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Research

Psychometric Properties of the Turkish Version of the Surgical Anxiety Questionnaire (SAQ)



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A B S T R A C T

Keywords:

surgery
preoperative anxiety
validity
reliability

Purpose: This study aimed to determine the psychometric properties of the Turkish surgical anxiety questionnaire (SAQ) version.

Design: This study design was methodological.

Methods: The study was evaluated with construct validity, exploratory (EFA) and confirmatory factor analysis (CFA), and convergent and discriminant validity. For scale reliability, internal consistency, Cronbach Alpha Coefficient, Pearson Correlation Analysis, and Inter-item Correlation Analysis, test-retest, and parallel forms methods were used.

Findings: The Turkish version of the surgical anxiety questionnaire consisted of a 3-factor structure, and the Cronbach's alpha value was 0.93. The CFA factor loads varied between 0.48-0.98. A positive, high correlation was found between SAQ and the Amsterdam Preoperative Anxiety and Knowledge Scale (APASIS). A positive, moderate correlation between SAQ and State-Trait Anxiety Inventory-1 (STAI-1) was found.

Conclusion: SAQ has strong validity and reliability in the Turkish society. Nurses could use the SAQ to determine the anxiety level in surgical patients.

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Most patients experience anxiety before surgery.¹ Preoperative anxiety, which develops specific to surgery, is defined as the tension created by hospitalization, anesthesia, surgery, and uncertainty.² Reasons for preoperative anxiety include fear of waking up, experiencing pain during the surgery, postoperative pain, nausea, and vomiting, the possibility of staying in the intensive care unit,³ death, fear of failure of the surgery, and fear of losing control.^{1,3}

It is reported that the incidence of preoperative anxiety varies between 44% and 92.6%.^{4–6} A study stated that more than half of patients undergoing cardiac surgery experienced moderate and high anxiety levels.⁷ High preoperative anxiety may cause excessive anesthetic requirements during surgery and related respiratory system problems. Preoperative anxiety causes more pain after surgery,^{8,9} an increase in the dose of analgesic usage, deterioration in the quality of life, and even a prolonged hospital stay.²

If preoperative anxiety remains elevated for extended periods, it increases the catecholamine level in the body by activating the hypothalamic-pituitary-adrenal system. Preoperative anxiety affects postoperative healing and leads to tachycardia, hypertension, immune

system suppression, inflammatory response suppression, and delayed wound healing.¹⁰ Patients who underwent orthopedic surgery with a high level of preoperative anxiety were shown to have higher levels of postoperative anxiety and stress, and the quality of recovery was also affected.¹¹ Therefore, preoperative management of anxiety is necessary. The first condition of being able to manage anxiety is to define the level of anxiety experienced.⁹

There are many measurement tools used to quantify anxiety. One of the most frequently used scales is Spielberg's State-Trait Anxiety Inventory (STAI). STAI is commonly used to examine anxiety levels in the Turkish population because of its validity and reliability in Turkish culture.¹² Since the scale is not specific to the surgical process, there is a need for tools that measure the level of preoperative anxiety specific to surgery. The Turkish validity and reliability of the Amsterdam Preoperative Anxiety and Knowledge Scale (APASIS) was conducted to determine the preoperative anxiety level.³ However, since this scale only defines anxiety related to anesthesia and the procedure, a more comprehensive measurement tool was needed. The surgical anxiety questionnaire (SAQ), consisting of 17 items, developed by Burton et al in 2019, is a comprehensive measurement tool because it includes concerns about surgical wounds, infection from the hospital, pain, inability to wake up from anesthesia, discharge, and postoperative social support.¹³ The present research was conducted to determine the psychometric properties of the Turkish version of the SAQ.

Conflict of Interest: None to report.

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Methods

Design

In this methodological study, conducted between January 2021 and June 2021, the psychometric properties of the SAQ adapted to Turkish were examined.

