

DOI: 10.5455/msm.2019.31.49-52

Received: December 19 2018; Accepted: February 20, 2019

© 2019 Amina Krupalija Solak, Haris Pandza, Edin Beciragic, Amila Husic, Ida Tursunovic, Harun Djozic

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ORIGINAL PAPER

Mater Sociomed. 2019 Mar; 31(1): 49-52

Elective Case Cancellation on the Day of Surgery at a General Hospital in Sarajevo: Causes and Possible Solutions

Amina Krupalija Solak, Haris Pandza, Edin Beciragic, Amila Husic, Ida Tursunovic, Harun Djozic

General Hospital "Prim. Dr. Abdulah Nakas", Sarajevo, Bosnia and Herzegovina

Corresponding author: Amina Krupalija Solak, MD, PhD. General Hospital "Prim. Dr. Abdulah Nakas", Sarajevo, Bosnia and Herzegovina. E-mail: aminakrupalija@hotmail.com. ORCID ID: <http://www.orcid.org/0000-0000-0000-0000>.

ABSTRACT

Introduction: Cancelling elective procedures on the day of surgery presents a constant problem in all higher-level medical facilities, and the research of causes, consequences and possible solutions is the duty of every facility in order to enhance the quality of healthcare services. **Aim:** The aim of the research was to determine the percentage and reasons for cancelling elective procedures and provide adequate measure to reduce this number in the future and to identify ways to improve the patients' satisfaction level. **Material and Methods:** This prospective study included all patients that were scheduled for surgery from March 2016 to November 2018 in the operating rooms at our Department of Surgery, including both performed and cancelled cases. Cases by different surgical departments (general surgery, gynecology, orthopedics, urology, plastic surgery, ophthalmology and otorhinolaryngology) were all included. **Results:** Out of 8201 planned elective procedures from March 2016 to November 2018 at the General Hospital "Abdulah Nakas", 7825 cases were performed and 376 cases (4.58%) were cancelled on the day of surgery. The most common reasons for cancelling a surgical procedure on the day of surgery were: lack of time to perform surgery (33.51%), surgery cancelled due to medical/anesthetic reasons (31.38%), surgical procedure cancelled by the surgeon on the day of surgery (11.97%). **Conclusion:** This study has shown that the percentage of elective cases cancelled on the day of surgery at our institution stands at an acceptable 4.58%. The most common reasons for case cancellation on the day of surgery were identified. The majority of reasons for cancellation were avoidable, which means that appropriate steps could contribute to lowering the percentage of cancelled elective cases and an improved quality of healthcare services.

Keywords: cancellation of surgical procedures, reasons for cancelling, improvement of quality, avoidable and unavoidable causes.

1. INTRODUCTION

Elective case cancellation on the day of surgery is an ongoing problem in most higher-level medical facilities. It leads to an increase in costs and under utilization of hospital resources. Case cancellation on the day of surgery is defined in multiple ways (1). We used the definition according to which the cancellation of an operation is defined as: a scheduled surgical procedure that is not performed on a given day. The percentage of cancelled elective procedures on the day of surgery varies in different studies and can be as low as 3.9% (2) or extremely high at 40% (3).

The reasons for cancelling elective cases on the day of surgery are numerous, and they vary from facility to facility (4).

Some of the possible reasons for cancellations are:

- Patient-related factors: inadequate pre-operative preparation of the patient, a change in the medical condition of the patient right before the surgical procedure or the patient decides not to undergo surgery.
- Surgeon-related factors: inadequate interpretation of indications and inadequate scheduling of the surgical procedure.
- * Operating room-related factors: emergency procedures which interfere with the regular operating schedule, lack of space and time to perform surgery or shortage of staff and materials necessary for the surgical procedure (5, 6, 7).

