

The Relationship Between Load-Capacity Index and Common Geriatric Syndromes

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ABSTRACT

Introduction: The body mass index (BMI) does not accurately reflect changes in fat and muscle with age. The metabolic load-capacity framework identifies fat as “load” and muscle as “capacity”; this is measured by the load-capacity index (LCI), defined as the fat-mass-to-fat-free-mass ratio (FM/FFM). This study examined the relationship between LCI and health outcomes in older adults across obesity levels defined by BMI.

Methods: This study included adults aged 65 years and older who visited the Geriatric Outpatient Clinic from January 2024 to April 2025. A total of 113 participants were divided into two groups based on the number of geriatric syndromes: low (0-2 syndromes; 55 participants) and high (3 or more syndromes; 58 participants). The study used statistical tests to compare the groups and to examine the association between LCI and the frailty index, the SARC-F score, and the total number of geriatric syndromes.

Results: The high syndrome burden group demonstrated significantly worse physical performance, higher LCI, greater FM, lower lean body mass, poorer nutritional status, reduced functional independence, and higher rates of depression, polypharmacy, falls, urinary incontinence, and obesity compared with the low burden group, whereas age, sex, walking speed, and cognitive status did not differ between groups. In the obesity subgroup, objective performance measures and functional independence were comparable to those of the non-obese group, yet frailty, sarcopenia risk, syndrome burden, and LCI were significantly elevated, underscoring the limitations of BMI alone. LCI showed significant, moderate positive correlations with the frailty index, the SARC-F score, and the total number of geriatric syndromes.

Conclusion: Elevated LCI values were significantly associated with increased frailty, higher SARC-F scores, and a greater prevalence of geriatric syndromes. This finding supports the use of FM/FFM as a practical, biologically meaningful adjunct to CGA for screening and risk stratification in older adults.

Keywords: Geriatric syndromes, load-capacity index, body composition, frailty

Introduction

The aging trend of the global population has redirected the focus of geriatric medicine from addressing individual diseases to the comprehensive management of complex health conditions in older adults (1). Geriatric syndromes, including falls, urinary incontinence, cognitive impairment, malnutrition, and frailty, are considered clinical indicators that better reflect the overall health status of older adults than isolated diagnoses (2). The fundamental mechanism underlying these syndromes is the reduction in physiological reserves and narrowing of homeostatic capacity that occurs with aging. Because frailty represents heightened susceptibility to adverse outcomes when homeostatic reserves are depleted, body composition-centered models have emerged

as a promising avenue for clarifying the biological substrate of the aging phenotype (3).

Aging is accompanied by opposing shifts in tissue distribution: skeletal muscle steadily declines while adipose accumulation continues, and standard anthropometry, most notably body mass index (BMI), fails to register this reciprocal remodeling. Consequently, even patients whose weight and BMI remain within the reference ranges may exhibit a sarcopenic-obese phenotype in which reduced lean mass and expanded fat depots coexist. Research has consistently shown that BMI is insufficient for assessing the relationship between body composition and frailty, highlighting the need for more comprehensive indices (4).



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The load-capacity model of body composition provides a conceptual framework to address this limitation. Within this framework, visceral adiposity acts as a metabolic burden driving impaired insulin signaling, persistent low-grade inflammatory activity, and oxidative injury, whereas skeletal muscle constitutes the compensatory reserve that offsets these deleterious inputs (5,6). When the metabolic load exceeds the available capacity, the risk of adverse health outcomes increases. The load capacity index (LCI), operationally defined as the ratio of fat-mass to fat-free mass (FM/FFM), quantifies this balance as a single, continuous, dimensionless metric derived from body composition parameters (7). Several load-to-capacity ratios have been proposed in the literature, including the appendicular skeletal muscle mass to total body fat ratio (ASM/TBF) and trunk FM to ASM mass ratio (TrFM/ASM). Among these, the FM/FFM ratio was selected for the present study because it can be readily calculated from any bioelectrical impedance analysis (BIA) device without requiring segmental or regional body composition data, thereby offering broader clinical applicability in settings where advanced imaging modalities such as dual-energy X-ray absorptiometry (DXA), computed tomography or magnetic resonance imaging are not feasible (8).

Clinical studies have demonstrated that higher load-to-capacity ratios are associated with physical limitations, reduced walking speed, diabetes, metabolic syndrome, and cardiovascular disease (8). However, the relationship between LCI and common geriatric syndromes, including frailty, sarcopenia, falls, cognitive impairment, and malnutrition, has not been sufficiently explored.

