The Perioperative Patient Experience During COVID-19

Andrew T. Dipple, BS, Kristen M. Quinn, MD, Melinda Walto, BSN, Rupak Mukherjee, PhD, Prabhakar K. Baliga, MD, and Andrea M. Abbott, MD, MSCR

Abstract

Background: Access to elective surgical procedures has been impacted by the COVID-19 pandemic.

Methods: We sought to understand the patient experience by developing and distributing an anonymous online survey to those who underwent non-emergency surgery at a large academic tertiary medical center between March and October 2020.

Results: The survey was completed by 184 patients; the majority were white (84%), female (74.6%), and ranged from 18 to 88 years old. Patients were likely unaware of case delay as only 23.6% reported a delay, 82% of which agreed with that decision. Conversely, 44% felt that the delay negatively impacted their quality of life. Overall, 82.7% of patients indicated high satisfaction with their care. African American patients more often indicated a “neutral” vs “satisfactory” hospital experience ($P < .05$) and considered postponing their surgery ($P < .01$). Interestingly, younger patients (<60) were more likely than older (≥60) patients to note anxiety associated with having surgery during the pandemic ($P < .01$), feeling unprepared for discharge ($P < .02$), not being allowed visitors ($P < .02$), and learning about the spread of COVID-19 from health care providers ($P < .02$).

Discussion: These results suggest that patients are resilient and accepting of changes to health care delivery during the current pandemic; however, certain patient populations may have higher levels of anxiety which could be addressed by their care provider. These findings can help inform and guide ongoing and future health care delivery adaptations in response to care disruptions.

Keywords
other, special topics, general surgery, COVID-19, surgical quality

Key Takeaways

- Patients are resilient and accepting of changes to health care delivery during times of crisis.
- Patients less than 60 years old reported increased anxiety compared to older patients regarding perioperative preparedness and policy changes due to COVID-19.

Introduction

During the initial COVID-19 response, the health care system underwent rapid and novel changes. Changes in policy were motivated to safeguard patients and maintain emergency response capability and adequate medical workforce and materials, thus access to surgical care and staff was intentionally limited during hospitalization. The cancellation of “non-essential” procedures was implemented in preparation for COVID-19 case surges as health care systems sought to prepare for the potential conversion of operating rooms to negative pressure rooms. Many hospitals developed new criteria for life-saving or life-altering procedures and prioritization schema were developed to guide treatment for oncology patients to ensure health care systems could meet surge capacity. Broadly, these efforts not only altered the case load of surgical departments but may have also...
impacted patient acuity for non-COVID-19-related illness during the initial response to the COVID-19 pandemic. In addition to decreasing the number of surgical cases and procedures performed, hospital systems initiated safety protocols to prevent the spread of COVID-19 among healthy patients seeking routine care. Changes included adoption of health care delivery through online platforms, limitations in visitors to the hospital, universal masking, and compulsory COVID testing and screening. Such limitations in visitors to the hospital, universal masking, adoption of health care delivery through online platforms, healthy patients seeking routine care. Changes included addition to decreasing the number of surgical cases and during the initial response to the COVID-19 pandemic. In impacted patient acuity for non-COVID-19-related illness

The authors perceived the impact of COVID-19-related policy changes on their patients anecdotaly and wished to quantify the effects. The study was designed to understand and characterize the patient perspective at the perioperative phase of care during COVID-19 policy changes at a single academic institution. We sought to determine if policy changes were perceived as anxiety-provoking or anxiety-relieving in the context of the global pandemic and surgical care. Further, by stratifying patient subpopulations, we planned to identify any subgroup differences in perception of the health system operational changes. Our findings revealed generally low anxiety, acceptance of altered operations, and durable care satisfaction, with the exception of elevated low anxiety reaching statistical significance in patients younger than 60 years of age.

