Assessment and Management of Preoperative Anxiety

*Isabel Tulloch, and †John S. Rubin, *†London, United Kingdom

Summary: Background. Preoperative anxiety has the potential to alter the dynamics of an elective procedure and has been shown to detrimentally affect patients both cognitively and physiologically. If mismanaged, it can lead to essential procedures being postponed or canceled, delay postoperative recovery, and increase patients' requirements for medical intervention postoperatively. These outcomes have harmful implications both clinically and economically. Our primary objective was to evaluate the levels of anxiety patients experience immediately before elective otorhinolaryngologic procedures. Our secondary outcome was to assess the subjects' views on potential management strategies to tackle their anxiety.

Methods. This is an observational cross-sectional project evaluating 53 patients who were selected consecutively from a list of elective otorhinolaryngologic procedures. All procedures were to be completed under general anesthetic, and all patients had received the same preoperative assessment preparation. 29 male and 24 female patients were included, aged between 19 and 76 years (mean 45). The Spielberger State-Trait Anxiety Inventory was used to assess preoperative anxiety directly before the otorhinolaryngologic procedure. The Service Improvement questionnaire was used to assess whether patients would favor the introduction of anxiety-reduction measures.

Results. There was neither a significant increase in patient anxiety levels preoperatively ($P = 0.37$) nor a significant increase in anxiety levels preoperatively when results were stratified according to patient gender and age ($P = 0.45$ and $P = 0.27$). 54% of the patients felt that their anxiety would have been reduced if they had read a procedural information leaflet, and 22% felt it would have been reduced if they had received preoperative behavioral training. 17% of the patients wanted more information from the surgical team. However, 12% of the patients would have liked less information from the surgical team preoperatively.

Conclusions. Patients did not have a significant increase in their anxiety levels preoperatively. On the basis of our findings, we will work to improve the information we provide to patients preoperatively and to identify patient subgroups that require additional preoperative support.

Key Words: Preoperative anxiety−Otorhinolaryngologic surgery−State-Trait Anxiety Inventory−Anxiety-reduction measures−Elective surgery.

BACKGROUND

Preoperative anxiety has the potential to alter the dynamics of an elective procedure. If mismanaged, preoperative anxiety can lead to essential procedures being postponed or canceled. Both outcomes have detrimental implications clinically and economically.

Anxiety influences patients both cognitively and physiologically. Distressed patients may be unable to understand and recall information, rendering them unable to provide consent for the operation.[1] Physiologically, anxiety can lead to autonomic dysfunction and can modify inflammatory responses, platelet activity, and immunologic functioning.[2,3] Anxious patients may require more sedation and anesthesia because of a heightened perception of pain.[4−6]

These adverse effects can lead to lengthened recovery times and increase requirements for medical intervention postoperatively.[5,7,8] The effects of anxiety can also render patients unable to fully appreciate the improvements that have been achieved by the operation.[5,9]

Preprocedural anxiety is present in up to 80% of patients.[10] Recognized risk factors of preoperative anxiety include being female, having a higher American Society of Anesthesiologists (ASA) grading, psychiatric illness, high baseline anxiety levels, previous adverse clinical experiences, and undergoing specific types of operation.[10−12] Theoretically, patients identified as likely to be more anxious preoperatively can be targeted with specific antianxiety measures, for example, leaflets and behavioral training.

Our primary end point was to assess the level of anxiety that patients experience immediately before their otorhinolaryngologic procedure. The hypothesis was that patients would have an increase in their anxiety levels preoperatively. Our secondary end point was to assess whether patients would welcome the introduction of anxiety-reduction measures. We hypothesized that patients would welcome the introduction of antianxiety measures.

METHODS

A single-center, observational, prospective, cross-sectional questionnaire-based project was performed to evaluate the levels of preoperative anxiety in 53 patients undergoing elective otorhinolaryngologic procedures under general anesthesia within a central London otolaryngologic center over a 3-month period.