This study aimed to investigate the relationship between the FM/FFM ratio, a BIA-derived metabolic LCI, and common geriatric syndromes, and to evaluate the potential utility of this ratio as a practical screening and risk-stratification tool that reflects metabolic imbalance in the context of comprehensive geriatric assessment (CGA). We hypothesized that higher LCI values would be positively associated with a greater burden of geriatric syndromes, and sought to explore whether this association persists across BMI-defined obesity categories.

Methods

Study Design

This retrospective, observational, cross-sectional study included individuals aged ≥ 65 years who attended at Istanbul University-Cerrahpaşa Faculty of Medicine, Department of Geriatrics Outpatient Clinic between January 2024 and April 2025. The protocol conformed to the ethical principles set out in the Declaration of Helsinki. The Istanbul University-Cerrahpaşa Faculty of Medicine Ethics Committee granted retrospective institutional review and approval for the analysis of anonymized outpatient records on 01 October 2025 (decision number: 2025/646). Sample size estimation was performed a priori using G*Power software (version 3.1.9.7). The calculation was based on an independent-samples t-test comparing obese and non-obese older adults. Assuming a two-sided α level of 0.05, a statistical power ($1-\beta$) of 80%, an allocation ratio of 1:1, and a moderate effect size (Cohen's d : 0.48), derived from

previous studies on body composition in older adults, the minimum required sample size was calculated to be 110 participants (55 per group). The statistical power achieved for this sample size was 80.4%.

Participants were stratified by obesity status, as obesity affects body composition, physical performance, and the prevalence of geriatric syndromes. Stratification permitted examination of the association between the LCI and geriatric outcomes within more homogeneous subgroups. Because only de-identified data collected during routine outpatient care were analyzed, the Ethics Committee waived the requirement for individual informed consent.

Inclusion and Exclusion Criteria

Patients aged ≥ 65 years who underwent CGA and body composition analysis during the study period were deemed eligible for inclusion. The following exclusion criteria were applied: presence of a pacemaker, defibrillator, or active electronic or metal implants; limb amputation; a diagnosis of active malignancy or receipt of oncological treatment within the last 6 months; terminal organ failure (advanced heart, liver, or kidney failure); and severe cognitive impairment that would prevent completion of the survey forms. From the eligible patient pool with complete data records, those meeting the inclusion criteria were selected for analysis.

The study population was divided into two groups according to the median value of the total number of geriatric syndromes: "Low Syndrome Burden" (0-2 syndromes) and "High Syndrome Burden" (≥ 3 syndromes). Additionally, participants were categorized and compared as patients with obesity (BMI ≥ 30 kg/m²) and patients without obesity (BMI < 30 kg/m²) based on their BMI values.

Comprehensive Geriatric Assessment

A CGA was conducted by a specialist geriatrician using standardized, validated tools (Table 1). Body composition was evaluated using BIA. FM and FFM were measured, and the LCI was calculated as the FM/FFM ratio. All CGA components, including nutritional screening, sarcopenia risk, cumulative deficit frailty, cognition, functional independence, and objective physical performance, were assessed using the validated instruments and cut-offs summarized in Table 1. Body composition indices (FM, FFM, and LCI) were derived from bioimpedance analysis, and standard demographic and clinical variables were extracted from medical records.

In addition, demographic and clinical data, including age, sex, medication use, history of falls, urinary incontinence, and comorbidities, were recorded using a standard data collection form (9).

Physical Performance and Body Composition Measurements

Handgrip strength was quantified using a Takei TKK 5401 dynamometer (Takei Scientific Instruments, Tokyo, Japan) in a seated position with 90° elbow flexion; the best of three trials per hand was retained. Physical performance testing comprised the 6-meter gait speed measurement and the five-repetition sit-to-stand test, both timed to the nearest second.

