



Patient satisfaction and telemedicine in thyroid and parathyroid diseases: a review

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Abstract: Patient satisfaction is intimately related to patient expectations and quality of care but encompasses the entire patient experience with health care. In thyroid and parathyroid surgery, patient satisfaction incorporates facets of pre, peri, and post-operative care. Pre-operative satisfaction begins with patient perceptions of the physician and institutions involved and continues with appropriate patient counselling about surgery and the disease process. Peri-operative satisfaction is dependent on surgical factors such as operative technique, surgical scar, use of drains, hospital stay, and anesthesia used. Post-operative satisfaction is focused on complications, patient surveillance and if patient outcomes aligned with patient expectations. Patient satisfaction will play an increasingly important role in medicine and surgery as reimbursement becomes intimately associated with it. Finally, telemedicine incorporates aspects of patient satisfaction by allowing both consultation and surgical evaluation to be performed remotely at the discretion of the patient.

Keywords: Patient satisfaction; telemedicine; thyroid; parathyroid; expectations

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Introduction

Patient satisfaction is a multidimensional concept (1). It is closely related to patient's expectations and quality of care (1,2). The true definition; however, is elusive with many physicians and patients understanding the concept but often without agreement. Linder-Pelz defined patient satisfaction as, 'The individual's positive evaluations of distinct dimensions of health care'; however, today the scope of patient satisfaction has broadened to incorporate all facets, both positive and negative, of their experience (3). Patient satisfaction is increasingly viewed as the "patient-centric quality assessment" formalized by the US legislation as the Patient Protection and Affordable Care Act may play a role in reimbursement (4).

There are many factors other than the quality of care that influence patient satisfaction. Determinants of satisfaction are named in one reference as the expectations, value, entitlement, occurrences, and interpersonal comparisons that a patient has or experiences (3). For example, despite good clinical outcomes patients may be disgruntled due to the costs of the treatment, location of the hospital and even the cost of the parking, which may result in low satisfaction score on the patient surveys (1). Patient satisfaction has also been shown to be influenced by patient's level of optimism (5). Variations in patient satisfaction may also be cultural, but unstudied, as most literature about patient satisfaction is produced in the developed world, especially the United States. These factors are however beyond the health care providers' control and will not be discussed in this article.

In general, patients are more likely to express dissatisfaction of the care they received if their treatments failed to meet their pre-operative expectations. In this article, we will discuss various considerations and factors influencing patient satisfaction and how they can be integrated in the practice of head and neck endocrine surgery. Integration of innovative technologies such as telemedicine and how its potential application in this Otolaryngologic field may be beneficial for patient satisfaction will also be explored.

Methods

Using search concepts for patient satisfaction and telemedicine in thyroid and parathyroid diseases, comprehensive search terms were developed with the assistance of a medical librarian. PubMed, EMBASE, Web of Science, Scopus, and Cochrane were performed from their inception through May 2019. 709 articles were identified and exported to Endnote9. 427 duplicates were removed. 89 candidate titles and abstracts were independently reviewed by two authors (CB, EC) using the below inclusion criteria. Manuscripts meeting inclusion criteria described either patient satisfaction topics or telemedicine in thyroid and parathyroid disease. Non-English language studies without an available translation and studies describing benign thyroid disease only were excluded. Bibliographic review was then performed, and additional eligible articles identified.

Discussion

Preoperative considerations

Patient satisfaction begins with preconceived notions and expectations that help shape the patient's perception of their experience (2). These notions begin with the patient's knowledge of the provider and institution where they will receive care. Patients' perception can be both positive and negative and can also lead to expectations in line with their treatment or unrealistic expectations that may stem from a lack of understanding of either their condition or the procedure being performed (2). Receiving insufficient pre-operative information from their surgeon leads to poor patient satisfaction after care of their disease in thyroid cancer (6). Clearly, expectations can be improved by a comprehensive discussion with the surgeon where expectations are appropriately tempered and not shaped by

prior perceptions of the experience.