Accepted for publication February 13, 2018.
Conflict of interest: The authors report no conflicts of interest.
Author contribution: Each listed author has contributed to the design and implementation of this report.
Ethics, consent to publish, and permissions: All ethical and institutional guidelines have been met and written consent to publish has been provided for all study participants.
From the *Neurosurgery, King's College Hospital, London, United Kingdom; and the †The University College London Hospital, University of London, London, United Kingdom.
Address correspondence and reprint requests to Isabel Tulloch, Neurosurgery, King's College Hospital, London, United Kingdom. E-mail: isabeltulloch@doctors.org.uk
Journal of Voice, Vol. 33, No. 5, pp. 691−696
0892-1997

https://doi.org/10.1016/j.jvoice.2018.02.008

Participants

Patients were selected consecutively from a list of scheduled surgical procedures. There was no eligibility restriction in terms of age, gender, comorbidities, ASA grading, or type of operation. These inclusion measures were applied to provide a realistic portrayal of the elective patient population.

Before their admission, all subjects completed a preoperative assessment with a clinical specialist nurse. The subjects had also all discussed the planned procedure in an outpatient setting with a senior surgical doctor qualified to complete the procedure (specialist registrar or consultant) within 3 months of their elective admission. On the morning of the procedure, the subjects were admitted to ward beds by a nurse upon approval by the surgeon and were assessed by the anesthetist. The subjects then were offered the opportunity to participate in the project. No patients declined involvement. None of the patients had received anesthetic, anxiolytic, or sedative agents at this point.

Data collection

After providing written consent to participate and reviewing an information leaflet explaining the project, the subjects then spent 10 minutes alone completing the Spielberger State-Trait Anxiety Inventory (STAI) and the Service Improvement (SI) questionnaire.

The STAI has been used in over 3000 studies, many of which have examined preprocedural anxiety. The STAI was chosen so that our results could be compared with the results of previously published reports on preoperative anxiety levels. The first part of the STAI assesses anxiety at a particular moment in time—"state" anxiety (STAI-S). The second part of the inventory assesses "trait" anxiety (STAI-T)—the subject's baseline level of anxiety.[13]

The STAI is an established clinical tool for diagnosing and differentiating state-trait anxiety and distinguishing it from depressive syndromes. The STAI can be reliably used across a range of socioeconomic status levels and requires only a "sixth grade" reading level to complete.[14] Spielberger[14] classified a STAI score of 20−37 as showing no anxiety or low anxiety, a score of 38−44 as representing moderate anxiety, and a score exceeding 45 as representing high anxiety.

The SI questionnaire is an 8-point questionnaire designed for this project (Figure 1). It asks subjects whether they would like various antianxiety measures to be introduced preoperatively. It consists of a series of closed statements answerable by "yes" or "no," with an open final question allowing the subject to give additional comments.

Ethical considerations

This project was performed in line with National Health System Health Research Authority guidelines and is classified as an observational service evaluation project. All data collected were anonymized and stored confidentially. Clinicians involved in the provision of care of the patient were not informed of either the patient's choice to participate in the project or of the results of the data that were collected through the patient's involvement in the project.

Statistical analysis

A power calculation was performed to ensure that an adequate number of subjects were included. For analysis of the primary hypothesis, a one-tailed, paired-sample t test with equal variance was used. To compare within subgroups (gender and patient age), we used unpaired two-tailed t tests with equal variance. The P value for statistical significance was set at 0.05.

RESULTS

29 men and 24 women were included, aged between 19 and 76 (mean age 45 years). Table 1 displays the relative age distribution of the subjects.

The ASA grading for participants ranged from I to IV (28% of the patients were grade I, 60% were grade II, 9% were grade III, and 2% were grade IV). Six of the patients had previously required psychiatric input.

The project population consisted of patients who had been admitted for a variety of different operations (see Table 2). This heterogeneity was allowed to provide a realistic portrayal of our patient population.

