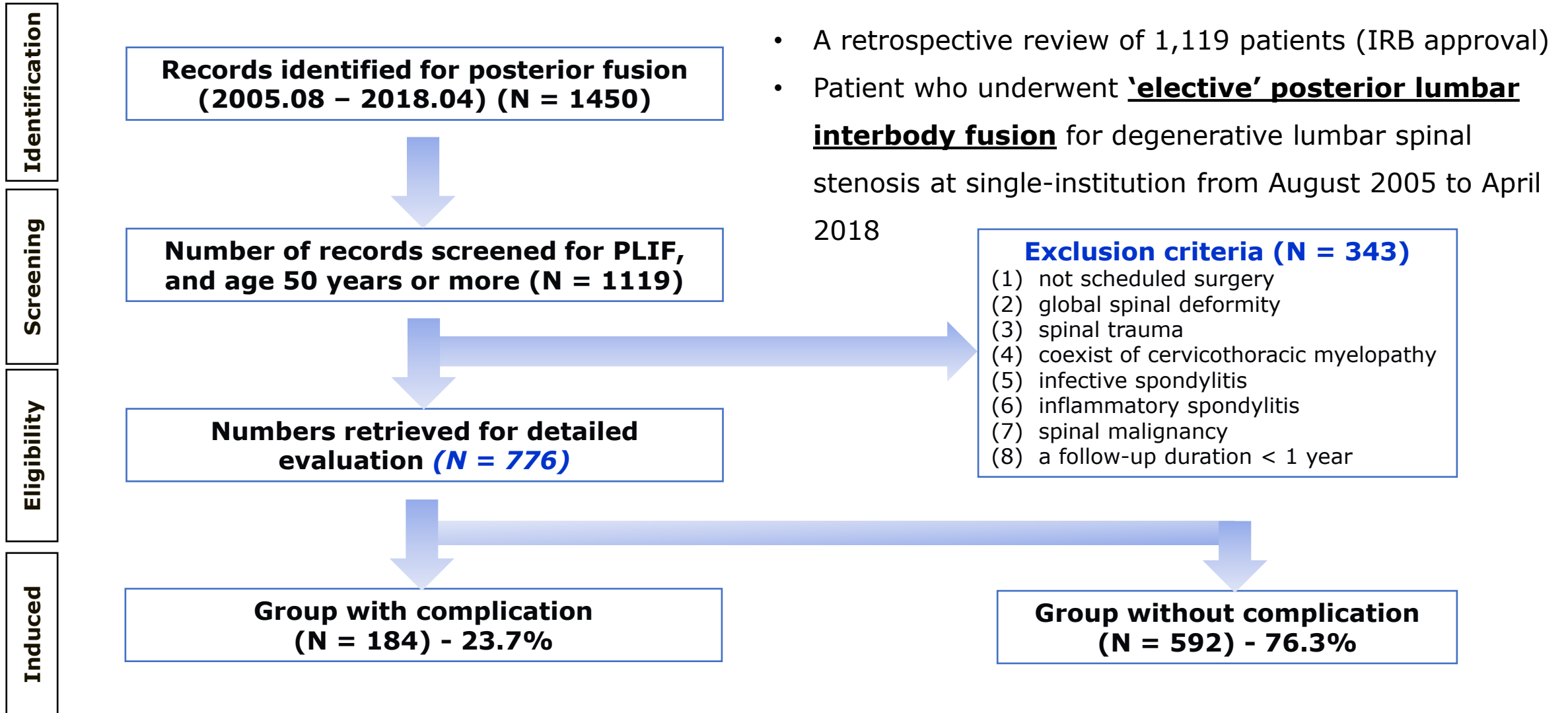
- **Our hypothesis:**

In the instrumented lumbar fusion surgery for degenerative lumbar spinal stenosis, the nutritional parameters (*body mass index, serum albumin, **PNI, & NRI***) are the independent risk factors of postoperative complications.

- **Purpose in this study:**

To determine the patients nutritional parameters as predictors of postoperative complications in elective posterior lumbar interbody fusion surgery.