Participants

The research was carried out in a university hospital's otorhinolaryngology, orthopedics, thoracic surgery, general surgery, cardiovascular surgery, neurosurgery, and urology services. The population of the study consisted of 455 patients who were hospitalized in surgical wards in the preoperative period. Inclusion criteria of the study were as follows; (1) individuals who were hospitalized in surgical services, in the preoperative period, and undergoing surgery (2) those over the age of 18, (3) did not have communication problems, (3) did not have mental problems, and (4) agreed to be included in the study. In scale validity and reliability studies, since the sample size must be five to 20 times more than the number of scale items,¹⁴⁻¹⁶ it was planned to recruit at least 340 patients. Considering the possibility of data loss, the study was completed with 400 patients who met the inclusion criteria.

Data Collection Tools

In the data collection, introductory information forms, SAQ, STAI-I, and APASIS were used.

Introductory Information Form

This form, created by the researchers by scanning the literature,^{3,13} consisted of 10 questions including introductory features such as age, gender, occupation, marital status, and presence of chronic disease.

SAQ

In this 17-item scale, the individual was asked to rate how anxious or worried they are for each item on a five-point Likert type scale: "Not at all," "A little bit," "Moderately," "Very," and "Extremely." The answers given to each item are scored between zero and four. There is no cut-off value, and as the score increases, the individual's anxiety is interpreted as higher. Cronbach's alpha coefficient was reported to be 0.91 in the original version of the scale.¹³ In the current study, Cronbach's alpha value was determined as 0.93.

STAI- I

The scale was developed in 1970 by Spielberg et al Öner. Le Compte examined Turkish validity and reliability in 1985. It consists of two parts, STAI-I, which measures the level of state anxiety and consists of 20 items, and STAI-II, which consists of 20 items, measures the level of trait anxiety. Only STAI-I was used in the study since STAI-I measures state anxiety. STAI-I determines how the individual feels at a certain moment and under certain conditions, and for each item, one of the options "not at all," "a little," "a lot," or "totally" is marked.¹²

APASIS

Moerman et al developed APASIS in 1996 to assess patients' pre-operative anxiety and information needs.¹⁷ Turkish validity and reliability were determined by Çetinkaya et al³ in 2019. The scale has six items and two sub-dimensions: anxiety and need for information. As the score obtained from the Likert-type scale is evaluated from 1 ("not worried at all") to 5 ("extremely worried"), the level of anxiety increases.

Procedure

Two linguists translated the SAQ from English to Turkish. An expert compared Turkish translations, and the Turkish form of the scale was completed by deciding on the most appropriate expressions. The Turkish form was translated back into English by two linguists. Then, an expert who knew English well examined the English translations of the scale, and appropriate expressions were decided. After the back translations were completed, the researchers, with another expert fluent in English, compared the two versions to determine the differences between the English and Turkish translations and finalized the scale.

Ten experts (two psychiatric nursing specialists, two experts experienced in validity and reliability research, and six surgical nursing specialists) were requested to examine the scale for content validity. The Turkish form and the original English version of the scale were sent to them, and they were requested to give points from one to four (one=not at all appropriate, four=completely appropriate) to analyze the suitability of the items. As a result of the scoring, the content validity index (CVI) was calculated. The Turkish form of the scale was re-evaluated in line with expert opinions.¹⁶

Data Collection

The researchers, by face-to-face interview method, collected data. Before starting the research, a preliminary application was made with 15 participants to evaluate the comprehensibility of the data collection forms. After the pre-application, the incomprehensible questions in the forms were corrected, and the questionnaire form was given its final form. Data collection took about 10 minutes.

Ethical Consideration

Ethical approval (Decision no: 2021/131) from the ethics committee of the Erciyes University, study permission from the relevant institution, and verbal and written consent from the individuals were obtained. Permission was obtained by email for adapting the scale to Turkish from the owner of the scale, who had developed the scale.¹³

Data Analysis

Data were analyzed using IBM SPSS Statistics 24 and IBM SPSS Amos 24 (IBM Corp. Armonk, NY) programs. Descriptive characteristics were analyzed by number (n), percent (%), mean and standard deviation. For content validity, CVI was calculated. The adequacy of the sample number and the eligibility of the sample for factor analysis were detected by Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity (BTS) analysis.

Construct validity was examined by convergent and discriminant validity, confirmatory factor analysis (CFA), and an exploratory factor analysis (EFA). First, the sample was divided into two parts in the database with the statistical program.¹⁸ In the first part, EFA, and the second part, CFA was performed.

