Reasons of cancellation of elective surgical cases at the University Medical Center

Dmitriy Viderman (drviderman@gmail.com)
Nazarbayev University School of Medicine https://orcid.org/0000-0002-6007-9326

Agzam Zhumadilov
University Medical Center

Yerlan Umbetzhanov
NYU Langone Health

Bruce Ben-David
University of Pittsburgh Medical Center

Research article

Keywords: case cancellation, perioperative hypertension, perioperative myocardial ischemia, perioperative dysrhythmia

Posted Date: February 21st, 2019

DOI: https://doi.org/10.21203/rs.2.365/v1

Abstract

Background Cancellation of scheduled cases on the day of surgery leads to waste of resources, financial burden, patient dissatisfaction, extended hospital stay, and unnecessary repetition of preoperative preparations. The purpose of this retrospective study was to analyze the causes of case cancellation in our institution so as to improve hospital quality control as well as perioperative risk management. Methods We conducted a retrospective analysis of all cancellations of scheduled elective surgical procedures. We analyzed all cases that were canceled after the patient had been delivered to the operating room (OR). The data about case cancellations was obtained from the Hospital Information System (HIS) of the National Research Oncology and Transplantation Center. Results The most common single reason for cancellation was preoperative hypertensive crisis (n=67; 80.7%), followed by heart rhythm disorders (n=6; 7.2%), incomplete preoperative patient evaluation (n=5; 6.1%), myocardial ischemia (n=4; 4.8%), and pneumonia (n=1; 1.2%). Most of the cancellations (76 out of 83; 92%) were considered to be potentially avoidable. Conclusions In conclusion, that the most common reasons for case cancellation were patient-related cardiovascular conditions (preoperative hypertensive crisis, dysrhythmia, myocardial ischemia). Improvement in preoperative assessment and management of the cardiovascular condition is needed to reduce scheduled case cancellation rate.

Background

Cancellation of scheduled cases on the day of surgery leads to waste of resources, financial burden, patient dissatisfaction, extended hospital stay, and unnecessary repetition of preoperative preparations. [1] The most common reasons for cancellation include patient-related or surgeon-related issues, inadequate preoperative evaluation, and emergency surgeries affecting the scheduled order of cases. [2] The reasons for cancellation can be further classified as either avoidable or unavoidable. [3] The purpose of this retrospective study was to analyze the causes of case cancellation in our institution so as to improve hospital quality control as well as perioperative risk management.

Methods

We conducted a retrospective analysis of all cancellations of scheduled elective surgical procedures between January and December 2018 at National Research Oncology and Transplantation Center (NROTC), University Medical Center, Astana, Kazakhstan. The NROTC has a bed capacity of 280 and an operating department of 10 operating rooms distributed among eleven specialties: thoracoabdominal surgery, hepato-billiary surgery, orthopedic surgery, gynecology, urology, vascular surgery, cardiology, plastic surgery otolaryngology. We analyzed all cases that were canceled after the patient had been delivered to the operating room (OR). The data about case cancellations was obtained from the Hospital Information System (HIS) of the National Research Oncology and Transplantation Center. Reasons for cancellation were classified as either potentially avoidable or non-avoidable. Avoidable cancellations were defined as those cancellations that could have been avoided had there been the adequate review of

medical records or appropriate preparation of the patient for the surgery (eg. appropriate antihypertensive therapy).

We collected the data on the following variables: the number of scheduled elective surgeries, the number of canceled elective surgeries, and the reasons for cancellation which in turn were classified as either avoidable or unavoidable as well as divided into the following predefined categories: patient-related, work-up/medical condition change, financial, facility, bed availability, and surgeon-related. Patient-related reasons were further subdivided into hypertension-related, heart-rhythm disorder, myocardial ischemia, and pneumonia.

Results

A total of 2243 elective surgical procedures were scheduled between January 1, 2018, and December 30, 2018. Altogether 83 of these cases were canceled after the patient had been delivered to the operating room area. The mean cancellation rate was 3.7% (roughly every 27-th case was canceled). The reasons for cancellation are shown in the table 1. The most common single reason for cancellation was preoperative hypertensive crisis (n=67; 80.7%), followed by heart rhythm disorders (n=6; 7.2%), incomplete preoperative patient evaluation (n=5; 6.1%), myocardial ischemia (n=4; 4.8%), and pneumonia (n=1; 1.2%). Incomplete preoperative patient evaluation which constituted 6.1% (n=5) included incomplete cardiovascular clearance (ECG not done, the absence of cardiologist consult), pulmonary clearance (spirometry not done, the absence of pulmonologist consult), neurological clearance (MRI not done, the absence of neurologist consult). Most of the cancellations (76 out of 83; 92%) were considered to be potentially avoidable.