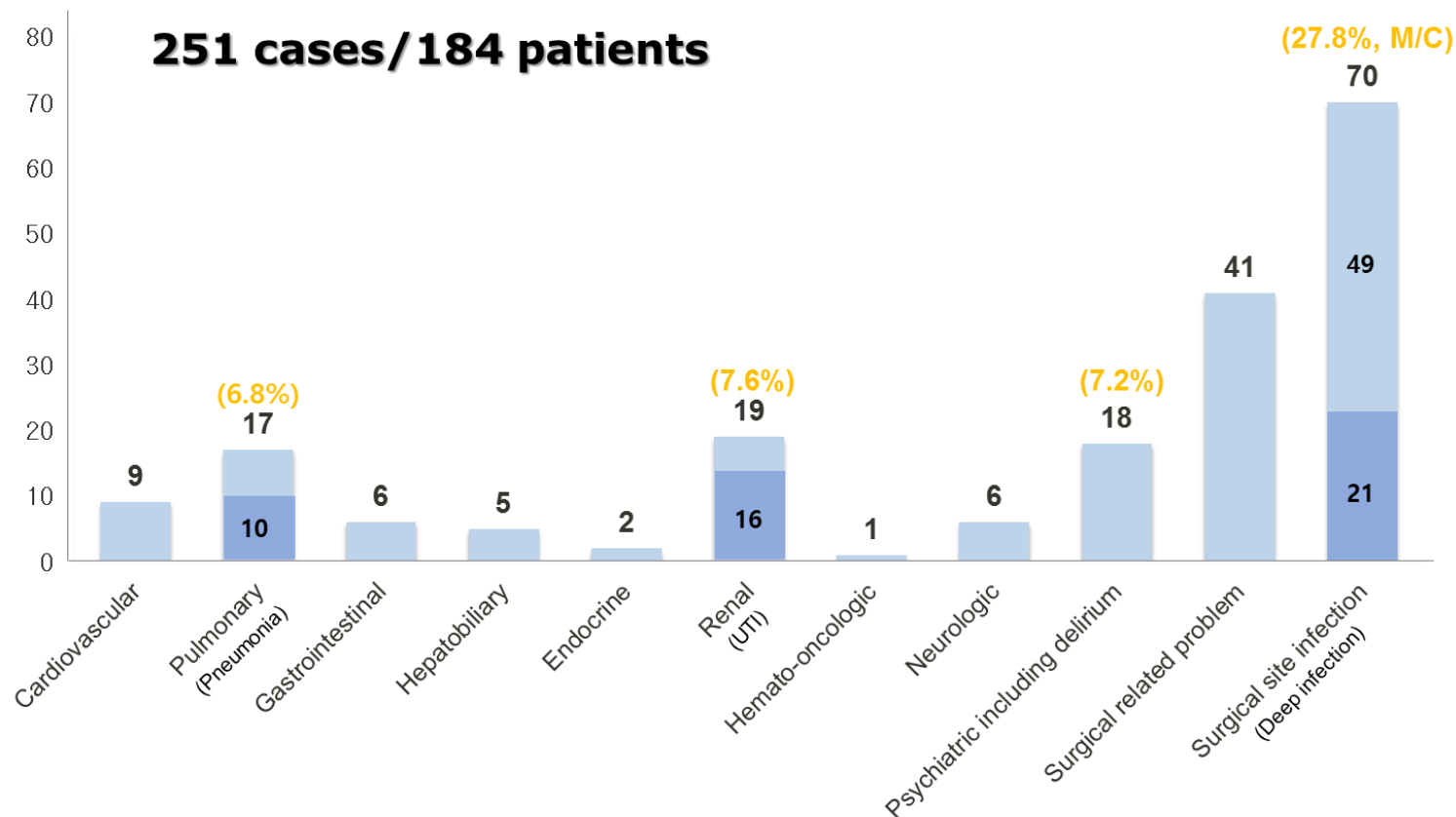
Materials & Methods



Results (I): Collected Data

	AVR \pm STD	Range
Age (years)	75.4 \pm 9.3	50 – 98
Sex (M:F)	M: 247 / F: 529	
Height (cm)	155.9 \pm 8.9	125.8 – 182.7
Weight (kg)	61.6 \pm 10.2	37.0 – 100.5
BMI	25.3 \pm 3.4	15.4 – 40.3
BMD (T-score)	-2.2 \pm 1.2	-5.4 – 2.7
Claudication (m)	90.2 \pm 143	0 - 1000
Carlson Comorbidity Index	0.82 \pm 0.98	0 - 5

