

A Prospective Observational Study to Assess the Causes of Elective Surgery Cancellation in Different Operation Theatre on the Day of Surgery at Tertiary Care Centre of Southern Rajasthan

Alka Yadav¹, Devendra Verma², Basant K Dindor³, Hemraj Tungria^{4*}, Ravindra Gehlot⁵, C P Sharma⁶

¹Senior Resident, Department of Anaesthesiology, RNT Medical College, Udaipur

²Senior Professor, Department of Anaesthesiology, RNT Medical College, Udaipur

³Associate Professor, Department of Anaesthesiology, RNT Medical College, Udaipur

⁴Associate Professor, Department of Anaesthesiology, RNT Medical College, Udaipur

⁵Associate Professor, Department of Anaesthesiology, RNT Medical College, Udaipur

⁶Junior Resident III, Department of Anaesthesiology, RNT Medical College, Udaipur

Received: 20-03-2023 / Revised: 13-04-2023 / Accepted: 15-05-2023

Corresponding author: Dr Hemraj Tungria

Conflict of interest: Nil

Abstract

Background: Cancellation of planned surgeries on the day of surgery is a common problem in many medical facilities, despite significant investments in resources. This can lead to inefficient use of the resources and patient dissatisfaction. So this study was planned to evaluate the various reasons for cancellation and to identify potential solutions to this problem.

Method: This observational, hospital-based cross-sectional study evaluated the reasons for all cancelled surgeries in different elective operation theatres at a tertiary care centre over a period of six months. The reasons for cancellation were avoidable or unavoidable and related to the hospital, patients, surgeon, or anaesthesia factors. Data on the cancelled operations were obtained from daily lists and documented in a proforma.

Results: Total 2950 elective surgeries were planned during study period, out of which 379 (12.85%) were cancelled on the day of surgery amongst them majority 347 (91.56%) of cancellation of cases had avoidable (lack of space and time to perform surgery with existing infrastructure and resources 276 (72.8%), PAE unfitness 42 (11%), cancellation by surgeon 18 (4.7%), patients refusal 9 (2.3%) and 32 (8.44%) cases had unavoidable reasons (changes in the comorbid medical condition 26 (6.8%), unavailability of operating room 4 (1%), additional investigation requirements in 2 (0.5%) patients).

Conclusion: In our study, majority of cancellation are due to avoidable reasons, like overscheduling, frequent rescheduling of postponed cases and posting PAE unfit patients and can be reduced by effective coordination, proper discussions and time discipline amongst operative team including surgeons, anaesthetists and OT staff.

Keywords: Elective surgeries, Cancellation, Speciality, Operation theatre (OT).

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

A lot of surgeries take place in tertiary care hospitals in India every day. In spite of best efforts, planned surgeries get cancelled on their schedule days. Elective surgery cancellation on the day of surgery is a big problem in most high-level medical facilities. There are several consequences of elective surgery cancellations, both for the patients and the hospital. For the patients, cancelled surgeries can lead to increased anxiety, stress and inconvenience. It may also result in delays in treatment and a need for rescheduling the surgery, which may not be feasible for some patients. This may ultimately affect their health outcomes and increase the cost of their care. For hospitals, cancellations can lead to underutilization of resources, such as operating rooms, equipment, and staff, which may result in increased costs. This may also affect the hospital's reputation and credibility, as patients may lose trust in the hospital's ability to provide timely and efficient care. The reported incidence of cancellation ranges from 10% to 40%.[1] The reasons for cancellation of elective cases are numerous, and they vary from facility to facility.[2] Some of the reasons might be Patient-related, Anaesthesia related, Surgeon-related or it may be Operational factor (hospital) related which includes factors interfering with conduction of cases due to institutional and government protocols like time factors, infrastructures, resources available. Reasons may be also be classified as Avoidable which includes factors that can be avoided with proper team coordination, planning, and time management and Unavoidable reasons, which are beyond our efforts and inevitable and might be due to some emergencies, administrative and government compulsion etc.[3]

Cancellation of a planned surgery by any reason can cause significant financial, logistic, and other challenges for patients

and hospitals.[4,5] Taking into consideration all these factors and to assess underlying issues in functioning, we planned this study to evaluate various reasons for cancellation on the day of surgery in our tertiary care government hospital.