Discussion

Cancellation of scheduled surgery is a global problem with a worldwide incidence ranging from 1 to over 23 %. [4,5] Our findings differ from previously published studies. Kaddoum et el. in their study showed, that 55 % of surgeries were canceled because of workup-related, 7% due to patient-related, 22 % due to admission-related, 12 % - due to surgeon/facility-related issues. [6] Our analysis, in turn, showed that preoperative hypertensive crisis was the single most common reason for the cancellation of a scheduled surgery (80.7%). Arterial hypertension is a prevalent disease affecting up to 30% of patients scheduled for non-cardiac surgery. [7] A history of poorly controlled hypertension is associated with an increase in the risk of perioperative mortality in non-cardiac surgery, perioperative complications such as cerebral stroke, myocardial ischemia, and acute heart failure. [8] It has also been shown that about 25 % of the patients undergoing non-cardiac surgery [9] and 80 % undergoing cardiac surgery have perioperative hypertension [10] and the history of hypertension can increase the perioperative cardiovascular complications by 35 %. [11] It is generally recommended to cancel elective surgery if the systolic blood pressure is higher than 180 mmHg or if the diastolic blood pressure is higher than 110 mmHg. [12] Therefore the majority of our case cancellations due to a patient health condition were intended to avoid perioperative complications such as stroke, acute myocardial infarction, heart failure, and fatal

dysrhythmias. In many cases, if the patient arrives at the operating theatre having an elevated blood pressure or any other abnormality of a physiological parameter, it is a difficult question for the anesthesiologist: “To cancel the case or to try to stabilize or normalize the patient’s condition in the immediate preoperative period”. Certainly, there are many pressures to do the latter. In the case of hypertension, the anesthesiologist can readily reduce the blood pressure but its rapid reduction can result in cerebral ischemia (levels of autoregulation remain abnormal) and increase the risk for perioperative ischemic stroke. Recent work on the increase in mortality, cardiac injury, and renal injury with intraoperative hypotension often defined as MAP < 65 may be relevant here as it is unclear what defines “hypotension” in the chronic hypertensive? Disorders of heart rhythm were the second most common cause of surgery cancellation. The incidence of atrial fibrillation in patients undergoing non-cardiac thoracic or abdominal surgeries was estimated to be from 8% to 13%. [13] It is difficult to eliminate all possible causes of perioperative dysrhythmia even if appropriate antiarrhythmic drugs are prescribed or readjusted preoperatively. Several patient factors including coronary artery disease, hypertension, obesity, enlarge atria increase the risk of perioperative arrhythmias. [14,15,16] The third most common cause of case cancellation was myocardial ischemia. It is critically important to diagnose perioperative myocardial ischemia in a timely fashion, however, it is quite difficult to do so in the anesthetized or sedated patient. Our study showed that the most important reasons for scheduled case cancellation were patient health-related issues. We did not find even a single case that was canceled due to issues of financial clearance, lack of OR time, or absence of the patient or surgeon. This is a notable difference from the findings in other studies. [17] Likely this has much to do with the differences in health care systems. Notably, the surgical volume at NROTC is much less than in many hospitals. Thus while our results may not be generalizable, the methodology is. It is a worthwhile exercise for every institution to do this and examine their own reasons for cancellations. Our findings reveal that there is a need in our institution to improve preoperative patient assessment prior to OR arrival, to improve communication between surgeon and anesthesiologist, to improve preoperative diagnosis of poorly controlled hypertension, and for better adjustment of perioperative antihypertensive, antianginal, and antiarrhythmic therapy.

Conclusion

we found that the most common reasons for case cancellation were patient-related cardiovascular conditions (preoperative hypertensive crisis, dysrhythmia, myocardial ischemia). Improvement in preoperative assessment and management of the cardiovascular condition is needed to reduce scheduled case cancellation rate.

Declarations

Acknowledgements:

None.

Funding

None of the authors received any funding in regard to this paper or related to this paper's data.

Availability of data and materials

Data supporting this study's findings are available upon request from the corresponding author.

Author contributions:

DV, AZ, YU contributed to the data acquisition. DV and BB contributed to the drafting of the article. DV and BB contributed to the critical revision of the article for important intellectual content. All authors read and approved the final manuscript.

Ethics approval and consent to participate:

The study was considered exempt from human subject research by the Ethics Committee of the University Medical Center, Astana, Kazakhstan. Since it was a quality improvement project and information collected did not include personal identifiers, individual consents were not required.