Table 1. Geriatric Assessment

Category	Tool/parameter	Cut-off values and interpretation
Obesity status	BMI	BMI ≥ 30 kg/m²: Patient with obesity BMI < 30 kg/m²: Patient without obesity
Probable sarcopenia	SARC-F and handgrip	SARC-F ≥ 4 Low handgrip strength
Medication	Polypharmacy	≥ 5 medications: Polypharmacy present
Nutrition	MNA (SF/LF)	SF < 12: Malnutrition risk; LF < 17: Malnutrition
Frailty	FRAIL scale	0: Robust; 1-2: Pre-frail; 3-5: Frail
Depression	GDS-15	≥ 5 points: Presence of depressive symptoms
Cognition	SMMSE	< 24 points: Cognitive impairment suspicion
Functionality	IADL/Katz ADL	IADL 17/Katz 0: Full independence
Muscle strength	Handgrip (HGS)	Male < 27 kg; female < 16 kg: Low strength
Performance	Gait speed/5xSTS	≤ 0.8 m/s/> 15 sec: Low physical performance

BMI: Body mass index, SARC-F: Strength, assistance with walking, rise from a chair, climb stairs, and falls, MNA: Mini nutritional assessment, SF: Short form, LF: Long form, FRAIL: Fatigue, resistance, ambulation, illness, and loss of weight, GDS-15: Geriatric depression scale (short form), SMMSE: Standard mini-mental state examination, ADL/IADL: Activities of daily living/ Instrumental activities of daily living, HGS: Handgrip strength, 5xSTS: 5 times sit-to-stand test

Body composition was assessed using BIA with the Tanita Body Composition Analyzer TBF-300 (Tanita Co., Tokyo, Japan) after a 12-hour fast; FM and FFM were obtained. The main focus of the study, the LCI, was calculated by dividing FM, which represents metabolic load, by FFM, which represents functional capacity ($LCI = FM/FFM$) (10).

Statistical Analysis

Analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Distributional characteristics of continuous variables were first assessed using Shapiro-Wilk and Kolmogorov-Smirnov tests. Variables meeting normality assumptions are reported as mean $\pm$ standard deviation; otherwise, median with interquartile range is given. Two-group comparisons relied on Student's t-test when parametric assumptions held, and on the Mann-Whitney U test otherwise, whereas categorical variables were contrasted using Pearson's chi-square test. The associations of LCI with the FRAIL score, SARC-F, and cumulative geriatric syndrome count were examined using Spearman's rank correlation. Significance was defined as a two-tailed p-value below 0.05. Where appropriate, effect sizes and 95% confidence intervals accompany the primary comparisons to convey both magnitude and precision.

Results

A total of 113 individuals aged ≥ 65 years, who were evaluated in terms of functionality and multimorbidity, and whose CGA were completed, were included in the study. Accordingly, participants were divided into the low syndrome burden group (0-2 syndromes, $n=55$) and the high syndrome burden group (≥ 3 syndromes, $n=58$). In the subgroup analysis, participants were also categorized into two groups according to the World Health Organization BMI classification: patients with obesity ($BMI \geq 30$ kg/m², $n=45$) and patients without obesity ($BMI < 30$ kg/m², $n=68$).

No significant differences were found between the groups with low and high syndrome burdens in terms of age ($p=0.07$), sex ($p=0.21$), walking speed ($p=0.09$), or cognitive status ($p=0.12$). In the group with a high

syndrome burden, handgrip strength was lower ($p=0.0004$), sit-to-stand times were longer ($p=0.01$), LCI values were significantly higher ($p=0.007$), and mobility scores were worse ($p<0.0001$). Compared with the low syndrome burden group, the high syndrome burden group had GDS scores ($p<0.0001$), sleep problems ($p=0.002$), polypharmacy rates ($p=0.0001$), and FM ($p=0.04$). Similarly, the number of falls ($p=0.0003$), the presence of urinary incontinence ($p=0.0001$), and the prevalence of obesity ($p=0.002$) were significantly elevated in this cohort. Conversely, functional independence ($p=0.005$), nutritional status ($p=0.002$), and lean body mass ($p=0.01$) were significantly lower in individuals with a high syndrome burden (Table 2).

When the obesity group was compared with the non-obesity group, no significant differences were observed in age ($p=0.21$), gender distribution ($p=0.35$), handgrip strength ($p=0.30$), sit-to-stand time ($p=0.22$), walking speed ($p=0.67$), cognitive status ($p=0.61$), or functional independence ($p=0.20$). The SARC-F score ($p=0.0006$), frailty index ($p<0.0001$), FM ($p<0.0001$), lean body mass ($p=0.03$), and geriatric syndrome burden ($p=0.003$) were higher in the obesity group. LCI was significantly higher in the obese group ($p<0.0001$). No significant differences were observed between the groups in terms of handgrip strength, sit-to-stand time, walking speed, prevalence of sarcopenia, nutritional status, instrumental activities of daily living, cognitive status, polypharmacy, incontinence, antidepressant use, or mobility score (Table 3).

