

RESEARCH ARTICLE

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The Effect of Preoperative B12 Level on Recovery in Patients with Moderate CTS Who Underwent Surgery

Cerrahi Olarak Tedavi Edilen KTS Hastalarında Preop B12 Düzeyinin İyileşmeye Etkisi

ABSTRACT

Objective

The Effect of Preoperative B12 Level on Recovery in Patients with Moderate CTS Who Underwent Surgery

Objective

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, resulting from compression of the median nerve in the wrist. Vitamin B12 deficiency is associated with hematological, gastrointestinal, and neuropsychiatric disorders, and may contribute to neurological symptoms through impaired neuronal myelination. This study investigates the effect of preoperative B12 levels on postoperative recovery in patients undergoing surgery for moderate CTS.

Materials and Methods

Our study involved 47 patients undergoing CTS surgery in whom preoperative B12 levels were investigated. Clinical findings were retrospectively analyzed. Symptom severity and functional status were evaluated using validated scales: the Boston Symptom Severity Scale (SSS), Boston Functional Status Scale (FSS), and the Quick Disabilities of the Arm, Shoulder, and Hand (Quick-DASH) questionnaire. These scores were recorded preoperatively and at months 3, 6 and 12. postoperatively. Patients were categorized into two groups: Group 1 (B12 > 300 ng/L) and Group 2 (B12 < 300 ng/L). Appropriate statistical analyses (Kolmogorov-Smirnov, Mann-Whitney U, Student's t-test) were applied.

Results

The mean age of patients was 50.96±11.06 years. There were 32 patients in Group 1 and 15 in Group 2. No significant differences were found between groups in age (P=0.501), gender (P=0.168), or preoperative questionnaire scores (SSS: P=0.429; FSS: P=0.376; Quick-DASH: P=0.871). However, at the 3-month postoperative follow-up, a statistically significant improvement was observed in Group 1, and this improvement persisted through the 12-month follow-up.

Conclusion

Our findings suggest that evaluating and correcting B12 levels prior to surgery may enhance postoperative recovery in patients with moderate CTS.

Key Words

Vitamin B12, CTS, Surgery, Recovery, Peripheral Neuropathy

Öz

Amaç

Karpal tünel sendromu (KTS), el bileği düzeyinde median sinirin tuzaklanma sonucu oluşan ve en sık görülen tuzak-nöropatisidir. B12 eksikliği hematolojik, gastrointestinal ve nöropsikiyatrik bozukluklara neden olabilir ve kesin olmamakla birlikte nöronal miyelinleşmedeki sorunlardan dolayı nörolojik semptomların ortaya çıkabileceği düşünülmektedir.

Gereç ve Yöntemler

Çalışmamızda karpal tünel sendromu ameliyatı geçiren 47 hastanın ameliyat öncesi B12 düzeylerini araştırdık. Hastaların klinik bulguları retrospektif olarak analiz edildi. Hastaların ameliyat öncesi B12 düzeyleri ile birlikte Bostan Quick Disability of the Arm, Shoulder, and Hand (Quick DASH) anketinin ameliyat öncesi ve sonrası değerleri değerlendirildi. KTS'li hastalarda semptomların şiddeti ve fonksiyonel durum, Boston anketindeki semptom şiddeti ölçeği (SSS) kullanılarak değerlendirildi. SSS semptomları şiddetine, sıklığına, zamanına ve türüne göre değerlendirir. Her iki anketin değerleri ameliyat sonrası 3., 6. ve 12. aylarda kaydedildi.

Bulgular

Çalışmamıza dahil edilen hastaların yaş ortalaması $50,96 \pm 11,06$ idi. Gruplar 300'lük bir kesme değerinin üstünde veya altında olarak sınıflandırıldı. Gruplar arasında yaş ($P=0,501$) veya cinsiyet ($P=0,168$) açısından anlamlı bir fark bulunmamıştır. Ayrıca gruplar arasında ameliyat öncesi Boston şiddet ölçeği ve Boston fonksiyonel ölçeğinde anlamlı bir fark yoktu (sırasıyla $P=0,429$ ve $P=0,376$). Ancak ameliyat sonrası 3. ay takibinde B12 düzeyi yüksek olan grupta anlamlı düzelme görüldü ve bu düzelme 12. ay takibinde de devam etti.

Sonuç

Çalışmamızda, cerrahi planlanan hastalarda B12 düzeylerinin değerlendirilip yerine konulmasının yararlı olabileceğini düşündük. Cerrahi uygulanan ve preoperatif B12 düzeyleri yüksek olan orta şiddette KTS'li hastalarda daha belirgin iyileşme gözlemledik.

Anahtar Kelimeler

Vitamin B12, KTS, İyileşme, Cerrahi Tedavi, Periferik Nöropati

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, caused by compression of the median nerve at the wrist (1). It affects 3–6% of the population, with a higher incidence among women (2, 3). Risk factors include diabetes mellitus, thyroid dysfunction, rheumatoid arthritis, pregnancy, obesity, repetitive hand movements, and certain occupations.

