Preoperative Nutritional and Endocrine Factors of the Patient Did Not Affect the Rotator Cuff Healing

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INTRODUCTION: Rotator cuff (RC) healing failure remains a major concern, with retear rates ranging from 11% to 94% reported in the literature. Several previous studies argued that various nutritional and endocrine factors might influence the successful healing after arthroscopic rotator cuff repair (ARCR). Therefore, this study aimed to determine the impact of preoperative nutritional and endocrine factors on the outcome of ARCR in the single cohort, attempting to predict RC healing failure.

METHODS:

The authors retrospectively reviewed the records of 615 patients who underwent primary arthroscopic rotator cuff repair (ARCR) performed by a single surgeon between January 2015 and June 2022, with a minimum follow-up of 12 months. The mean age at surgery was 60.98 ± 8.7 years (range, 31–81), with 259 male and 356 female patients. The mean follow-up period was 31.22 ± 19.2 months (range, 12–99).

Rotator cuff healing failure was evaluated using MRI performed at 1 year postoperatively.

Patient-related factors analyzed included body mass index (BMI), obesity class, serum albumin levels, preoperative nutritional status using the Nutritional Risk Index (NRI), vitamin D deficiency, hypertension, diabetes mellitus, and dyslipidaemia.

Obesity was categorized as: normal (<25 kg/m²), class 1 (25–29.9), class 2 (30–34.9), and class 3 (≥35).

Nutritional risk was classified using NRI as: no risk (≥100), low risk (97.5–99.9), moderate risk (83.5–97.4), and high risk (<83.5).

Vitamin D deficiency was defined as a serum 25(OH)D level <20 ng/mL.

To reduce selection bias and control for confounding factors, 1:3 propensity score matching (PSM) was performed using age, gender, preoperative fatty degeneration of the infraspinatus, subscapularis involvement, and work level as covariates.

RESULTS:

The overall healing failure rate was 13% (80/615). Patients were divided into two groups based on tendon healing status: the healed group (n=535) and the retear group (n=80). Following 1:3 propensity score matching based on age, gender, work level, subscapularis involvement, and preoperative infraspinatus fatty degeneration, 320 patients were included for logistic regression analysis.

Multivariable logistic regression revealed that vitamin D deficiency was significantly associated with an increased risk of rotator cuff retear. Patients without vitamin D deficiency demonstrated a significantly lower likelihood of healing failure (OR 0.47, 95% CI 0.25–0.90, p=0.023). Other patient-related factors, including obesity class (p=0.39–0.87), serum albumin level (p=0.58), nutritional risk index category (p=0.69–0.89), osteoporosis (p=0.89), hypertension (p=0.29), diabetes (p=0.58), and hyperlipidaemia (p=0.29), were not significantly associated with retear risk (all p > 0.05).

DISCUSSION AND CONCLUSION:

Vitamin D deficiency was identified as a significant independent risk factor for rotator cuff healing failure following arthroscopic repair. In contrast, obesity class, nutritional status, and common metabolic comorbidities such as hypertension, diabetes, and dyslipidaemia were not significantly associated with retear. These findings highlight the potential role of preoperative vitamin D optimization in improving tendon healing outcomes after rotator cuff repair.