Traditionally, the reasons for cancellation can be divided into:

- Avoidable reasons: cancellation of surgical procedure due to inadequate preoperative preparation, issues with the operating schedule, cancelling surgery due to shortage of equipment and staff.
- Unavoidable reasons: changes in the medical condition of the patient, emergency procedures which interfere with the elective operating schedule etc. (8).

Healthcare facilities have the goal of taking appropriate steps that will have an impact on the avoidable factors for cancelling elective cases in order to reduce the hospital's costs, shorten the number of hospitalization days, enhance the utilization of the operating rooms, enable better distribution of the staff and increase the patient's satisfaction level.

In accordance with the Hospital's organization, internal work evaluation is conducted in order to improve efficiency, safety and quality of healthcare services (9). The rate of elective case cancellation on the day of surgery is an important health care quality indicator.

2. AIMS

The purpose of the research was to determine the percentage and reasons for cancelling elective procedures and provide adequate measure to reduce this number in the future. We presumed that our results would be similar to those shown in literature at other healthcare facilities. We also aimed to identify ways to improve the patients' satisfaction level.

3. METHODS

Our facility is a 345 beds major referral hospital in the city of Sarajevo, Bosnia and Herzegovina. The Department of Surgery has a 85 beds capacity. The Hospital has nine operating rooms which are used for surgical procedures including general and abdominal surgery, orthopedics, otorhinolaryngology, ophthalmology, gynecology, and urology. There is no dedicated operating room for emergency procedures, and they are performed in the above rooms based on their availability.

Elective surgery schedule is made one day earlier for all surgical disciplines. Emergency procedures are performed in the first available operating room regardless of the surgical schedule.

The study included all patients scheduled for surgery from March 2016 to November 2018, whether their surgery was performed or not. All cancelled surgical procedures were entered in a form that included the relevant data.

The research was conducted as a prospective study. The reasons for cancellation fell under three categories:

- Patient-related reasons: the patient decides not to undergo surgery or a female patient starts menstruating.
- Health-related reasons: worsening of the patient's condition, the need for further diagnostic procedures or an ongoing preoperative therapy.
- Reasons related to shortage of staff, available rooms, time and equipment: lack of time during work hours to perform surgery whether it might be due to an unplanned emergency surgery, an overbooked surgical schedule, unplanned shortage of equipment and materials for the scheduled surgical procedure, no

available operating rooms because of contamination or shortage of staff to perform the surgical procedure.

It is important to note that at our facility, the presence of menstruation in a female patient is a contraindication for an elective procedure in that patient.

Survey Questionnaire

To conduct the research, a survey form and a database with relevant information were created. Excel spreadsheet was used to process the data. The results were reported using descriptive statistics parameters, and they are shown in tables and graphs.

4. RESULTS

The Out of the 8201 planned elective cases (3893 in male patients and 4308 in female patients), 7825 were performed, whereas 376 (4.58%) elective cases were cancelled on the day of the surgery.

When considering the likelihood of cancellation of surgery, there was no statistically significant difference between male and female patients ($P < 0.05$). However, if we analyze the reasons for cancellation, we can conclude that there were statistically significant differences between genders ($p > 0.05$).

Results show that out of 4.58% of cancelled procedures, 4.69% were in female and 4.47% were in male patients. The reasons for cancellation according to gender are shown in Table 1.

The most common reason for cancelling elective cases was "lack of time to perform surgery", 33.51% out of the total number of cancelled cases. Lack of time to perform surgery was a statistically more prevalent avoidable reason in male patients ($P < 0.05$).

The second most common reason for cancelling cases on the day of surgery was "surgery cancelled due to medical/anesthetic reasons" (31.38%). This reason falls under unavoidable causes given that the condition of the surgical patient worsened prior to the surgical procedure. It is important to note that all of our surgical patients have a scheduled pre-operative assessment by the anesthesiologist within a week prior to the procedure.