The analysis of the relationship between LCI values and clinical parameters revealed moderate, statistically significant positive correlations with the frailty index ($r: 0.4046$, $p<0.0001$), SARC-F scores ($r: 0.3666$, $p<0.0001$), and the total number of geriatric syndromes ($r: 0.3250$, $p=0.004$). The findings are summarized in Table 4.

Discussion

The primary finding of this study was that an increase in the LCI, which represents the ratio of FM to lean body mass, was independently associated with a higher prevalence of geriatric syndromes. Our results demonstrate that individuals with an elevated LCI exhibit significantly higher frailty indices and SARC-F scores, suggesting that an unfavorable

Table 2. Comparison of demographic data and anthropometric measurements based on the number of geriatric syndromes

	Number of geriatric syndromes (0-2) n=55	Number of geriatric syndromes (≥3) n=58	p
Age (years)*	74.20±6.42	76.29±5.34	0.07
Gender (male/female)***	9/46 (83.6% female)	5/53 (91.3% female)	0.21
HGS** (kg)	24 (20-30)	20 (16-24.5)	0.0004
5xSTS** (s)	14.3 (12-16.27)	16 (13.55-20)	0.01
Gait speed* (m/s)	0.64±0.20	0.58±0.21	0.09
BMI** (kg/m ²)	27.7 (25.68-30.03)	30.30 (24-33.15)	0.18
SARC-F**	1 (0-2)	4 (2-5)	<0.0001
Frailty index**	1 (0-2)	2 (2-3)	<0.0001
GDS-15**	1 (0-2.25)	4 (2-8)	<0.0001
Sleep problem***	7/55 (12.7%)	26/58 (44.8%)	0.002
Polypharmacy***	20/55 (36.3%)	42/58 (72.4%)	0.0001
FM (kg/m ²)**	8.93 (7.93-10.54)	10.33 (8.16-12.08)	0.04
FFM (kg/m ²)**	5.83 (5.7-6.56)	5.45 (5.3-6.16)	0.01
Load capacity index**	1.55 (1.23-1.85)	1.79 (1.50-2.12)	0.007
Waist-to-hip ratio**	0.906 (0.82-0.95)	0.891 (0.83-0.97)	0.87
Sarcopenia***	8/55 (14.5%)	28/58 (48.2%)	0.0001
MNA-SF**	14 (11-14)	12 (10-14)	0.007
MNA total**	26.75 (24.38-28)	24.50 (21-27)	0.002
Lawton IADL**	16 (13.75-17)	14 (10-16.5)	0.005
SMMSE**	28 (27-29)	27 (25-29)	0.12
Antidepressant usage***	8/55 (14.5%)	12/58 (20.6%)	0.39
Number of falls**	0 (0-1)	1 (0-2)	0.0003
Incontinence***	11/55 (20%)	32/58 (55.17%)	0.0001
Mobility score (0-6)**	6 (5-7)	5 (3-6)	<0.0001
Number of drugs**	4 (2-5)	6 (4-8)	<0.0001
Obesity**	14/55 (25.4%)	31/58 (53.4%)	0.002

*mean ± standard deviation, **median (25th percentile-75th percentile), ***n (%). BMI: Body mass index, SARC-F: Strength, assistance with walking, rise from a chair, climb stairs, and falls, MNA: Mini nutritional assessment, SF: Short form, GDS-15: Geriatric depression scale (short form), SMMSE: Standardized mini-mental state examination, IADL: Instrumental activities of daily living, HGS: Handgrip strength, 5xSTS: 5 times sit-to-stand test, FM (kg/m²): Fat mass, FFM (kg/m²): Free fat mass

balance between metabolic load and physiological reserve may be a key driver of the frailty phenotype in advanced age (8). This observation is coherent with the load-capacity framework, in which fat compartments impose metabolic stress while lean mass sustains functional reserve; accordingly, the clinical consequences of body composition emerge not from absolute amounts but from the equilibrium or lack thereof between these two axes (11). Recent evidence corroborates this concept, showing that higher LCIs are superior to traditional anthropometric measurements in predicting adverse cardiometabolic outcomes and overall risks (12).