STAI results

The mean STAI-S score was 36 (range 20−63), and the mean STAI-T score was also 36 (range 20−68). There was no difference between state anxiety and trait anxiety preoperatively, supporting the null hypothesis ($P = 0.37$).

Subgroup analyses

Patient gender

Women were observed to have both trait and state anxiety levels, which were on average 7 points higher than their male counterparts ($P = 0.01$). However, neither men nor women showed a significant increase in their anxiety levels preoperatively when gender was taken into account ($P = 0.45$).

Patient age

Patient age was not shown to affect either state or trait anxiety level in patients ($P = 0.5$ and 0.3 for STAI-S and STAI-T, respectively). In addition, there was no significant difference in the increase in the level of anxiety between the older and the younger populations preoperatively (ie, STAI-S relative to STAI-S) ($P = 0.27$).

TABLE 1.
Age Distribution of Subjects

Age Grouping (y)	Number of Patients
18−30	9
31−40	13
41−50	17
51−60	6
61−70	3
71−80	5
Total	53

Suggestions For improvement of Practice 1

Patient number: _____ **Date:** _____

We have listed here several suggested ways in which we as surgeons can reduce our patients' anxiety levels before an operation. We would like to establish whether our patients think these suggestions would be useful for us to integrate into our everyday practice. Please answer yes or no to the list of questions below:

I think that I would have felt less anxious if I had been:

Provided with more information in clinic about the procedure	Yes	No
Given a leaflet explaining the procedure in more detail	Yes	No
Provided with more information on the day of the procedure by the Surgeon	Yes	No
Provided with more information on the day of the procedure by the Nursing staff	Yes	No
Provided with more information on the day of the procedure by the Anaesthetist	Yes	No
Taught therapeutic ways to relieve my stress, for example deep breathing exercises	Yes	No
Shown a video of the procedure	Yes	No
Been given less information about the procedure	Yes	No
Other suggestions of ways in which to reduce patient anxiety:		

[Delete as required]

FIGURE 1. The SI questionnaire.

Previous surgical history

58% (n = 31) of the subjects who participated in our project had undergone at least one ear, nose, and throat (ENT) operation before. 42% of the cases (n = 13) had undergone the same ENT surgical procedure within the previous 12 months. There was on average a 3-point increase in anxiety preoperatively in patients who had never previously had an ENT procedure relative to those who had ($P = 0.11$).

SI results

12 patients did not complete the SI questionnaire because of preoperative time constraints. Figure 2 depicts the findings of the 41 completed SI questionnaires. The most notable findings were as follows: to reduce their preoperative anxiety, 54% of the patients (n = 22) strongly supported the introduction of a leaflet explaining the procedure; 22% advocated preoperative behavioral training; 17% (n = 7) favored a more in-depth

TABLE 2.
Table Listing the Type of Procedures Performed

Type of Procedure			No.	Overall
Laryngeal	Microlaryngoscopy	+Biopsy	7	23
		+Laser	7	
		+Botulinum toxin	5	
		+ Fat graft	4	
Rhinological	Sinus	FESS	7	21
	Nasal	Septorhinoplasty	7	
		Septoplasty	1	
		Minor	6	
Airway	Endoscopy	Sleep nasendoscopy	4	6
		+Salivary gland botulinum toxin	1	
		Panendoscopy	1	
Oropharyngeal	Pharynx	Adenotonsillectomy	1	3
		Uvuloplasty	1	
	Oral	Radiofrequency ablation tongue	1	

Abbreviation: FESS, functional endoscopic sinus surgery.

discussion with their surgeon on the day of the procedure; 12% (n = 5) supported more information in the outpatient clinic before their admission; 12% (n = 5) stated that they would have liked less information preoperatively; 12% (n = 5) requested specific improvements to the written information they received through the mail in the lead-up to their admission, with specific regard to its content, clarity, and timeliness.