Methods

This research was approved for subject recruitment by the Institutional Review Board for Human Subjects Research. An investigator-generated survey using a Likert 5-point scale was used to assess causes of patient anxiety regarding the risk of COVID-19 itself, changes in hospital procedures, patient satisfaction, and overall quality of life. RAND-36 sub-scales were also used as a validated survey tool to quantify physical health and well-being. Additionally, subjects were asked to provide demographic and surgery-specific data such as procedure type, duration of hospitalization, and if their procedure was delayed (Figure 1). The survey was open to all patients who received non-emergent general surgery from March 13, 2020 through September 29, 2020 at a single, academic institution. Dates of inclusion were chosen based on the first un-official national call by the US Surgeon General for US Hospitals to cancel elective procedures on March 13, 2020. The end date of September 30, 2020 was chosen as it represented a plateau of COVID-19 case counts in the region. Patients who had previously agreed to be contacted through the institution’s electronic medical portal (MyChart) were surveyed. Patients who received urgent or emergent surgeries, organ transplant, and duplicate or repeated surgeries were excluded (Figure 2). Qualifying patients were contacted with a recruitment message and webpage link to complete the survey hosted in REDCap. Study data were collected and managed using REDCap electronic data capture tools. REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies.

Comparative analysis was conducted on the sample mean on the 5-point Likert scale. Responses were grouped as low (rank of 1 or 2), neutral (3), and high (4 or 5). Cohort analysis of subgroup responses was examined by gender, race, and age. For age analysis, the number sixty
was used as a cutoff between a younger population and older population as it reflected the approximate mean of the sample surveyed. The age of sixty stratified our sample into 2 almost equivalently sized groups, thus was used for further analysis. Comparative statistics including chi-square analysis and unpaired 2-tailed t-tests were completed using GraphPad Prism and Microsoft Excel. A $P$ value of .05 was used for statistical significance.

**Results**

Surveys were distributed to 362 patients with a response rate of 51% ($n = 184$) (Figure 2). Respondents were most likely to be female (75.3%, $n = 140$) and white (84.4%, $n = 157$) with a median age of 61 years (range 18-88). African American respondents totaled 15.1% ($n = 28$) and .5% ($n = 1$) American Indian or Alaskan Native. A large proportion of respondents, 77.4% ($n = 123$), did not report being aware of a delay in their surgery date (Table 1). Patients endorsed the following types of procedures: plastic surgery, endocrine, oncologic, general, acute care, cardiothoracic, bariatric and foregut, vascular, and colorectal (Appendix 1). For patients without delay, we completed subgroup analyses. We completed cohort analysis comparing responses endorsing anxiety graded on a 5-point Likert scale, based on age (<60 years old $[n = 88]$ vs >60 $[n = 96]$), sex (female vs male), and by race (African American vs white).

Subjects ranked their anxiety from 1 “no anxiety” to 5 “severe anxiety” and overall our sample demonstrated low anxiety across all assessed causes, with a mean range of 1.48-2.28 (Table 2). In cohort group comparison by 2-tailed unpaired t-test, a statistically significant increase of anxiety was noted between the <60-year-old patients and >60 years old regarding visitor limitation (2.69±.38 v 1.91±.28, $P = .002$), and going through the discharge process alone (2.60±.39 v 1.85±.30, $P = .003$) (Table 2, Figure 3a). For patients <60 years old, anxiety was also elevated during screening procedures ($P = .058$). Anxiety related to learning of COVID-19 spread approached significance when comparing African American vs white respondents (2.22±.6 v 1.56±.18, $P = .053$) (Figure 3b). Anxiety regarding visitor limitations between female and male respondents also approached significance (2.40±.29 v 2.31±.24, $P = .056$) (Figure 3c). Patients who were aware and reported a delay in their surgery overall were satisfied with their care (80.65%), felt it increased their safety (43.48%), and agreed with the institution’s decision to delay their surgery (81.82%) (Table 3).

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**Figure 1.** Selected questions from our investigator-generated survey addressing anxiety, impact of staying alone in the hospital, discharge and safety, and overall care satisfaction.