Material and methods

Institutional ethical committee (IEC) clearance (RNT/STAT/IEC/2020/06) was taken and this prospective, hospital based, cross-sectional study was conducted between June 2021 to November 2021 in elective operating theatre at tertiary care centre. As per record 40-50 surgeries per day were performed in our hospital in various operation theatre of General surgery, Orthopaedic, Obstetrics & Gynaecology and Otorhinolaryngology. All patients who were planned for a surgery on a particular day were recruited in the study. Patients whose elective surgeries got postponed on scheduled day were evaluated for different reason and the same were also mentioned on the Operation theatre (OT) list. All emergency procedures conducted at emergency operation theatres were excluded from study. As per our institutional protocols, all patients were evaluated in the pre-anaesthesia clinic well before surgery, getting reviewed and clearance and posted for surgery. Complicated cases were shown to the concerned anaesthesiologist a day prior to surgery. The operation list was prepared by the surgeons, and sent to concern OT by afternoon of day before surgery. The dependent variable of the study was the cancelled operation and independent variables included were age, sex, ASA (American Society of Anaesthesiologists) class, the type of operation cancelled and reasons for cancellation. The reasons for cancellation were broadly includes Hospital related (operational factor) which includes lack of space and time to perform surgery in

available resources and infrastructure (which might be due to overscheduled OT list as per government timing protocols, frequent rescheduling of the postponed cases), emergency procedures which interfere with the regular operating schedule, or shortage of staff and materials necessary for the surgical procedure⁶ and unavailability of OT due to sudden declaration of GH, Patients related which includes inadequate preoperative 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 which includes main operating surgeon unavailability due to urgent meeting called or unexpected leave, improper scheduling of the surgical procedures, inadequate interpretation of indications (additional test required to conduct surgery, surgeon skills and experience) and Anaesthesia related factors like PAE fitness issues. Cancellation of elective cases includes potentially avoidable and unavoidable causes. Potentially Avoidable causes for Cancellations includes : time constraints (overscheduled OT list as per time schedule of government hospitals) and unavailability of postoperative beds (lack

of time and space to perform surgery), posting PAE unfit patients, administrative reasons, equipment or transportation problem, shortage of staff, communication failure, inadequate preoperative preparation and surgeon's unavailability. Unavoidable causes may be Patient refusal, Change in clinical condition of patient, Priorities to emergency case and additional investigation required. All the above reasons for cancellation were mentioned in the concerned OT list and data from different operation theatres were collected on daily basis and were documented in a proforma. Further they were tabulated into individual factor related (ie operational, anaesthesia, patient and surgeon related), different speciality wise and into avoidable and unavoidable reasons and also represented in proportions and analysed by Chi square test and P value less than 0.05 was considered statistically significant.

Results

In our study, majority of the patients 205 (54.08%) belong to young adult age group (21-50 yrs), 223 (58.8%) were male and 156 (41.2%) female and 231 patients (60.9%) belong to ASA grade II. (Table 1)

Table 1: Demographic profile

Age wise distribution		
Age (Years)	Frequency (No.)	Percentage (%)
≤10	3	0.79
11-20	27	7.12
21-30	72	18.99
31-40	52	13.72
41-50	81	21.37
51-60	62	16.35
61-70	67	17.67
71-80	15	3.95
>80	6	1.58
Gender wise distribution		
Male	223	58.8
Female	156	41.2
ASA (American Society of Anaesthesiologist) wise distribution		
ASA I	123	32.5

ASA II	231	60.9
ASA III	25	6.6

Table 2: Distribution of patients according to different causes of cancellation in different speciality

S. No.	Causes of cancellation	Total cancelled cases (%)	General Surgery	Orthopaedic surgery	Obstetrics & Gynaecology	Otorhinolaryngology
1	Lack of space and time to perform surgery.	276 (72.8%)	190 (90%)	51 (49%)	29 (55.8%)	06 (50%)
2	PAE unfit patients.	42 (11%)	08 (3.8%)	32 (30.8%)	02 (3.8%)	00
3	Changes in the medical condition of the patient.	26 (6.8%)	06 (2.8%)	08 (7.7%)	09 (17.3%)	03 (25%)
4	Surgery cancelled by surgeon.	18 (4.7%)	03 (1.5%)	06 (5.7%)	08 (15.4%)	01 (8.3%)
5	Patient deciding not to undergo surgery	09 (2.3%)	03 (1.5%)	01 (0.9%)	03 (5.8%)	02 (16.7%)
6	No available operating room. (Sudden declaration of GH or Emergency case)	04 (1%)	01 (0.5%)	03 (2.8%)	00	00
7	Shortage of staff and materials necessary for the surgical procedure.	02 (0.5%)	00	02 (1.9%)	00	00
8	Additional tests needed.	02 (0.5%)	00	01 (0.9%)	01 (1.9%)	00
9	Inadequate preoperative preparation.	00.0	00	00	00	00
Total		379 (100%)	211 (100%)	104 (100%)	52 (100%)	12 (100%)
Percentages of total cancellation			55.7%	27.4%	13.7%	3.2%