The pathophysiology involves median nerve compression, initially disrupting microcirculation and causing venous congestion. Continued pressure results in intraneural edema, myelin loss, and eventually fibrosis (2). Diagnosis relies on clinical findings and confirmation via electromyographic (EMG) studies (4-6).

Vitamin B12 deficiency is associated with neurological dysfunction via impaired myelination, though the exact mechanisms are still debated (7). Our study aims to assess the impact of preoperative B12 levels on postoperative recovery in moderate CTS cases managed surgically.

MATERIALS and METHODS

Approval from the Eskisehir Osmangazi University Medical Faculty Non-interventional Ethics Committee was obtained on March 22, 2022 (Decision No. 13). The study adhered to the principles of the Declaration of Helsinki. Informed consent was obtained from all participants.

We retrospectively evaluated 47 patients who underwent surgery for moderate CTS. Inclusion criteria included age between 18 and 75 years, diagnosis of moderate CTS (confirmed by nerve conduction studies), and documented preoperative B12 levels. Exclusion criteria included severe CTS, diabetes mellitus, age >75 , or missing B12 data. All patients underwent open surgical decompression of the median nerve, performed under local anesthesia using a standard mini-incision technique.

Symptom severity and functional status were assessed using the Boston Symptom Severity Scale (SSS), Boston Functional Status Scale (FSS), and Quick-DASH questionnaire. The Turkish validation of Quick-DASH was conducted by Koldas Dogan et al., and the Boston questionnaire by Sezgin et al. (8, 9). Scores were recorded preoperatively and at months 3, 6 and 12 postoperatively.

Patients were divided into two groups according to their B12 level: Group 1 ($B12 > 300$ ng/L) and Group 2 ($B12 < 300$ ng/L), based on the neurologically relevant cut-off value of 300 ng/L (10). Demographic variables were compared using chi-square test. Data normality was assessed with Kolmogorov-Smirnov test. Student's t-test or Mann-Whitney U test was used where appropriate. Significance was accepted at $p < 0.05$.

RESULTS

Forty-seven patients were included (32 in Group 1, 15 in Group 2). The average age was 50.96 ± 11.06 . No significant differences were observed between groups in age ($P=0.501$), gender ($P=0.168$), or preoperative scores (SSS:

$P=0.429$; FSS: $P=0.376$; Quick-DASH: $P=0.871$).

As shown in Table I and Table II, Group 1 demonstrated significantly better outcomes at 3rd and 12th months in terms of symptom severity and functional recovery.

Table I. Pre-o and Post-o Boston Carpal Tunnel Syndrome Questionnaire values

	Pre-o. BSS	Post-o. BSS	P	Pre-o. BFS	Post-o. BFS	P
B12 High Level	38,04	21,69	0,008	20,83	13,17	0,000
B12 Low Level	39,08	21,69	0,175	21,174	10,5	0,098

Pre-o:Pre-operative; BSS: Boston Severity Scale; BFS: Boston Functional Scale; Post-o: Postoperative; B12 Level High: B12 >300; B12 Low level: B12 <300

Table II. Pre-o and Post-o Boston qDASH values

	Pre-o Quick-DASH	Post-o Quick-DASH	P
B12 High Level	46,13	28,13	0,016
B12 Low Level	45,15	39,19	0,851

Pre-o: Pre-operative; Post-o: Postoperative; B12 High Level: B12 >300; B12 Low level: B12 <300

DISCUSSION

This study indicates that patients with moderate CTS who had higher preoperative B12 levels showed more pronounced improvement following surgery.

Although previous research questioned the role of B12 in CTS pathogenesis, our findings align with studies that suggest supplementation may improve outcomes (11-13). Negro et al. demonstrated symptom relief in patients with peripheral entrapment neuropathies using uridine monophosphate, folic acid, and B12. Biçer et al. also reported improvements in symptom and function scores with B-complex supplementation (11, 12).

Current guidelines recommend conservative treatments for CTS, with surgery indicated when conservative measures fail (14). Our patients had moderate CTS unresponsive to conservative management.

Though a placebo-controlled trial found no benefit for vitamin B6 alone (15), studies using B-complex vitamins showed improved outcomes (12).

Limitations of our study include its retrospective design and lack of serum folate or homocysteine measurements. Despite this, it offers clinically relevant insights regarding perioperative nutritional status and functional recovery.

CONCLUSION

Preoperative evaluation and potential correction of vitamin B12 levels may contribute to better recovery outcomes in patients with moderate CTS undergoing surgical decompression.

Ethics Committee Approval

This research complies with all the relevant national regulations, institutional policies and is in accordance the tenets of the Helsinki Declaration, and has been approved by the Eskisehir Osmangazi University Medical Faculty Ethical Committee, March 22, 2022 (Decision No. 13).

Informed Consent

Retrospective design; informed consent not required.

Author Contributions

Concept – S.E.G., K.G.; Design – S.E.G., K.G.; Supervision – S.E.G., K.G.; Materials – K.G.; Data Collection – S.E.G., K.G.; Analysis – S.E.G., K.G.; Literature Search – K.G.; Manuscript Writing – S.E.G., K.G.; Critical Review – S.E.G., K.G.

Conflict of Interest

None declared.

Financial Disclosure

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