Postoperative complications



Results (II): Comparative Analysis

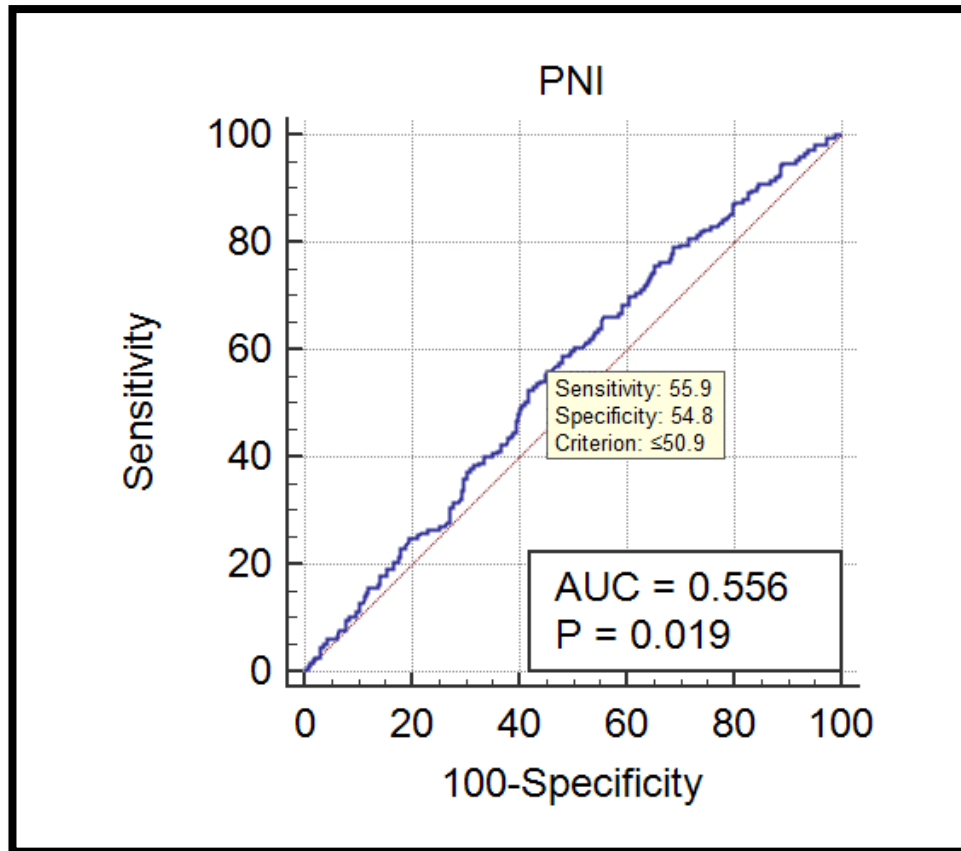
	Complication group	Non-complication group	<i>P-value</i>
	AVR ± STD	AVR ± STD	
Age	75.03 ± 9.674	76.69 ± 8.033	0.02
BMI	25.38 ± 3.36	25.11 ± 3.40	0.363
BMD	-2.29 ± 1.128	-2.08 ± 1.239	0.09
mCCI	0.79 ± 0.987	0.89 ± 0.933	0.27
Alb (g/dl)	3.97 ± 0.41	4.07 ± 0.38	0.003
TLC (/mm³)	2137.47 ± 776.68	2094.75 ± 656.48	0.504
PNI	50.19 ± 5.69	51.43 ± 5.88	0.013
NRI	53.19 ± 6.56	53.82 ± 6.35	0.243

BMI: body mass index, BMD: bone mineral density, mCCI: modified Charlson Comorbidity Index, Alb: serum albumin, TLC: total lymphocyte count, PNI: prognostic nutritional index, NRI: nutritional risk index