Most common causes of cancellation (Table 2) were lack of space and time to perform surgery with existing infrastructure and resources (overscheduling, frequent rescheduling of postponed cases, procedure taken longer than expected, postoperative ICU bed availability) 276 patients (72.8%), issues related to PAE fitness 42 (11%), changes in the medical condition 26 (6.8%) and surgery cancelled by surgeon 18 (4.7%) patients refusal 9 (2.3%), unavailability of OT (sudden declaration of government holiday or some emergency procedure) 4 (1%), and shortage of staff and equipment

needed for the surgery (already occupied in running procedure, improper communication) 2 (0.5%). Although lack of space and time to perform surgery was the most common reason for cancellation of surgery in the all speciality. In General surgery, it was 190 (90%), in Obstetrics & Gynaecology, Otorhinolaryngology and Orthopaedic surgery, it was 29 (55.8%), 6 (50%), and 51 (49%) respectively. If we talk about PAE unfit as a reason of cancellation of surgery, majority 32 (30.8%) of patients belongs to orthopaedic surgery and 8 (3.8%) in General surgery and 2 (3.8%) in Obstetrics & Gynaecology

surgery.

Table 3: Distribution according to Cancellation rates amongst different speciality

Speciality	Cases placed for surgery		Total	P value
	Surgery performed	Cancelled		
General surgery	1092 (83.80%)	211 (16.19%)	1303 (100%)	0.000
Orthopaedic surgery	524 (83.43%)	104 (16.56%)	628 (100%)	
OBG	688 (93.0%)	52 (7.0%)	740 (100%)	
ENT	267 (95.7%)	12 (4.3%)	279 (100%)	
Total	2571 (87.15%)	379 (12.85%)	2950 (100%)	

Test used Chi square test ($\chi^2=61.35$, $df=3$)

Table 3 denotes that maximum 104 (16.56%) cancellation rate was found in Orthopaedic surgery department, followed by 211 (16.19%) in General surgery department, 52 (7%) in Obstetrics and

Gynaecology (OBG) department and 12 (4.3%) in Otorhinolaryngology (ENT) department and this association was found statistically significant. (P <0.05%).

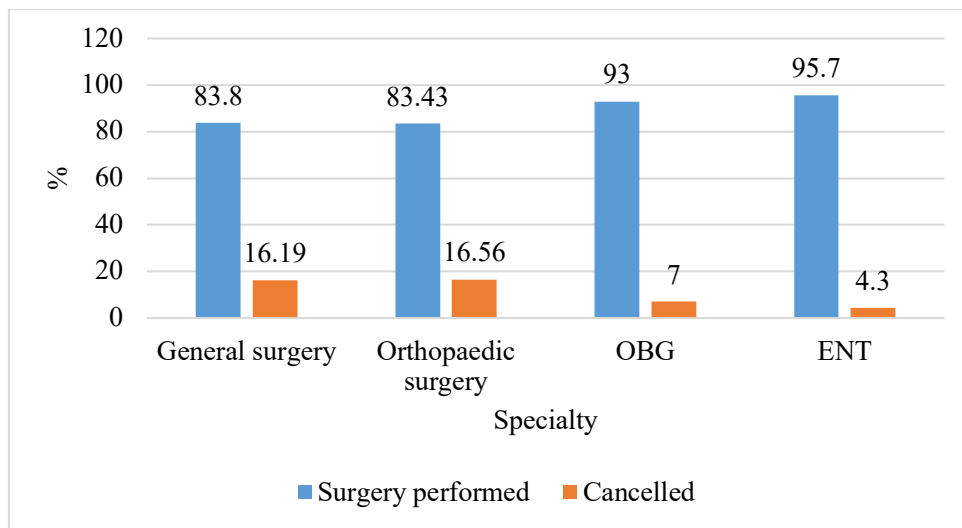


Figure 1: Distribution of Cancellation rates among different speciality

Table 4: Distribution of Cancelled cases according to patient, anaesthesia, surgeon and hospital related (operational) factors in different speciality