The third most common reason for elective case can-

Reason for cancellation	Male	Female	Both
No available operating room	6.32%	4.95%	5.59%
Lack of time to perform surgery	44.25%	24.26%	33.51%
Lack of time due to emergency procedure	4.60%	7.43%	6.12%
Shortage of equipment	2.87%	3.47%	3.19%
Patient decided not to undergo surgery	2.87%	2.97%	2.93%
Surgery cancelled by a surgeon	8.62%	14.85%	11.97%
Surgery cancelled due to medical/anesthetic reasons	25.86%	36.14%	31.38%
Preoperative therapy was not given to the patient	2.87%	3.47%	3.19%
Additional tests needed	1.15%	2.48%	1.86%
Shortage of staff in the operating room	0.57%	0.00%	0.27%

Table 1. The reasons for cancelling elective cases on the day of surgery

cellation on the day of surgery was “surgery cancelled by the surgeon” (11.97%). This category of avoidable causes refers to reasons such as inadequate indication for surgery and the start of a menstrual cycle in females. Both of these reasons were statistically more prevalent in female patients ($P < 0.05$). Out of the total number, 6.12% of cancelled cases were due to “lack of time due to emergency procedures” while 3.19% were cancelled due to “shortage of equipment”. 2.93% of cancelled cases were because of the “patient’s decision on the day of surgery not to undergo surgery”. “The necessity to conduct further tests” was the reason for cancellation in 1.86% of all cancelled elective cases.

The least common reason for cancelling elective surgery was “shortage of staff in the operating room” which encompassed 0.27% out of the total number of cancelled elective cases.

5. DISCUSSION

Unexpected operating room cancellations are traditionally divided into avoidable causes (e.g., scheduling errors, equipment shortages, and cancellation due to inadequate preoperative evaluation) and unavoidable causes (e.g., emergency case superseding the elective schedule, unexpected changes in the patient’s medical status, or patient nonappearance). Cancelling elective cases on the day of surgery varies from low, 3.9% (2), to very high, 40% (3), depending on the healthcare facility. The percentage of cancelled elective cases on the day of surgery at our facility was 4.58%. This percentage was in line with several research results obtained in other healthcare facilities. At the King Abdullah University Hospital in Jordan, the percentage of cancelled elective procedures on the day of surgery was 3.6% (10). Even if there is no formal recommendation regarding the percentage of cancelled elective cases on the day of surgery, lower than 5% is considered acceptable (12).

According to the study by Abelleh et al., the four most common causes for cancelling elective cases on the day of surgery were: lack of time to perform surgery (30%), inadequate preoperative preparation (21%), upper respiratory tract infection (19%) and high blood pressure (13%) (11). According to literature sources and our research, the most common cause for case-cancellation on the day of surgery was the lack of time to perform surgery. In our study 33.5% of the cancellations fell into this category. This mostly occurs due to an overburdened schedule with too many procedures planned for a given day. Surgeons are sometimes too optimistic and, aware of the long waiting lists, they want to operate as many patients as possible. This reason can be avoided by a better internal organization of work as well as planned use of staff breaks and the adequate preoperative preparation of the patients. In general, surgeons took longer than estimated time to finish the procedure. This was especially true for less-experienced surgeons and trainees. In addition, the time interval between two cases was influenced by the patient’s successful recovery from anesthesia. While there is no optimum number of surgical procedures in a given operating room, an alignment of surgical and anesthetic assessments when putting together the operating room program can lower the number of cancelled elective cases on the day of surgery due to lack of time (14).

The second most common reason for cancelling a case was “surgery cancelled due to medical/anesthetic reasons”, 31.38% out of the total number of cancelled cases. Unforeseen anesthetic or surgical problems may delay the planned list. This reason falls under the unavoidable causes given that the condition of the surgical patient acutely worsened prior to the surgical procedure. An increase in blood pressure right before surgery, cardiac arrhythmia and upper respiratory infection were the most common etiologies. Admission of a female patients should be planned according to her menstrual cycle. In return, it may result in a lower number of cancelled cases on the day of surgery.