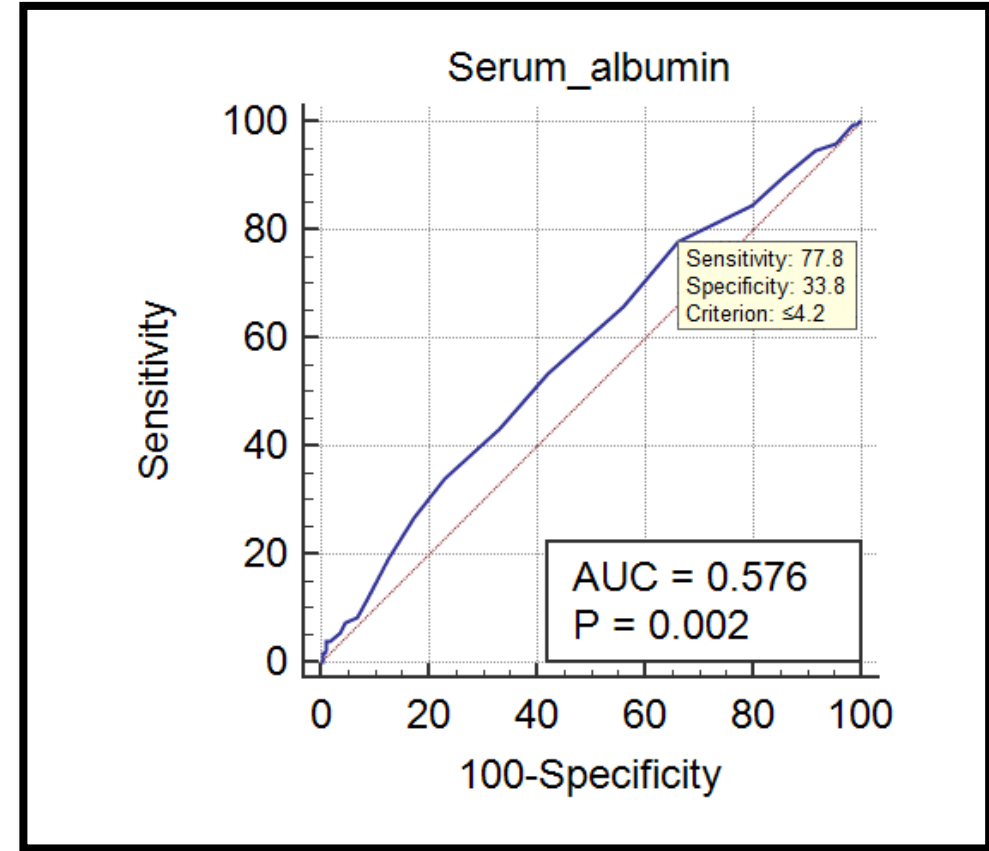
Results (III): Logistic Regression Analysis

Parameters	Univariate		Multivariate (+albumin)		Multivariate (+PNI)	
	ORs (95% CI)	P -value	ORs (95% CI)	P- value	ORs (95% CI)	P -value
Age (yr)	1.020 (1.001-1.039)	0.035				
BMI	1.000 (1.000-1.000)	0.504				
BMD	1.198 (1.000-1.435)	0.055				
mCCI	1.091 (0.923-1.290)	0.308				
Alb (g/dL)	0.521 (0.343-0.791)	0.003	0.558 (0.320-0.974)	0.04		
TLC (/mm ³)	1.000 (1.000-1.000)	0.504				
PNI	0.972 (0.949-0.996)	0.023			0.622 (0.425-0.911)	0.015
NRI	0.998 (0.977-1.020)	0.873				

Results (IV): ROC curve of PNI & Albumin



Cut-off value: 47.3



Cut-off value: 3.7

Discussion

- In several studies, **serum albumin level, total lymphocyte count, and transferrin level** were introduced with significant laboratory values predicts postoperative complications and mortality.
- In particular, the **Prognostic Nutritional Index (PNI) and Nutritional Risk Index (NRI)** are parameter for a patient's nutritional condition, and they are known an effective predictors for the postoperative complications of cancer surgery and geriatric surgery.

- Cross MB, et al., J Am Acad Orthop Surg 2014;22.

Conclusion

- **The nutritional status is a critical factor on postoperative complications** in the patients who had elective posterior lumbar interbody fusion surgery.
- **However, the golden standard guideline for malnutrition is not clear.** Therefore, it is necessary to apply specific guidelines for the assessment of malnutrition.
- **PNI is an independent prognostic factor**, and cut-off value of postoperative complication rates is demonstrated in patient with **PNI < 47.3**.

Thank You For Your Kindly Attention



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Kang MS and Kim TH have not any potential conflict of interest