Speciality	Reason for Cancellation				Total	P value
	Patient	Anaesthesia	Surgeon	Operational		
General surgery	09(4.27%)	08(3.79%)	03(1.42%)	191(90.52%)	211(100%)	0.000
Orthopaedic surgery	09(8.65%)	32(30.77%)	07(6.73%)	56(53.85%)	104(100%)	
OBG	12(23.07%)	02(3.85%)	09(17.30%)	29(55.78%)	52(100%)	
ENT	05(41.67%)	00	01(8.33%)	06(50%)	12(100%)	
Total	35(9.23%)	42(11.09%)	20(5.28%)	282(74.40%)	379(100%)	

As per table 4 among different specialities majority 282 (74.40%) of patient cancellation was due to operational factors ie hospital and its resources related. In general surgery department it contributed 90.52% cancellation.

Table 5: Distribution of cancelled cases according to avoidable and unavoidable causes in different speciality

Speciality	Reason for Cancellation		Total	P value
	Avoidable cause	Unavoidable cause		
General surgery	204 (96.7%)	7 (3.3%)	211 (100%)	0.000
Orthopaedic surgery	92 (88.5%)	12 (11.5%)	104 (100%)	
OBG	42 (80.8%)	10 (19.2%)	52 (100%)	
ENT	9 (75.0%)	3 (25.0)	12 (100%)	
Total	347 (91.6%)	32 (8.4%)	379 (100%)	

Table 5 denotes that majority 347 (91.56%) of cancellation of cases had avoidable and 32 (8.44%) cases unavoidable reasons. In each speciality avoidable causes had greater contribution than unavoidable causes and this finding was found statistically significant. (P <0.05%)

Discussion

To reduce the cost of surgery necessitates an efficient use of theatre time and personnel. Cancellation of elective operation on the schedule day of surgery is a big concern now a days and it also used as a criterion to assess quality of patient care and quality of management system. It is associated with many undesirable consequences and lead to major drain on health resources, increases theatre costs, decrease patient satisfaction, wasted operating room time and decrease efficiency. Though there is no acceptable rate of case cancellation, but usually less than 5% is generally recommended [7] but in the present study it was 12.85%. Thus, to know the real gaps in our health care system functioning, we planned this prospective study to evaluate various reasons for cancellation of cases on the scheduled day of surgery at government tertiary care centre in southern Rajasthan.

In our study total 2950 elective surgeries were performed during June to November 2021, out of which 379 (12.85%) were cancelled on the day of surgery. We found 12.85% cancellation rate in our study similar to previous studies.[3,4,8-11] but in contrary, more cancellation[12-15] and

less cancellation[16-18] in some studies might be due to different institutional protocols. Majority 205 (54.08%) of the cancelled cases belong to young adult age group (21-50 yrs) similar to past studies[13,14] but some studies[13] found higher rate of cancellations in pediatric age group but we have not included pediatric OT data in our study. In our study 223 (58.8%) were male similar to previous study[14] but in a some studies[15] female contribution was more in cancelled cases. Approximately three forth i.e. 276 (72.8%) elective surgeries (Out of 379 cancelled cases) were cancelled due to lack of space and time to perform surgery with available infrastructure and resources like some procedures taken longer time than expected, more cases were posted as per available time and it may be due to frequent rescheduling the postponed cases and it was similar to previous studies[3,10,11,13,15,16,18] but some studies[8,9,14,17,18] differ and includes other causes of cancellation as a major causes were, issue related to preop preparation[9,18] and PAE11, changes in the medical condition[10,16,17,18], cancellation by surgeon[8,14,18], patients refusal[9,14,15,17], unavailability of OT (sudden declaration of government holiday), and shortage of staff and equipments needed for the surgery.[10,11,17] In our study, overall cancellation rate was highest in general surgery department (55.7%) followed by orthopedic department (27.4%) but department wise cancellation rate was highest in Orthopaedic (16.56%) followed

by (16.19%) in Surgery department similar to previous studies[13,14] but in some studies highest rate was seen in general surgery[4] and otorhinolaryngology[10] department. In present study majority (91.6%) of the cancelled cases had avoidable cause of cancellation similar to previous studies[9,10,17,18]. In each speciality avoidable causes had greater contribution than unavoidable causes.

As our institute has separate facility as well as surgeon's and anesthetist's team for emergency surgical procedure, so we did not find any case to be cancelled due to Emergency procedures which interfere with the elective operating schedule. This reason was found for cancellation of surgery in some studies[11,14] because sometimes it became inevitable to avoid emergency procedures in elective operation theatres.