Consent for publication

Consent for publication of this data was obtained from the hospital medical director.

Competing interests

The authors declare that they have no competing interests.

References:

1. Perroca, M.G., Jericó, M.D.C. and Facundin, S.D., 2007. Surgery cancelling at a teaching hospital: implications for cost management. Revista latino-americana de enfermagem, 15(5), pp.1018-1024.

2. Kumar, R. and Gandhi, R., 2012. Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. Journal of anaesthesiology, clinical pharmacology, 28(1), p.66.

3. Kumar R, Gandhi R. Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. Journal of anaesthesiology, clinical pharmacology. 2012 Jan;28(1):66.

4. González-Arévalo, A., Gómez-Arnau, J.I., DelaCruz, F.J., Marzal, J.M., Ramírez, S., Corral, E.M. and García-del-Valle, S., 2009. Causes for cancellation of elective surgical procedures in a Spanish general hospital. Anaesthesia, 64(5), pp.487-493.

5.Haana, V., Sethuraman, K., Stephens, L., Rosen, H. and Meara, J.G., 2009. Case cancellations on the day of surgery: an investigation in an Australian paediatric hospital. ANZ journal of surgery, 79(9), pp.636-640.

6. Kaddoum, R., Fadlallah, R., Hitti, E., Fadi, E.J. and El Eid, G., 2016. Causes of cancellations on the day of surgery at a Tertiary Teaching Hospital. BMC health services research, 16(1), p.259.

7. Amar, D., Burt, M.E., Bains, M.S. and Leung, D.H., 1996. Symptomatic tachydysrhythmias after esophagectomy: incidence and outcome measures. The Annals of thoracic surgery, 61(5), pp.1506-1509.

8. Goldman L, Caldera DL. Risks of general anesthesia and elective operation in the hypertensive patient. Anesthesiology. 1979 Apr 1;50(4):285-92.

9. Dix, P. and Howell, S., 2001. Survey of cancellation rate of hypertensive patients undergoing anaesthesia and elective surgery. British journal of anaesthesia, 86(6), pp.789-793.

10. Cheung, A.T., 2006. Exploring an optimum intra/postoperative management strategy for acute hypertension in the cardiac surgery patient. Journal of cardiac surgery, 21, pp.S8-S14.

11. Howell, S.J., Sear, J.W. and Foex, P., 2004. Hypertension, hypertensive heart disease and perioperative cardiac risk. British Journal of Anaesthesia, 92(4), pp.570-583.

12. Howell, S.J., Sear, J.W. and Foex, P., 2004. Hypertension, hypertensive heart disease and perioperative cardiac risk. British Journal of Anaesthesia, 92(4), pp.570-583.

13. Cardinale, D., Martinoni, A., Cipolla, C.M., Civelli, M., Lamantia, G., Fiorentini, C. and Mezzetti, M., 1999. Atrial fibrillation after operation for lung cancer: clinical and prognostic significance. The Annals of thoracic surgery, 68(5), pp.1827-1831.

14. Adams, D.C., Heyer, E.J., Simon, A.E., Delphin, E., Rose, E.A., Oz, M.C., McMahon, D.J. and Sun, L.S., 2000. Incidence of atrial fibrillation after mild or moderate hypothermic cardiopulmonary bypass. Critical care medicine, 28(2), pp.309-311.

15. Polanczyk, C.A., Goldman, L., Marcantonio, E.R., Orav, E.J. and Lee, T.H., 1998. Supraventricular arrhythmia in patients having noncardiac surgery: clinical correlates and effect on length of stay. Annals of internal medicine, 129(4), pp.279-285.

16. Zacharias, A., Schwann, T.A., Riordan, C.J., Durham, S.J., Shah, A.S. and Habib, R.H., 2005. Obesity and risk of new-onset atrial fibrillation after cardiac surgery. Circulation, 112(21), pp.3247-3255.

17. Kaddoum, R., Fadlallah, R., Hitti, E., Fadi, E.J. and El Eid, G., 2016. Causes of cancellations on the day of surgery at a Tertiary Teaching Hospital. BMC health services research, 16(1), p.259.

Tables

Table 1. Medical reasons for case cancellation

Medical reason of cancellation	Number of cancelled cases (n,%)
Preoperative hypertensive crisis	n=67; 80.7%
Heart rhythm disorders	n=6; 7.2%
Incomplete preoperative patient evaluation	n=5; 6.1%
Myocardial ischemia	n=4; 4.8%
Pneumonia	n=1; 1.2%