A surgeon can cancel a surgical procedure for various reasons. Some of the reasons may be an inadequate indication for the surgical procedure most commonly set by junior surgeons or the start of the menstrual cycle in female patients on the day of surgery. The surgery can also be cancelled by a surgeon due to a change in the surgical plan. In our study, the category “a surgery canceled by a surgeon” was the third most common reason (11.97%) and this category was more prevalent in female patients (14.85%) when compared to male patients (8.62%).

“Lack of time due to emergency procedures” is another unavoidable causes of cancellation involving patients delayed because the surgical team was needed elsewhere and represented 6.12% of the total number of canceled operations. Our hospital does not have a dedicated operating room and/or surgical team that would only be used for patients requiring emergency surgery.

A total of 11 patients decided not to undergo surgery which makes up for 2.9% out of the total number of patients whose surgery has been cancelled on the day of surgery. The possible reasons for refusing surgery may be fear from the surgical procedure, patient’s distrust in the surgeon or not seeing any benefits to the surgery. A better preoperative preparation and walking the patients through the surgery, explaining the complications and benefits of the surgery would help patients prepare adequately and reduce the number of patients walking away from the surgical procedure on the day of surgery. Comparably, the study by Fayed et al. showed that 9% of patients decided not to undergo elective surgery on the day of surgery (15). A patient’s decision not to undergo surgery is also an avoidable cause given that a better preoperative preparation of the patient, i.e., a more adequate and more detailed conversation with the patient prior to establishing the indication for surgery and admitting them to the ward could lower the number of cancelled elective cases.

Inadequate preoperative preparation and the need for more diagnostic tests was also one of the causes for cancelling elective procedures on the day of surgery. An insight into available research shows that adequate preoperative preparation not only significantly reduces the percentage of cancelled elective cases on the day of surgery (16), but it also leads to higher patient satisfaction levels (17). It also reduces the number of unnecessary diagnostic tests right before the surgery (18), as well as the length of stay in the hospital which in turn reduces preoperative and postoperative morbidity and complications. Seven patients, i.e., 1.86% out of the total number of cancelled cases were due

to the need for additional tests. This avoidable cause can be reduced with a better preoperative preparation and more adequate preoperative examinations by the anesthesiologist and the attending surgeon. The percentage of cancelled elective procedures on the day of surgery and the reasons for cancellation in our facility are similar and comparable to the results of similarly conducted studies (11-14, 19, 20)

6. CONCLUSION

The results of our study are in line with the results obtained in literature sources. Based on the results of our study, we came to the conclusion that the percentage of elective cases cancelled on the day of surgery would be lowered with a better preoperative preparation of the patient - in terms of psychological state, diagnosis and therapy, a more rational surgical schedule, better planning of surgical procedures, and a better utilization of operating rooms and medical staff. Although the percentage of cancelled operations is relatively low, it does not mean that measures should not be implemented to reduce it even further. The smaller the percentage of cancelled elective cases, the smaller the costs of the hospital, the better the utilization of the operating rooms and the higher the satisfaction of the patients. These are all important factors that contribute to a higher quality of healthcare services.

- **Author's contribution:** Author gave substantial contributions to the conception or design of the work in acquisition, analysis, or interpretation of data for the work and a part in article preparing for drafting or revising it critically for important intellectual content. Also, author gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- **Financial support and sponsorship:** Nil.
- **Conflict of interest:** There are no conflicts of interest.