Patient perceptions of thyroid surgery are heavily influenced by patient perceptions generated by opinions of other physicians, friends, and family. The pre-operative consultation requires that the doctor patient relationship be strong with good understanding through discussion and imagery of the surgery and the post-operative care to ensure high patient satisfaction (7). This relationship extends to the patient relationship with the anesthesiologist. Even a small gesture such as a pre-operative anesthesia brochure improved patient satisfaction among those undergoing thyroid surgery (8). Finally, patient confidence can be improved with the use of multidisciplinary teams or second opinions, but these models may not be economically feasible (9,10). Understanding of the condition is integral to high patient satisfaction for the pre-operative visit and a good relationship with the surgeon is imperative as many patients undergoing thyroid and parathyroid procedures will most likely have preconceived opinions regarding the surgical process.

Intraoperative considerations

The peri-operative experience is integral to the patients' experience during thyroid surgery. Both long term effects of surgery, such as scarring, and immediate effects such as anesthesia, surgical technique, wound closure, and drain placement are important when considering patient satisfaction. Indeed, this is more important than ever as more physicians are offering newer techniques with smaller neck incisions or no neck incisions. Surgical technique and access will be one of the primary drivers for patients when seeking opinions for thyroid and parathyroid disease.

Traditional thyroidectomy plays a high value on the surgical incision as it relates to patient satisfaction. However, there is controversy as it relates to whether patients care more about placement, width, or length of scar and the timing of the assessment of the scar (11-18). Several studies claim that scars length may not effect satisfaction, while others states than patient satisfaction may decrease with scar length over 2 cm (11,13,16,18). One meta-analysis suggested that more emphasis should actually be placed on long term maturation of the scar and that if this is the goal, length is not as important and that patient satisfaction with scar should be determined after scar remodeling (15). It seems that while length might be controversial, scar width does affect patient satisfaction especially scar over 2 mm in width (11,13). Finally, it seems that lower scars on the neck

are more preferable to higher scars (14). Patient satisfaction with scar is not clearly based on the traditional thought that length is paramount, and patient considerations should be taken into account to ensure the highest degree of patient satisfaction.

Similarly, both wound closure method and drain placement can affect patient satisfaction. Two retrospective studies demonstrated that drain placement does not prevent complications and leads to decreased patient satisfaction and longer hospital stays (19,20). Wound closure technique may not lead to durable long-term differences in satisfaction. Adhesives may show some short-term superiority to other closures but neither staples, adhesives, nor subcuticular closures influence long term patient satisfaction levels (21-24). Tissue adhesives may enhance patient satisfaction for minimally invasive techniques (25). More meticulous closures seem to result in both higher satisfaction among patients and surgeons (21), however both outcomes and satisfaction are similar between different closure types longer term.

There are many new variations on remote access approaches to thyroidectomy which avoid a visible incision on the neck aimed at improving patient satisfaction. However, it is debatable whether patients prefer a non-visible scar approach over a traditional approach (15,17). With these techniques being relatively new, patient satisfaction with these techniques has had varied results compared to traditional thyroidectomy. Axillary techniques have shown higher patient satisfaction with neck cosmesis, but overall patient satisfaction has yet to be demonstrated (26-28). There are similar rates of patient satisfaction between the axillary technique and other techniques such as the face-lift (retroauricular approach) technique (29), however a true head to head comparison of remote-access techniques and traditional transcervical thyroidectomy has yet to be performed. A theoretical study asking patients if they would rather have an axillary approach or a cervical approach stated that they would be willing to pay more, tolerate a higher complication rate, and even accept a lower likelihood of cure for an axillary approach compared to traditional (28). However, less than 20% of patients who had a previous traditional thyroidectomy stated they would be interested in having a robotic thyroidectomy instead if they could make the choice again (30). Data on transoral techniques examining patient satisfaction are limited to date. As novice techniques evolve, patient satisfaction will play a key role in the longevity of these techniques, especially if they incur higher expense.