Conclusion

The present study concludes that majority of cancellation of elective surgeries are due to avoidable and operational reasons, and can be reduced by effective planning, coordination, discussions and punctuality amongst operative team including surgeons, anaesthetists and OT staff.

Recommendation

To reduce the incidence of postponement of planned scheduled elective surgery, we make the following recommendation:

1. Operation room facility should be on priority and should be ensured by hospital administration
2. Availability of manpower and other resources required for surgery must be ensured before posting the cases for surgery.
3. Avoid over scheduling by giving due emphasis on expected duration of each surgery and post cases accordingly after consultation with senior surgery faculty.
4. Post only PAE fit cases as per institutional protocol.

5. Prior discussion with concerned anaesthesiologist and following their suggestions and timely review can be beneficial.
6. Timely starting of operative procedures
7. Operating time depends on surgeons skill and experience and similarly anaesthesia time can be different for same surgery and similar patients.
8. On table cancellation of cases can be avoided by proper communication with patients and solving their doubts, improving coordination between different departments, effective management of OT floor and proper administrative measures.
9. Review monthly meeting to improve cancellation rate.
10. Proper team coordination, planning, execution and reviewing and reimplementation is the key to overall success.

References

1. El-Dawlatly AA, Turkistani A, Aldohayan A, Zubaidi A, Ahmed A. Reasons of Cancellation of Elective Surgery in a Teaching Hospital. Intern J Anesthesiol. 2008; 15:2.
2. 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: 214-22.
3. Kumar R, Gandhi R. Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. J Anesthesiol Clin Pharmacol. 2012; 25: 66-69.
4. Perroca MG, JericoMde C, Facundin SD. Surgery cancelling at a teaching hospital: implications for cost management. Rev Lat Am Enfermage. 2007;15(10):18-24.
5. Tait AR, Voepel Lewis T, Munro HM, Gutstein HB, Reynolds PI. Cancellation of pediatric outpatient surgery: economic and emotional implications for patients and their

- families. *J Clin Anesth.* 1997;9 (3):213–9.
6. Arg 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.
 7. Patil S, Jadhav K, Bapat V, Pawar R. Reasons of cancellation of elective cases on the day of surgery - A retrospective study. *MedPulse International Journal of Anesthesiology.* April 2019; 10(1): 62-65.
 8. Farasatkish R, Aghdalii 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.
 9. Fayed, A. Elkouny, N. Zoughaibi, and H. Wahabi, "Elective surgery cancelation on day of surgery: an endless dilemma," *Saudi J Anaesth*, vol. 10, no. 1, pp. 68–73, 2016.
 10. Schofield W N, Rubin G, Pizza M, Lai YY, Sindhusake D, Fearnside MR, et al. Cancellation of operations on the day of intended surgery at a major Australian referral hospital. *Med J Aust.* 2005; 182:612-5.
 11. Vinukondaiah K, Ananthkrishnan N, Ravishankar M. Audit of operation theatre utilization in general surgery. *Nat Med J India.* 2000; 13:118–21.
 12. 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.
 13. Ogwal A, Oyania F, Nkongwe E, Makumbi T, Galukande M. Prevalence and predictors of cancellation of elective surgical procedures at a Tertiary Hospital in Uganda: a cross-sectional study, *Hindawi. Surg Res Pract.* 2020; 19:1464098.
 14. Desta M, Manaye A, Tefera A, Worku A, Wale A, Mebrat A et al. Incidence and causes of Cancellations of elective operation on the intended day of surgery at a tertiary referral academic medical Centre in Ethiopia. *Patient Safety in Surgery* (2018); 12:25.
 15. Garg R, Bhalotra AR, Bhadoria P, Gupta N, Anand R. Reasons for Cancellation of Cases on the Day of Surgery-A Prospective Study. *Ind J Anaesth.* 2009,53:35-39.
 16. Solak AK, Pandza H, Beciragic E, Husc A, Tursunovic I, Djozic H. Elective Case Cancellation on the Day of Surgery at a General Hospital in Sarajevo: Causes and Possible Solutions. *Mater Socio med.* 2019 Mar; 31(1): 49-52.
 17. Kaddoum R, Fadlallah R, Hitti V, Jardali FE, Eid GE. Causes of cancellations on the day of surgery at a Tertiary Teaching Hospital. *BMC Health Serv Res.* 2016; 16:259.
 18. Xue W, Yan Z, Barnett R, Fleisher L, Liu R. Dynamics of elective case cancellation for inpatient and outpatient in an academic center. *J Anesth Clin Res.* 2013 May;4(5):314.