For scale reliability, internal consistency, Cronbach Alpha coefficient, Pearson Correlation Analysis, test-retest Intra-class Correlation Coefficient (ICC), and parallel forms methods were used. The data's normality was checked via the Shapiro-Wilk test and the skewness and kurtosis values. The confidence interval was accepted as 95%, and the significance level was $P < .05$ for all results.

Results

In **Table 1**, the introductory characteristics of the patients are given. 54.8% of the patients were male, 78.3% were married, 48.5% were unemployed, 47.5% had a chronic disease, and 17.3% had

hypertension. 75.0% of the patients had previous surgery history, 94.0% received general anesthesia, and 32.3% were hospitalized in the orthopedic service.

Content Validity

In this study, the item-level content validity index (I-CVI) was between 0.8 and 1. The scale-level content validity index (S-CVI) was 0.97.

EFA

The KMO coefficient in the study was 0.924, and the BTS value was 5114.575330 ($P < .001$). The Varimax rotation method was used in the factor analysis. EFA results are shown in Table 2. SAQ had a 3-factor structure; concerns about health and uncertainty (Item 1, 2, 5, 9, 11, 12, 15), concerns about anesthesia (Item 4, 6, 8, 13), and concerns about the surgical process (Item 3, 7, 17, 16). The total explained variance was 66.51%. Items 10 and 14 were removed from the SAQ according to the results of EFA. Because any item that is included in more than one factor with a difference of < 0.1 is considered an overlapping item, and these items are removed from the scale.¹⁸ As a result, the Turkish form of the scale contains 15 items. As a result of EFA, factor loadings of the adapted scale were found to be between 0.53 and 0.84 (Table 2).

CFA

The CFA showed the factor loadings varied between 0.48 and 0.98 (Figure 1). According to the model fit index, the model chi-square (χ^2) value was found to be 185.106 (df: 82), and the root means the square error of approximation (RMSEA) value was 0.079.

Another parameter for model fit is obtained by splitting the model chi-square value with the degree of freedom, which should be below 5.¹⁹ This value was 2.257 in our study. In addition, the goodness of fit index (GFI) was 0.89, the comparative fit index (CFI) was 0.95, the incremental fit index (IFI) was 0.95, the relative fit index (RFI) was 0.89, and the normed fit index (NFI) was 0.92 (Table 3).

Convergent and Discriminant Validity

The average variance extracted (AVE) values of the factors of SAQ were concerns about health and uncertainty (F1) = 0.54, concerns about anesthesia (F2) = 0.75, and concerns about the surgical process (F3) = 0.51. In addition, the scale’s composite reliability (CR) coefficients were 0.85, 0.88, and 0.82, respectively. The value was above 0.70.

In the three-factor scale, the correlation coefficient between the F1 and F2 factors was calculated as 0.56; the F1 and F3 factors as 0.42; and the F2 and F3 factors as 0.28 (Table 4).

Reliability Analysis

The total scale Cronbach’s alpha coefficient was 0.93. Among 400 patients included in the study, test-retest analysis was performed with 30 (7.5%) patients who applied to the outpatient clinic 15 days before the operation and were scheduled to be operated on. Test-retest reliability was evaluated by intra-class correlation and was found to be 0.93. The reliability of the scale was also evaluated with parallel forms. APASIS and STAI-1 were used as parallel forms. A positive, high correlation was found between SAQ and APASIS, and a positive, moderate correlation between SAQ and STAI-1 ($P < .001$). (Table 5).

Table 1
Descriptive Characteristics of the Patients

Variable	Mean	SD
Age	52.23	17.70
Gender	n	%
Male	219	54.8
Female	181	45.3
Marital status		
Married	313	78.3
Unmarried	87	22.7
Having a child		
Yes	313	78.3
No	87	22.7
Occupation		
Self-employment	61	15.3
Worker	23	5.8
Retired	87	21.8
Officer	35	8.8
Unemployed	194	48.5
Presence of chronic disease		
Yes	190	47.5
No	210	52.5
Chronic disease		
Hypertension	69	17.3
Diabetes	64	16.0
Heart disease	17	4.3
Lung diseases such as asthma and COPD	26	6.5
Kidney related diseases	14	3.5
Previous surgery experience		
Yes	300	75.0
No	100	25.0
Type of anaesthetic		
General	376	94.0
Local	24	6.0
Surgical services		
Urology	83	20.8
Otolaryngology	76	19.0
Orthopaedics	129	32.3
General surgery	72	18.0
Brain surgery	33	8.3
Thoracic-Cardiovascular surgery	7	1.8
Type of surgery		
Otorhinological surgery	63	15.7
Cancer surgery	114	28.5
Orthopaedic surgery	128	32.0
Biopsy	4	1.0
Disc herniation	18	4.5
Abdominal surgery	19	4.7
Urological surgery	51	12.9
Heart valve surgery	3	0.7
SAQ Total score	16.25±13.79	(0-55)