Perioperative analgesia and anesthesia experience also affects the perception of their experience. Patient satisfaction during anesthesia can be measured by the amount of pain felt by the patient, the amount of post-operative nausea and vomiting, and even by the type of anesthesia itself as it relates to general or local (19,31-38). Analgesia during thyroid surgery has expanded to include non-opioid related medicines. Perioperative flurbiprofen, a non-steroidal anti-inflammatory decreased intra operative opioid use and improved pain control as did the addition of dexmedetomidine during thyroid surgery, and both improved patient satisfaction in the perioperative period (32,34). However, local anesthesia may not be as effective as general anesthesia. Ropivacaine infiltration at the end of thyroid surgery did not demonstrate significant anesthesia benefit or improve patient satisfaction scores (33). Interestingly, patients undergoing thyroidectomy with local anesthesia seem to have similar rates of patient satisfaction as those undergoing general anesthesia (35-38). Finally, postoperative nausea, while important, may not contribute to patient satisfaction as much as analgesia. Intravenous anesthesia has improved post-operative nausea and vomiting in the perioperative period in patients receiving either Propofol or Aprepitant; however, neither are shown to significantly improve patient satisfaction (19,31).

Post-operative considerations

In the immediate post-operative period, there are several factors which are important for patient satisfaction both in the short term and in the long term. Post-operative pain control improves patient satisfaction. Alternative techniques such as electroacupuncture can decrease pain medication needs (39). In addition, NSAID derivatives seem to be more effective than other non-opioids at controlling immediate post-operative pain (40). Finally, one day surgery seems to have high patient satisfaction both in low and high resource settings (41,42). Same day surgery is also related to high patient satisfaction, but the surgeon should use discretion for who should and should not be admitted (43,44).

In line with pre-operative decision making, the decision to use I131 radiation for differentiated thyroid cancer is improved with both patient information about I131 usage (45), and with shared decision making between patient and physician (46). A better informed patient is also associated with a decreased fear of cancer recurrence (47). Patients also appreciate getting bad news associated with cancer recurrence either in person, or on the phone rather than

electronically (48). Post-operative patient involvement in both surveillance and decision making is integral to high patient satisfaction.

Patient satisfaction with their surgical experience must balance with their pre-operative expectations. Small variations in the patients pre-operative perceptions of patient's expectations and outcomes may be tolerated (2). Still, complications do worsen patient life satisfaction. For example, persistent hypoparathyroidism may be more burdensome long term compared to recurrent laryngeal nerve injury and both will diminish patient satisfaction (49). Nonetheless, complications are impossible to avoid completely and proper pre-operative counselling will lead to the higher levels of patient satisfaction regardless of the outcome.

Thyroid and parathyroid surgery and telemedicine

Telemedicine is defined as the use of telecommunication devices that allow remote access to clinical consultation between patients and health care professionals (50,51). There are two forms of telemedicine: store-and-forward (asynchronous) and real-time (synchronous) (51-54). The asynchronous method is used when initial providers collect clinical data, for example radiology studies and/or patient photos, and forwards them to the consultant physician who reviews the relevant data at a later time. In this model, the patient and the consultant specialist do not interact while the referring providers and the consultant physician work together in a different time and space for the management of the patient (54). On the other hand, the synchronous model is the live teleconferencing method which allows the patients and their family members as well as the referring providers to have a real-time encounter via the telecommunication device with the consultant physician (54).

Telemedicine has become increasingly utilized over the past decade, and its application has been largely driven by the need to improve access to healthcare. With the national healthcare reform and a greater number of patients seeking medical care, expanding access to care to meet the ever increasing demand remains as one of the main challenges of the American healthcare system (54). Telemedicine becomes particularly useful and cost-effective when it comes to improving access to care especially in the remote, rural areas where the presence of healthcare providers and specialists may be scarce.