REFERENCES

1. Ezike H, Ajuzieogu V, Amucheazi A. Reason for elective surgery cancellation in a referral hospital. *Ann Med Health Sci Res.* 2011; 1: 197-202.
2. Jimenez A, Artigas C, Elia M, Casamayor C, Gracia J, Martinez M. Cancellation in ambulatory day surgery: An observational study. *Ambul Surg.* 2006; 12: 119-123.
3. Chalya PL, Gilyoma JM, Mabula JB, Simbila S, Ngayomela IH, Chandika AB, et al. Incidence, causes and pattern of cancellation of elective surgical operation in a university teaching hospital in the Lake Zone, Tanzania. *Afr Health Sci.* 2011; 11: 438-443.
4. Lee A, Kerridge RK, Chui PT, Chiu CH, Gin T. Perioperative Systems as a Quality model of perioperative medicine and surgical care. *Health Policy.* 2011; 102: 214-222.
5. Argo JL, Vick CC, Graham LA, Itani KM, Bishop MJ, Hawn MT. Elective surgical case cancellation in the veterans' health administration system: identifying areas improvement. *Am J Surg.* 2009; 198(5): 600-606.
6. Sultan N, Rashid A, Abbas SM. Reason for cancellation of elective cardiac surgery at Prince Sultan Cardiac Centre, Saudi Arabia. *J Saudi Heart Assoc.* 2012; 24(1): 29-34.
7. Farasatkish R, Aghdali N, Azafarin R, Yazdanian F. Can preoperative anesthesia consultation clinic help to reduce operating room cancellation rate of cardiac surgery on the day of surgery? *Middle East J Anaesthesiol.* 2009; 20(1): 93-96.
8. Kumar R, Gandhi R. Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. *J anesteheiol Clin Pharmacol.* 2012; 25: 66-69.
9. General Hospital "Prim. Dr. Abdulah Nakaš", Rulebook on internal supervision of professional work, Sarajevo, 2014.
10. Meshmar M, Shatnawi NJ, Faori I, Khader YS. Reasons for cancellation of elective operations at major teaching referral hospital in Jordan. *East Mediterr Health J.* 2011; 17: 651-655.
11. Abeeleh, Mahmoud Abu. et al. Reasons for Operation Cancellations at a Teaching Hospital: Prioritizing Areas of Improvement. *Annals of Surgical Treatment and Research.* 2017; 93(2): 65-69.
12. Macario A. Are your hospital operating rooms efficient? A scoring system with eight performance indicators. *Anesthesiology.* 2006; 105: 237-240.
13. Da'ar, Omar B, Talal Al-Mutairi. How Do Patient Demographics, Time-Related Variables, Reasons for Cancellation, and Clinical Procedures Affect Frequency of Same-Day Operating Room Surgery Cancellation? A Maximum Likelihood Method. *BMC Health Services Research.* 2018; 18: 454.
14. Van Veen-Berkx E, Van Dijk MV, Cornelisse DC, Kazemier G, Moken FC. Scheduling anesthesia time reduces case cancellation and improves operating room workflow in a university hospital setting. *J Am Coll Surg.* 2016; 223: 343-351.
15. Fayed A, Elkouny A, Zoughaibi N, Wahabi HA. Elective surgery cancellation on day of surgery: An endless dilemma. *Saudi J Anesth.* 2016 Jan-Mar; 68-73.
16. Farasatkish R, Aghdali N, Azafarin R, Yazdanian F. Can preoperative anesthesia consultation clinic help reduce operating room cancellation rate of cardiac surgery on the day of surgery? *Middle East J Anaesthesiol.* 2009; 20: 93-96.
17. Hepner DL, Bader AM, Hurwitz S, Gustafson M, Tsen LC. Patient satisfaction with preoperative assessment in a preoperative assessment testing clinic. *Anesth Analg.* 2004; 98: 1099-1105.
18. Tsan LC, Segal S, Pothier M, Hartley LH, Bader AM. The effect of alterations in a preoperative assessment clinic on reducing the number and improving the yield of cardiology consultations. *Anesth Analg.* 2002; 95: 1563-1568.
19. Kaddoum R, Fadlallah R, Hitti E, El-Jardali F, El Eid G. Causes of cancellations on the day of surgery at a Tertiary Teaching Hospital. *BMC Health Service Research.* 2016.
20. Panditt JJ, Carey A. Estimating the duration of common elective operation: implication for operating list management. *Anesthesia.* 2006; 61: 768-776.