DISCUSSION

We performed this project primarily to evaluate the level of anxiety that our patients experienced preoperatively. It is well recognized that heightened preoperative anxiety levels can detrimentally affect a patient's postoperative recovery,[1–8] and we were keen to identify and manage our patient's anxiety if present. The project was therefore performed over a 3-month period on consecutive, electively admitted patients undergoing a variety of otorhinolaryngologic procedures, with a view to providing a realistic portrayal of anxiety levels within our elective patient body.

The mean STAI-S and STAI-T scores were both 36 (with standard deviations of 12 and 11, respectively). On average, our patients therefore fell within the range of no anxiety or low anxiety both at baseline and preoperatively. There was no

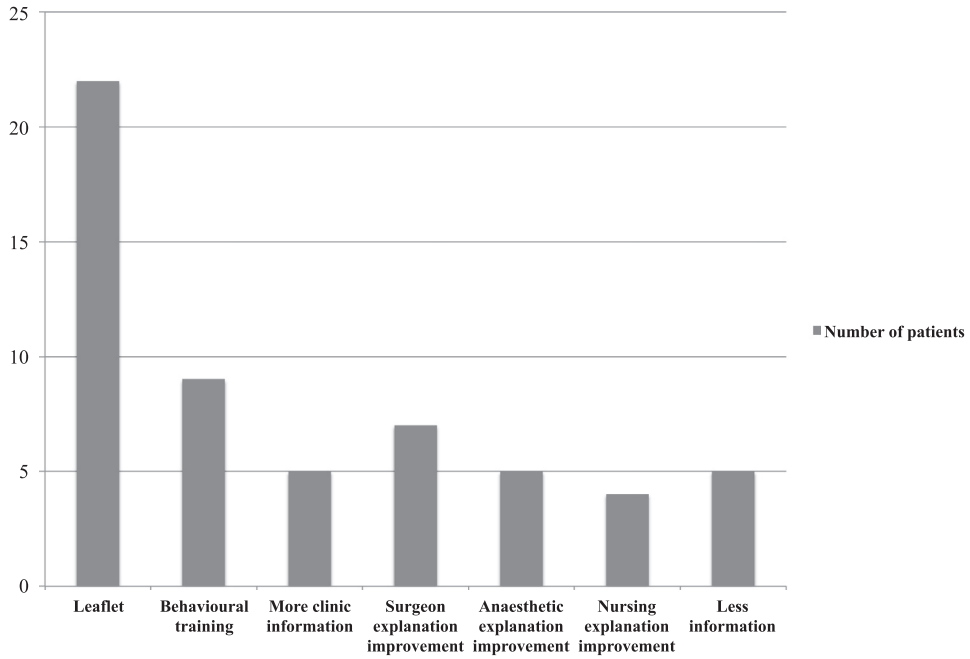

FIGURE 2. Results of the SI questionnaires.

significant difference in the STAI-S and STAI-T scores ($P = 0.37$), supporting the null hypothesis that patients did not have a significant increase in their anxiety levels preoperatively.

The subgroup analyses identified a gender difference between trait and state anxiety levels, with female patients being significantly more anxious both at baseline (trait) and preoperatively (state). Previous authors have also identified a similar gender difference.[11–15] However, neither men nor women showed a significant increase in their anxiety levels preoperatively when gender was taken into account ($P = 0.45$).

Patient age was not shown to significantly affect either state or trait anxiety levels in patients, and there was no significant difference in the increase in the level of anxiety between the older and the younger populations preoperatively. Contrary to our results, Jones et al, in their study of patients undergoing endoscopic procedures, reported that younger patients tended to have greater increases in their anxiety levels preprocedurally.[12]

We identified that 58% of our patients had undergone at least one ENT operation before, and 25% of the cohort had undergone the same procedure within the last 12 months. On average, a 3-point increase in anxiety levels preoperatively was noted in patients who had never previously had an ENT procedure relative to those who had. However, this result failed to reach statistical significance, indicating that this change did not represent a significant increase in patient anxiety levels preoperatively. In contrast, previous authors have reported that unfamiliarity with a surgical procedure can lead to elevated preoperative anxiety levels.[11]