Telemedicine has been well-established in various fields

of medicine, such as radiology, cardiology, dermatology and psychiatry (51,54). Many studies have reported high patient and physician satisfaction associated where telemedicine encounters have been successfully established and frequently used as part of delivery of care (54-56). Previous reports have also indicated patients' appreciation of the improved access to specialized care that telemedicine can provide (54,57). Rising need for specialized care in rural areas along with higher levels of expectation by the patients to be seen by a specialist have increased demands for teleconsultation (54,58).

Telemedicine is slower to adapt in other specialties such as otolaryngology (51,59). One of the likely reasons behind this slow adaptation may be due to the fact that otolaryngology is heavily procedural-based which requires direct physical interaction between health care professionals and patients. Clinical studies looking into the application of telemedicine in the field of head and neck surgery are currently limited. However, telemedicine may potentially be applied and may even be useful and cost-effective in this subspecialty of otolaryngology. In this final portion of the article, we will explore the potential ways telemedicine can be applied in thyroid and parathyroid surgery and how it can assist in improving patient and provider satisfaction. The challenges and pitfalls associated with its application will also be discussed.

Potential application of telemedicine in remote-access thyroid and parathyroid surgery

Remote-access thyroid and parathyroid surgery is a novel field within otolaryngology-head and neck surgery that is geared towards innovation and application of technology. The most common remote-access endocrine surgery procedures are performed using a robot or laparoscopic instruments, including robotic retroauricular (aka facelift) and transoral laparoscopic approaches. Although the remote-access robotic thyroid and parathyroid surgery was introduced to the United States nearly a decade ago, its widespread expansion and accessibility have remained a challenge in North America despite its proven safety and comparability to the conventional open approach (60). One of the main reasons behind its low level of adoption is that there is a paucity of American surgeons who are trained to offer the procedure in the United States. To ensure quality of care and optimal clinical outcomes that are comparable to the traditional open approach, remote-access approach for thyroid and parathyroid surgery should be performed

Table 1 Integration of telemedicine: potential advantages and disadvantages

Advantages	Disadvantages
Increased access to health care, especially to subspecialized care	Very expensive (equipment purchase, installation, maintenance, etc.)
Improved quality of care (greater range of treatment modalities and options, ease of patient monitoring, etc.)	Technological issues (internet connection or equipment failure, etc.)
Improved patient and provider satisfaction	State and federal regulations (interstate medical licensing, credentialing and privileges, etc.)
Improved cost-effectiveness	Insurance coverage and reimbursement (lower remuneration, lack of billing codes, etc.)
Reduced opportunity costs (reduced lost work hours and travel costs, etc.)	Medico-legal liability

at high volume centers by surgeons with extensive training and expertise in the field (61).

Advantages of telemedicine application

A notable advantage of the use of telemedicine within the field of thyroid and parathyroid surgery is the system's ability to assist in postoperative monitoring following surgery (*Table 1*). Recent clinical studies have illustrated successful application of telemedicine in postoperative monitoring following head and neck procedures, specifically thyroid and parathyroid surgeries (53,54). Follow up visits for thyroid and parathyroid surgery are generally brief and consist of review of pathology and wound checks, both of which can be done safely and effectively via high-definition video and a coordinated electronic medical records (EMR) system (54). There have been reports of successful programs utilizing telehealth for postoperative visits at the convenience and comfort of the patients' home while they recover from routine pediatric surgical procedures (62). This convenient and cost-effective postoperative monitoring system could be successfully implemented for select otolaryngologic procedures including thyroid and parathyroid surgery, illustrating how telemedicine could assist in significantly improving convenience of patients and quality of care while reducing opportunity costs.

Potential challenges and pitfalls with the application of telemedicine

There are some potential disadvantages and challenges that may arise with the application of telemedicine (*Table 1*). There are significant costs associated with the purchase and installment of the telemedicine infrastructure. In

general, real-time (aka synchronous) method involves a more sophisticated system with a wide bandwidth for communication lines to support streaming of high-quality video which often results in much higher costs than the asynchronous method (54). Furthermore, additional personnel such as a specially-trained nurse (also known as telefacilitator) is often necessary to assist in the telehealth visits for the encounters to run in a time-efficient manner, which further adds to indirect costs of using telehealth system (62).