Discussion

It is stated that 25% to 80% of patients hospitalized for surgery experience preoperative surgical anxiety, and anxiety negatively affects recovery.² Validity and reliability of APASIS were conducted to measure preoperative anxiety levels in Turkish culture.³ However, since this scale did not include concerns about surgical wounds, infection from the hospital, pain, inability to wake up from anesthesia, discharge, and postoperative social support, a more comprehensive measurement tool was needed. In this study, the psychometric properties of the SAQ were examined.

It is recommended that the number of experts is between 5 and 10 to evaluate content validity.²⁰ In the current study, the opinions of 10 experts in the fields of psychology, surgical anxiety, and surgical nursing were engaged for the content validity of the SAQ. It is recommended that I-CVI and S-CVI values be ≥ 0.80 to reveal that there is an accordance between the experts’ opinions.²⁰ In our study, it was detected that both I-CVI and S-CVI values were ≥ 0.80 . Consequently, it can be said the content validity of the SAQ has been achieved.

Table 2
Factor Loadings and Corrected Item–Total Correlation of the SAQ (n = 400)

Item Number	Item	Factor Loading	Corrected Item Total Correlation
1	Not know what will happen	0.702	0.757
2	My current health make difficult for my surgery or recovery	0.815	0.684
3	Having an injection or a vascular access establishing.	0.545	0.508
4	Not having any control on my surgical operation or anesthesia	0.816	0.781
5	Having a wound / incision on my tissues	0.664	0.719
6	Being awake or conscious during my surgery	0.829	0.780
7	Health care personnel making a mistake during my surgical operation	0.716	0.667
8	Not waking up from anesthesia	0.844	0.810
9	Other health problems could found by doctors during my surgery	0.649	0.740
10*	Feeling sick or vomiting after the surgery	0.555	0.691
11	Having pain or experiencing discomfort after my surgery	0.531	0.718
12	Being discharged without full recovery	0.789	0.665
13	Getting an infection or illness from the hospital setting.	0.599	0.556
14*	Getting have to take time off from school or work	0.567	0.326
15	It is not clear how soon I will be able to return to my normal daily life and hobbies.	0.761	0.639
16	Not getting sufficient social support after my surgery	0.765	0.593
17	The costs related to my surgery	0.761	0.562
Explained Variance (%)		66.5 %	

* Items were excluded from the scale.