Our findings are consistent with existing literature, showing that a disproportionate fat-to-lean mass ratio is associated with adverse health outcomes. Previous studies have established that a diminished muscle-to-visceral-fat ratio is associated with metabolic syndrome and vascular stiffness, and that increases in the fat-to-muscle ratio are accompanied by parallel increases in cardiovascular event rates and mortality risk. While these studies primarily focused on metabolic and prognostic outcomes, our study extends these observations to geriatric syndromes by demonstrating significant associations between LCI, frailty,

sarcopenia risk, and the burden of geriatric syndromes (13). Notably, participants with high LCI values demonstrated lower grip strength and prolonged sit-to-stand durations, reinforcing the notion that LCI reflects a simultaneous state of increased metabolic stress and depleted physiological reserve (14).

An especially informative finding emerged within the obese stratum, where LCI elevations tracked closely with frailty and the burden of geriatric syndromes, despite the absence of any meaningful correlation between BMI and performance, suggesting that BMI-based categorization systematically fails to detect functionally vulnerable obese older adults. Thus, LCI may serve as a more sensitive surrogate for identifying “at-risk” older adults with obesity who possess hidden functional deficits (13).

Interestingly, no significant association was found between the LCI and cognitive assessment scores, which contradicts some reports linking skeletal muscle depletion to cognitive impairment (15). This discrepancy should be interpreted with caution. The relatively low sensitivity of brief screening tools in detecting mild cognitive impairment and the potential “ceiling effect” in our sample may have obscured this relationship (16).

Table 3. Comparison of demographic and anthropometric measurements between patients with and without obesity

	Patient with obesity (n=45)	Patient with obesity (68)	p
Age (years)*	74.41±5.4	75.84±6.19	0.21
Gender (male/female)***	4/41 (91% female)	10/58 (85% female)	0.35
HGS** (kg)	22 (16-28)	22.6 (18-28)	0.30
5xSTS** (s)	15 (13.85-19.15)	14.85 (12-17.96)	0.22
Gait speed* (m/s)	0.62±0.23	0.60±0.20	0.67
BMI** (kg/m ²)	33.3 (31.6-36.4)	25.85 (23.2-27)	<0.0001
SARC-F**	3 (2-5)	2 (1-3)	0.0006
Frailty index**	2 (1-3)	1 (0-2)	<0.0001
GDS-15**	3 (0.5-8)	2 (1-3.75)	0.20
Sleep problem***	17/45 (37.78%)	17/68 (25%)	0.14
Polypharmacy***	29/45 (64.4%)	36/68 (52.94%)	0.22
FM (kg/m ²)**	35 (32-38)	25 (21-27)	<0.0001
FFM (kg/m ²)**	18.10 (16.65-19.15)	17.26 (16.40-17.70)	0.03
Load capacity index**	2.04 (1.8-2.2)	1.46 (1.18-1.68)	<0.0001
Waist-to-hip ratio**	0.906 (0.86-0.98)	0.89 (0.81-0.95)	0.06
Sarcopenia***	18/45 (40%)	18/68 (26.47%)	0.13
MNA-SF**	13 (11-14)	13 (10-14)	0.75
MNA total**	26 (23.75-28)	25.25 (22.13-27.5)	0.28
Lawton IADL**	15 (11-17)	15 (12.25-17)	0.20
SMMSE**	28 (25.5-29)	28 (26-29)	0.61
Antidepressant usage***	9/45 (20%)	10/68 (14.71%)	0.46
Number of falls**	1 (0-2)	0 (0-1)	0.09
Incontinence***	20/45 (44.4%)	23/68 (38.82%)	0.25
Mobility score (0–6)**	5 (3-6)	6 (4-6)	0.11
Number of drugs**	5 (3-7.5)	4 (3-6)	0.17

*mean ± standard deviation, **median (25th percentile-75th percentile), ***n (%). BMI: Body mass index, SARC-F: Strength, assistance with walking, rise from a chair, climb stairs, and falls, MNA: Mini nutritional assessment, SF: Short form, LF: Long form, FRAIL: Fatigue, resistance, ambulation, illness, and loss of weight, GDS-15: Geriatric depression scale (short form), SMMSE: Standardized mini-mental state examination, IADL: Instrumental activities of daily living, HGS: Handgrip strength, 5xSTS: 5 times sit-to-stand test, FM (kg/m²): Fat mass, FFM (kg/m²): Free fat mass

Table 4. Spearman correlation in frailty index-load capacity index and SARC-F score-load capacity index

	Correlation coefficient (r)	p	95% CI
Frailty index-LCI	0.4046	<0.0001	(0.232-0.552)
SARC-F score-LCI	0.3666	<0.0001	(0.187-0.518)
Number of geriatric syndrome-LCI	0.3250	0.004	(0.144-0.485)

LCI: Load capacity index, SARC-F: Strength, assistance with walking, rise from a chair, climb stairs, and falls, CI: Confidence interval.