Another challenge is concerning the state and federal regulations related to electronic communication (50). Essentially, the providers practicing medicine including telemedicine must be licensed in the state in which they choose to practice. Furthermore, the providers must also abide to the state's regulations such as ability to prescribe pain medications, credentialing and privileges for each state where they wish to provide care via telemedicine (62). Some states such as California and New Mexico do offer special telemedicine licensing in an effort to reduce costs and hurdles for physicians providing telemedicine care from out-of-state, but this option is not available in most states (63). There are some exceptions to the licensing rule, such as telementoring (physician to physician mentoring), medical emergencies and educational purposes (62).

Although insurance providers have acknowledged usefulness and cost-effectiveness of telemedicine and have improved reimbursement processes for many services such as teleradiology, the most heavily used telemedicine specialty, the reimbursement for non-radiology telehealth services overall lags (54,63,64). Lower remuneration, lack of widely accepted policies and inconsistency for telehealth services reimbursement discourage healthcare providers to invest in the technology and incorporate telehealth system

into their daily practice (64,65). In a recent national survey study of family practitioners, the lack of training, cost of equipment and potential liability issues were listed as the main barriers to telehealth (66). On a positive note, there has been evolution in laws and regulations to increase reimbursement for telehealth services over recent years with significant efforts and lobbying by organizations such as the American Telemedicine Association (63,67).

Although the application of telemedicine in clinical practice is geared towards patient's comfort and satisfaction, some patients may experience discomfort with the use of the technology to receive medical care (50). The vast majority (83%) of patients younger than the age of 40 stated that they are very comfortable with telemedicine technology while only 23% of the patients older than the age of 60 have indicated such. This highlights a trend with younger generations' greater comfort and ease with the use of new technology (50). Many studies have supported this finding, demonstrating a high patient and provider satisfaction following telehealth encounters (54-56,62). Patients seem to be able to easily overcome their sense of unfamiliarity and embrace the use of telehealth.

Telemedicine is associated with the issue of medicolegal liability and malpractice concerns (62,66). They have been previously cited by the healthcare providers as some of the main barriers to incorporating telehealth into their clinical practice (62,66). To decrease the risk of malpractice concerns, new patient to physician initial contact via teleconsultation may not be advised especially if good visualization and clinical examination of the patient is vital to reaching a diagnosis. This can potentially be a risky situation as the specialist would be assuming medicolegal responsibility for the patient's outcome (68,69). Another way to minimize the medicolegal risk is to favor the use of physician-to-physician teleconsultation (68,69). It is strongly advised for both for the referring and consulting providers to be aware of the standards of their local jurisdictions (69).

Despite all the challenges, demands and popularity of the telehealth are growing. With the mass marketing and availability of smartphones and mobile health apps, patients will be more engaged and empowered with their healthcare decisions than ever before. Progress is being made to integrate telemedicine and mobile health into the mainstream medical care to adapt to the rapidly evolving technology and the willingness of the newer generations to embrace it (63). Vast improvements in all areas, including but not limited to the EMRs, mobile software

and hardware, as well as the Health Insurance Portability and Accountability Act regulations, are being implemented to facilitate the adoption of teleconsultation for both the patients and providers to support the growing demand (63). For the surgeons, telehealth represents an opportunity to not only enhance patient satisfaction, but to improve efficiency of delivery of care and to optimize patient-surgeon relationship while providing cost-effective, patient-centered, quality of care (62).

Conclusions

Patient satisfaction is a multi-faceted concept that incorporates the entirety of the patient experience from when they evaluate the physician and institution administering their care to far beyond their post-operative course. Appropriate patient counselling is integral to the patient experience as are optimal outcomes, but these concepts are not all encompassing. While surgical incision, anesthesia, and postoperative hospital stay are critical to patient perceptions, a strong physician-patient relationship is important and helps mitigate negative effects of potential complications. Finally, telemedicine can help facilitate positive patient satisfaction, but must be utilized in the correct situations and appropriately.

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