The secondary end point of this project was to establish whether patients would favor the introduction of specific anti-anxiety measures preoperatively (Figure 2). The most notable finding was that over half of the cohort would have liked to have been provided with a leaflet explaining the procedure preoperatively. This requirement for improved provision of information preoperatively by the surgical team was further supported by 20% of the patients wanting a more in-depth discussion with their surgeon on the day of the procedure and 12% wanting more information in the outpatient clinic before their admission. However, importantly, this was not the case for all patients with 12% stating that they would have liked less information preoperatively rather than more. Mixed patient reception to the provision of information is not an unfamiliar concept and has been observed many times by previous authors.[16,17] Previous studies have shown that providing patients with additional information can both increase and decrease patient anxiety levels, and poignantly, a recent Cochrane review of 1441 women undergoing colposcopy identified no significant anxiety reduction with leaflets or preprocedural counseling.[11,14,18,19]

22% of our patients favored sessions on preoperative anti-anxiety behavioral training. 7% requested distractions to be provided on the ward preoperatively, suggesting increased access to television and music and being allowed to wear their own clothes. There is growing evidence for the role of music pre and perioperatively. Music has been shown to significantly reduce STAI-S anxiety and act as a viable alternative to anxiolytic medications.[18,20,21] This should be an area for further investigation in future studies.

Based on these findings, the content and timeliness of the information currently provided preoperatively at our institution could be improved upon. We look forward to involving both the multidisciplinary clinical team (nurses, anesthetists, and surgeons) and patients in improving this aspect of our service to ensure that it meets patient expectations. Patients must also have the opportunity to decline receiving preoperative information, although they must be given enough information to allow for informed consent.

With regard to this study's limitations, it is important to note that we have excluded patients who were undergoing emergency surgery, so it would be inappropriate to extrapolate these results to higher risk patients without further investigation. The patients who were included in the present study underwent a variety of different otorhinolaryngologic procedures; this limitation could be viewed as introducing variability into the results and hence limiting conclusions. However, our aim was to perform a realistic snapshot of current practice. We performed the project over a 3-month period, with no patients declining involvement in the study. All patients had undergone the standard preadmission process and had all been seen by their surgical team in the outpatient setting within 3 months of their elective admission. Similarly, the patients had all been reviewed by their anesthetist and operating surgeon on the morning of their operation before completing the questionnaire. With regard to using the STAI for evaluation of the patient's anxiety, opinions differ regarding its sensitivity in detecting relatively small changes in patient anxiety levels.[15] However, historically, the STAI is considered to be the gold standard test for assessing and differentiating clinical anxiety levels and was therefore deemed to be the most appropriate tool in this setting.

Suggestions for future research include the identification of subgroups of patients within the cohort who are more at risk of being anxious, with a view to recognizing which patients may need additional support and preventing essential procedures being postponed or even canceled.

CONCLUSIONS

Preoperative anxiety has previously been shown to be detrimental to patient outcome. This project has identified that our patients did not have a significant increase in their anxiety levels preoperatively. This did not alter even when subanalyses of subject age and gender were performed. However, our patients were keen for our service to improve, particularly with regard to the content and the amount of information we provided to them preoperatively. However, this request for additional preoperative information was not unanimous, with this project also showing that others must be given the option of declining this sort of support. This report is an important reminder of the potential detrimental effects of anxiety for clinicians who provide preoperative care. However, it is important to note that we did not identify any statistically significant increase in

our patients' anxiety levels preoperatively. This report is also valuable because it highlights the way in which patients would like their clinical services to improve. As care providers, the next step is for us to work to improve the information that we provide to patients preoperatively and to identify subgroups that require additional preoperative support.