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**Table 1.**

| Question                                                                 | No anxiety | A Little anxiety | Mild anxiety | Moderate anxiety | Severe anxiety |
|--------------------------------------------------------------------------|------------|------------------|-------------|------------------|---------------|
| How anxious were you about not having full access to your healthcare providers, like surgeons, nurses, and nurse navigators during your hospital stay? |            |                  |             |                  |               |

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**Table 2.**

| Impact of Staying Alone                                                                 |
|----------------------------------------------------------------------------------------|
| How comfortable were you being alone during your hospital stay?                        |
| Very uncomfortable | Uncomfortable | Neutral | Comfortable | Very comfortable |

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**Table 3.**

| Discharge and Safety                                                                 |
|-------------------------------------------------------------------------------------|
| How were your discharge instructions explained to you at discharge?                  |
| You in person | You over the phone | Caregiver in person | Caregiver over the phone | Other, please explain |

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**Table 4.**

| Care Evaluation and Satisfaction                                                   |
|-------------------------------------------------------------------------------------|
| Looking back at your experience, how satisfied are you that you proceeded with surgery? |
| Very unsatisfied | Unsatisfied | Neutral | Satisfied | Very satisfied |

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**Figure 2.**

Selected questions from our investigator-generated survey addressing anxiety, impact of staying alone in the hospital, discharge and safety, and overall care satisfaction.

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**Figure 3a.**

Results of anxiety comparison between <60-year-old and >60 years old patients.

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**Figure 3b.**

Results of anxiety comparison between African American and white respondents.

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**Figure 3c.**

Results of anxiety comparison between female and male respondents.

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Discussion

In this single-center survey study evaluating the mental health impacts of COVID-19 on surgical patients, we found that overall, patients reported low levels of anxiety associated with protocols that changed the way care was delivered. There was some variation by age as younger patients endorsed increased levels of anxiety related to their surgery during the COVID-19 pandemic when compared with those ≥60 years old. These findings suggest that patients were very receptive to the dynamic nature of the evolving pandemic and its impact on the health care system and on them as individuals. The pandemic was a novel entity and its impact on routine patient care was unknown. This paper helps to fill a gap in understanding how major changes in the health care system are perceived by patients and contributes to how hospitals and providers can aid patients in addressing foreseeable resulting barriers.

Early research indicated that advanced age and increased cardiovascular comorbidities were associated with worse clinical outcomes of COVID-19 infection.16 Given these data, we expected older patients and those with chronic illnesses to have increased anxiety and stress regarding COVID-19 infection. We also anticipated the older population to be less adaptable to evolving telehealth and virtual health care options. However, our results demonstrated patients <60 years old rated higher anxiety than patients ≥60 years old in regard to limited visitation and going through discharge alone. Tejada et al also found younger patients endorsed significantly more anxiety and depression up to 1 year after their index procedure.9 The authors also noted that female gender, lower socioeconomic status, and limited psychosocial support were linked to higher anxiety and depression 1 year following an index procedure.9 Our findings reiterate those of Tejada et al.9 Discharge alone and lack of visitation were the sources of anxiety we assessed most linked to social support and were the only sources of anxiety to

Figure 2. Study design and subject recruitment summary, with a response rate of 50.8%.

Table 1. Cohort Demographics.

| Characteristic          | n = 186 (100%) |
|-------------------------|----------------|
| Age                     | 58.0 ± 14.3    |
| Gender                  |                |
| Female                  | 140 (75.6)     |
| Male                    | 45 (24.3)      |
| Race                    |                |
| White                   | 157 (84.4)     |
| Black                   | 28 (15.1)      |
| Other                   | 1 (.5)         |
| Surgical delay          |                |
| No                      | 110 (61.4)     |
| Yes                     | 76 (42.6)      |