Nevertheless, the consistent correlation between the LCI, frailty, and SARC-F scores suggests that this index is a more sensitive marker of global geriatric vulnerability than isolated cognitive domains. Clinically, this underscores the need for the assessment of older adults to transcend weight-centric models (17). As a biologically grounded and easily calculable tool, the LCI can facilitate the early recognition of frailty and guide targeted interventions in geriatric outpatient settings (18).

Taken together, these findings support the consideration of LCI as a complementary body composition measure rather than a stand-alone diagnostic or prognostic instrument. Previous research on pre-frail older adults has similarly indicated that BMI may not adequately capture the distinct contributions of FM and FFM to physical function

and sarcopenia risk. Therefore, evaluating these compartments jointly within a load-capacity framework may provide a more integrated representation of body composition-related vulnerability than assessing BMI or either compartment in isolation. As LCI requires only a single BIA measurement, it is accessible in settings lacking DXA or cross-sectional imaging facilities. This is particularly beneficial for low- and middle-income countries.

Prospective longitudinal studies are required to determine whether the LCI provides incremental prognostic value for clinically relevant outcomes, including disability, falls, hospitalization, and mortality, beyond the established components of a CGA (19).

Study Limitations

Several caveats should temper the interpretation of these findings. Because the study design is cross-sectional and relies on retrospective chart data, we cannot infer causal direction between LCI and any specific geriatric syndrome. Recruitment was restricted to a single tertiary center, and women accounted for a disproportionate share of the cohort; both features limit the generalizability of our estimates to other populations. Body composition was captured by BIA rather than DXA or cross-sectional imaging. Although BIA is the pragmatic choice for outpatient settings, its readings are known to shift with hydration status, which is unpredictable in older adults with variable diuretic use or subclinical fluid overload. Finally, with 113 participants, some of the null findings—cognitive status in particular—may reflect insufficient statistical power rather than a true absence of an effect.

Although we found significant associations between the LCI and several geriatric syndromes, the LCI is a relatively new body composition metric, and evidence supporting its use in geriatric populations is limited. Therefore, these findings should be viewed as early supporting evidence rather than proof of clinical utility. They suggest that LCI may act as a complementary marker of metabolic imbalance within CGA and may provide a basis for future validation in geriatric populations.

Conclusion

In conclusion, higher LCI values were significantly associated with increased frailty, higher SARC-F scores, and a greater burden of geriatric syndromes. These findings suggest that the imbalance between metabolic load and physiological capacity is a fundamental component of frailty that is not adequately represented by BMI. The LCI is simple and inexpensive to obtain and may serve as a complementary tool in CGA. It provides information beyond that obtained from conventional anthropometric measurements for evaluating body composition and the burden of geriatric syndromes.

Ethics

Ethics Committee Approval: The İstanbul University-Cerrahpaşa Faculty of Medicine Ethics Committee granted retrospective institutional review and approval for the analysis of anonymized outpatient records on 01 October 2025 (decision number: 2025/646).

Informed Consent: Because only de-identified data collected during routine outpatient care were analyzed, the Ethics Committee waived the requirement for individual informed consent.

Footnotes

Authorship Contributions: Surgical and Medical Practices - G.K.A., A.D., D.S.E.; Concept - G.K.A., S.B., D.Ö., Ü.D., S.A., A.D., D.S.E.; Design - G.K.A., S.B., D.Ö., Ü.D., S.A., A.D., D.S.E.; Data Collection or Processing: G.K.A., D.Ö., K.Ç.A., Ü.D., S.A., A.D., D.S.E.; Analysis or Interpretation - G.K.A., S.B., D.Ö., K.Ç.A., A.D., D.S.E.; Literature Search: G.K.A., S.B., D.Ö., S.A., D.S.E.; Writing: G.K.A., S.B.

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