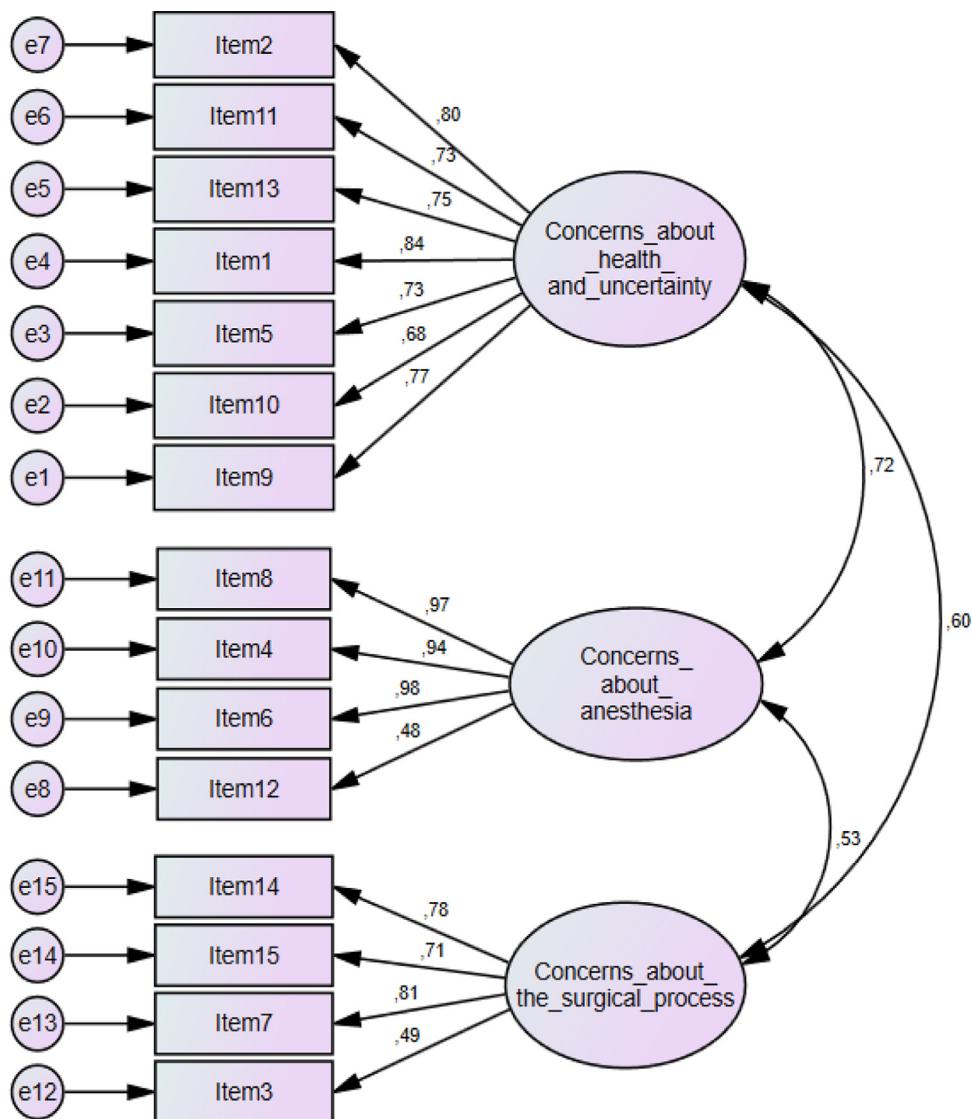


Figure 1. Confirmatory factor analysis of the Turkish form of SAQ. This figure is available in color online at www.jopan.org.

Table 3
Model fit Indices for CFA

Single Factor	χ^2	df*	χ^2/df	GFI [†]	NFI [‡]	IFI [§]	CFI	RFI [¶]	RMSEA ^{**}
Model	185.106	82	2.257	0.893	0.921	0.954	0.954	0.898	0.079

* Degree of Freedom.
[†] Goodness of Fit Index.
[‡] Normed Fit Index.
[§] Incremental Fit Index.
^{||} Comparative Fit Index.
[¶] Relative Fit Index.
^{**} Root Mean Square Error of Approximation.

Table 4
Standard Regression Weights of SAQ Items

	F1	F2	F3
Item 9	0.776		
Item 5	0.752		
Item 1	0.819		
Item 11	0.393		
Item 12	0.701		
Item 15	0.685		
Item 2	0.751		
Item 13		0.478	
Item 4		0.944	
Item 6		0.981	
Item 8		0.969	
Item 3			0.497
Item 7			0.811
Item 17			0.713
Item 16			0.781
AVE	0.54	0.75	0.51
CR	0.85	0.88	0.82
Cronbach α	0.91	0.90	0.81

Before performing the factor analysis, the adequacy of the sample size is evaluated with the KMO coefficient, and the significance of the inter-variable of the correlation coefficient is evaluated with the BTS. The KMO coefficient should be at least 0.50, and the BTS should be statistically significant to decide that the sample size is sufficient and to apply factor analysis.^{14,16,21} In the current study, the KMO value was 0.922, and the BTS test $P < .001$. These results revealed the sample and scale were suitable for factor analysis. Since KMO and BTS tests were not performed in the original version of the scale, a comparison could not be made.¹³

As a result of EFA, factor loads of the Turkish form of the scale were found to vary between 0.53 and 0.84. In addition, the SAQ had a three-factor structure: Concerns about health and uncertainty, concerns about anesthesia, and concerns about the surgical process. The total explained variance was 66.51%. It was stated the total explained variance should be 50% to 75%, and the factor load should be >0.30 .¹⁹ In this study, the total explained variance was $>50\%$, and factor loadings >0.30 , and the scale explained most of the variance. In the original version of the scale, the total explained variance was 52.58%.¹³ These results reveal the scale has strong construct validity.