Respondent demographics and mean age with standard deviation. Data represented as n (%).
| Source of anxiety                                      | Overall | <60 yrs | ≥60 yrs | P value | By age | AA | White | P value | By race | Female | Male | P value | By sex |
|--------------------------------------------------------|---------|---------|---------|---------|--------|-----|-------|---------|---------|--------|------|---------|--------|
| Surgery during COVID-19                                | 2.02 ± .18 | 2.18 ± .31 | 1.91 ± .21 | .154 | 2.37 ± .60 | 1.95 ± .19 | .212 | 2.08 ± .22 | 1.83 ± .31 | .195 |
| Risk of COVID-19 infection in health care setting      | 2.24 ± .20 | 2.38 ± .34 | 2.09 ± .25 | .183 | 2.44 ± .60 | 2.19 ± .22 | .449 | 2.29 ± .24 | 2.07 ± .40 | .365 |
| COVID-19 screening                                     | 1.51 ± .16 | 1.66 ± .29 | 1.36 ± .17 | .092 | 1.72 ± .59 | 1.47 ± .16 | .432 | 1.52 ± .19 | 1.48 ± .30 | .837 |
| Anxiety during screening                               | 1.49 ± .16 | 1.66 ± .29 | 1.33 ± .16 | .058 | 1.72 ± .59 | 1.44 ± .16 | .383 | 1.5 ± .21 | 1.45 ± .30 | .776 |
| Limited HCP contact                                    | 1.66 ± .19 | 1.79 ± .31 | 1.52 ± .23 | .170 | 1.72 ± .52 | 1.65 ± .20 | .814 | 1.67 ± .20 | 1.61 ± .42 | .783 |
| Learning of COVID-19 transmission                      | 1.66 ± .18 | 1.79 ± .32 | 1.53 ± .19 | .178 | 2.22 ± .60 | 1.56 ± .18 | .053 | 1.67 ± .28 | 1.62 ± .39 | .828 |
| Visitor limitations                                    | 2.28 ± .24 | 2.69 ± .38 | 1.91 ± .28 | .002 | 2.56 ± .71 | 2.24 ± .26 | .424 | 2.40 ± .29 | 1.90 ± .42 | .056 |
| Discharge alone                                        | 2.21 ± .25 | 2.60 ± .39 | 1.85 ± .30 | .003 | 2.28 ± .65 | 2.21 ± .27 | .842 | 2.31 ± .24 | 1.86 ± .45 | .108 |
| Limited surgeon contact post-op                        | 1.77 ± .20 | 1.71 ± .29 | 1.82 ± .29 | .605 | 1.89 ± .50 | 1.76 ± .22 | .640 | 1.83 ± .24 | 1.57 ± .37 | .259 |
| Telehealth use                                         | 1.48 ± .17 | 1.43 ± .22 | 1.49 ± .25 | .721 | 1.44 ± .36 | 1.49 ± .19 | .827 | 1.51 ± .19 | 1.38 ± .35 | .552 |

Anxiety measured by 5-point Likert response values reported with ± 95% confidence interval.
Two-tailed unpaired t-test reported for level of significance.
Care satisfaction and consideration of surgery postponement are reported by categorical response counts and percentage per cohort group.
Yrs, years; W, white; AA, African American; HCP, health care provider; post-op, postoperatively or postoperative period.
Figure 3. a Anxiety comparison by age. Mean 5-point Likert scale response reported with 95% confidence interval shown as error bars. Significance reached for visitor limitations ($P = .002$) and discharge alone ($P = .003$) represented by (*). b Comparing by race, learning of COVID-19 spread approaches significance with $P = .053$, represented by (+). c Comparing by gender, discharge alone approaches significance with a $P = .056$, represented by (++).
achieve statistical significance. The differences in reported anxiety level by age are likely multi-factorial and all variables are not captured in this survey study. Age likely influences overall health, time to recovery with implications on career and family, and may introduce generational differences in the willingness to discuss and endorse mental health challenges, such as anxiety and stress.

Our data revealed patients felt low levels of anxiety regarding possible contraction of COVID-19 from seeking care in a public place like a hospital. Additionally, patients overall endorsed feeling their health and safety was protected by altered operations. Even patients who endorsed a delay in their elective procedures demonstrated satisfaction with their care and viewed the delay as in-line with their best interests. Patients indicated no significant negative impact on overall health or quality of life, or overall safety, and agreed with the institutional decision to delay surgery. In a multi-hospital quality assurance review by Silvera et al.,\textsuperscript{17} patients did not report experiencing a large change in overall satisfaction with their care during the COVID-19 pandemic response. These data highlight the importance of clear communication with patients regarding the underlying reason for surgical delay. There was likely a strong interplay of outside messaging to patients through the media and national public health statements that supported hospital decisions. These communications likely made patients more accepting of a delay in surgery and demonstrated the personal and public value of delaying care.