REFERENCES

1. Hutson MM, Blaha JD. Patients' recall of preoperative instruction for informed consent for an operation. *J Bone Joint Surg Am*. 1991;73:160–162.
2. Frasure-Smith N, Lespérance F. Depression and anxiety as predictors of 2-year cardiac events in patients with stable coronary artery disease. *Arch Gen Psychiatry*. 2008;65(suppl 1):62–71.
3. Székely A, Balog P, Benkö E, et al. Anxiety predicts mortality and morbidity after coronary artery and valve surgery—a 4-year follow-up study. *Psychosom Med*. 2007;69:625–631.
4. Maranets I, Kain ZN. Preoperative anxiety and intraoperative anesthetic requirements. *Anesth Analg*. 1999;89:1346–1351.
5. Ip HY, Abrishami A, Peng PW, et al. Predictors of postoperative pain and analgesic consumption: a qualitative systematic review. *Anesthesiology*. 2009;111:657–677.
6. Goldmann I, Ogg TW, Levey AB. Hypnosis and daycase anaesthesia: a study to reduce pre-operative anxiety and intra-operative anaesthetic requirements. *Anaesthesia*. 1988;43:466–469.
7. Kain ZN, Sevarino F, Alexander GM. Preoperative anxiety and postoperative pain in women undergoing hysterectomy. A repeated-measures design. *J Psychosom Res*. 2000;49:417–422.
8. Hobson JA, Slade P, Wrench IJ. Preoperative anxiety and postoperative satisfaction in women undergoing elective caesarean section. *Int J Obstet Anesth*. 2006;15:18–23.
9. Thomas T, Robinson C, Champion D, et al. Prediction and assessment of the severity of post-operative pain and of satisfaction with management. *Pain*. 1998;75:177–185.
10. Caumo W, Schmidt AP, Schneider CN. Risk factors for preoperative anxiety in adults. *Acta Anaesthesiol Scand*. 2001;45:298–307.
11. Kiyohara LY, Kayano LK, Oliveira LM. Surgery information reduces anxiety in the pre-operative period. *Rev Hosp Clin Fac Med Sao Paulo*. 2004;59:51–56.
12. Jones MP, Ebert CC, Sloan T, et al. Patient anxiety and elective gastrointestinal endoscopy. *J Clin Gastroenterol*. 2004;38:35–40.
13. Spielberger CD, Gorsuch A, Lushane R, et al. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press; 1970.
14. Spielberger CD. *Manual for the State-Trait Anxiety Inventory STAI*. Redwood City, CA: Consulting Psychologists Press, Inc; 1983.
15. Jlala HA, French JL, Foxall GL, et al. Effect of preoperative multimedia information on perioperative anxiety in patients undergoing procedures under regional anaesthesia. *Br J Anaesth*. 2010;104:369–374.
16. Gillies MA, Baldwin FJ. Do patient information booklets increase perioperative anxiety? *Eur J Anaesthesiol*. 2001;18:620–622.
17. Oldman M, Moore D, Collins S. Drug patient information leaflets in anaesthesia: effect on anxiety and patient satisfaction. *Br J Anaesth*. 2004;92:854–858.
18. Galaal KA, Deane K, Sangal S, et al. Interventions for reducing anxiety in women undergoing colposcopy. *Syst Rev*. 2007(3) CD006013.
19. Goldberger JJ, Kruse J, Kadish AH, et al. Effect of informed consent format on patient anxiety, knowledge, and satisfaction. *Am Heart J*. 2011;162:780–785.
20. Bringman H, Giesecke K, Thörne A, et al. Relaxing music as pre-medication before surgery: a randomised controlled trial. *Acta Anaesthesiol Scand*. 2002;39:352–359.
21. Yung PM, Chui-Kam S, French P, et al. A controlled trial of music and pre-operative anxiety in Chinese men undergoing transurethral resection of the prostate. *J Adv Nurs*. 2002;39:352–359.