Table 5
Correlation Between the SAQ and the APASIS and STAI-I

Scales	APASIS		STAI-I	
	r	P	r	P
SAQ total	0.819	.000	0.635	.000
Concerns about health and uncertainty	0.806	.000	0.580	.000
Concerns about anaesthesia	0.817	.000	0.538	.000
Concerns about the surgical process	0.439	.000	0.528	.000

It was advised to examine the structure detected by EFA using CFA. It has been reported the model fit indices GFI, NFI, and CFI must be >0.90 , and RMSA must be <0.08 .^{22,23} In our study, model fit indices were compatible with the literature. Model fit indices were not given in the original scale; therefore, a comparison with the Turkish scale could not be made.

Reliability is that the measurement tool produces consistent measurements with repeated applications. It is the correct measurement of the feature.^{16,24} Internal consistency, test-retest reliability, and parallel forms are frequently used for reliability analyses. Cronbach's alpha coefficient is used to measure internal consistency.²⁴ A Cronbach's alpha coefficient higher than 0.80 indicates high reliability.¹⁶ In this study, the total Cronbach's alpha coefficient was 0.93. Like our study, Cronbach's alpha coefficient was reported to be 0.91 in the original version of the scale. These results show the scale is highly dependable. An ICC above 0.80 indicates good reliability.¹⁹ In this study, the ICC of our Turkish scale was 0.93, indicating high reliability. Performing test-retest analysis in our study is one of its strengths compared to the original scale.

In the current study, the scale's reliability was also evaluated with parallel forms. A positive and high correlation was found between SAQ and APASIS, and a moderate positive correlation between STAI-I ($P < .001$). Consistent with our study, a high positive correlation was found between SAQ and APASIS and a moderate positive correlation between STAI-I in the original scale.¹³

Convergent and discriminant validity of a new questionnaire is conducted to ensure that the questionnaire measures the theoretical construct it was designed to measure and can distinguish between closely related constructs.^{25,26} What is required for the convergent validity of a scale is that the CR value is >0.50 .²⁷ In the study, the CR coefficients of the F1, F2, and F3 factors were 0.85, 0.88, and 0.82, respectively. Accordingly, it can be said these three factors have high construct reliability.²⁸

Discriminant validity refers to the extent to which different constructs differ from one another empirically. It also determines the degree of differences between the overlapping structures. The discriminant validity is calculated by comparing the square root of the AVE with the correlation of latent constructs. A latent construct could better explain its indicator's variance, not other latent constructs' variance. Thus, the square root of the AVE of each construct could have a higher value than the correlations with other hidden

constructs.²⁹ As the F1-F2 and F1-F3 AVE values of the three-factor scale were greater than the square of these correlation coefficients, it can be said the scale has discriminant validity.^{27,29} The fact that the SAQ has both convergent and discriminant validity is strong evidence that the scale provides construct validity.

Limitation

Our limitation in the research is that the scale has not been validated as dependable in other countries' languages, so it has been compared only with the original scale.

Conclusion

Our findings showed that the Turkish version of the SAQ consisted of a three-factor structure, and the Cronbach's alpha value was high, as in the original version. It has been determined that SAQ has strong validity and reliability in the Turkish society. It can be suggested that this scale, which measures the anxiety level in the preoperative period and is specific to the surgical process, could be used to define the anxiety level in studies conducted on surgical patients.

Preoperative psychological preparation is one of the critical nursing interventions. Because it affects the patient's recovery process, the meaning attributed to the surgery by the patient and psychological symptoms such as anxiety and fear should be defined. Tools that focus on the psychological symptoms caused by surgery and that can accurately and safely measure the symptoms are required to determine the level of anxiety in patients. The scale, validated and reliable as a result of the study, can be used safely in all patients undergoing surgery.

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