Limited descriptions of patient’s perceptions of COVID-19 protocols for elective and non-elective surgery in the initial COVID-19 response have been published. Doglietto et al describe the cohort experience of neurosurgical patients in the immediate resumption of elective surgery in Northern Italy following the initial COVID-19 case surge.\textsuperscript{3} The authors describe similar patient satisfaction and acceptance of screening protocols, social distancing, and increased sanitation processes to our data. Their study noted, for oncologic patients, anxiety focused mainly on the risk of disease progression during surgical delay, with a median of 30 days duration proving to be more stressful than the risk of COVID-19 infection.\textsuperscript{3} This further reiterates that patient concerns of COVID-19 infection were likely minimized so that concern of primary disease and social support primarily drove patient anxiety.

These findings have implications to the manner of ongoing health care delivery in the context of the evolving COVID-19 pandemic, and can inform providers and hospitals as they address situations of future health care disruptions, for example, future pandemics, natural disasters, and mass casualty events. Our institution experienced a 1 month delay of elective surgery, similar in duration to other COVID-19 investigations and analyzed disruptions from natural disasters.\textsuperscript{3,18} Patients largely transitioned to telehealth modalities while maintaining high satisfaction with care, supporting the growing acceptance and durable nature of telehealth medicine. Patients of all ages, sex, and race sampled in our study largely maintained satisfaction with their care and accepted the changes in protocol as an effect of the current ecosystem of health care delivery. Furthermore, the critical role of social support for inpatients, previously described and reiterated in our findings, demonstrates the utility of a “subjective advocate” as outlined by Silvera et al.\textsuperscript{7} as a modality for health care systems to supplement lacking social support during times of visitor limitation. Given our description of differences by age and stage of inpatient hospitalization, we hope our results can contribute to an informed implementation of said “subjective advocates.”

This study seeks to understand the impact of COVID-19 on surgical patients, but certain limitations in this work must be acknowledged. While the survey queried all patients undergoing elective surgery, the delivery platform required internet and access to the electronic medical portal which may have selected patients who would feel comfortable adapting to electronic health care delivery platforms. Our study sample (n = 184) is small compared to the volume of patients that received surgery during this time, but reflects a response rate of 50.8% of patients who met inclusion criteria (Figure 2). This convenience sampling method captured the responses of patients that were noticeably different in race and gender than the population of patients receiving elective surgery at our institution. Mean age of our sample cohort, however, was reflective of average age of the surgical patient (58 vs 54.4
years, respectively). With this in mind, generalizability of the results of this study is limited and may not apply to health care settings that do not have a similar demographic breakdown as sampled here. Additional confounding factors include that while the majority of the patient population does have access to the internet, the ability to access and fill out the survey may imply a higher level of comfort with technology. The type of surgical procedure may influence levels of anxiety, but given that this was an anonymous survey, patient-reported procedure type could not be verified; thus, this variable was not analyzed separately. The variation in the severity of the initial COVID-19 pandemic experience within communities also likely informs anxiety and stress regarding infection and the perception of risk associated with disease impacting the generalizability of these findings. The patient perceptions of COVID-19 in our region are expectedly different than those who experienced significantly greater case fatality rates such as the New York Metropolitan Area and Northern Italy.

In conclusion, we can extract that patients in this survey demonstrated resilience and tolerated immediate and evolving changes to health care delivery. Most patients cited satisfaction with their care, and minimal to neutral stress with changes in policy and additional safety protocols. This suggests that medical centers and health care providers should not hesitate to make changes to health care delivery when unique circumstances arise, and that communication with patients, whether it be virtual or in-person, can still achieve high satisfaction.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Andrew T. Dippre  https://orcid.org/0000-0002-1238-0317

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Appendix 1

Figure A1. Surgical Procedure Type.