

A survey of perioperative complications with Clavien-Dindo classification: A cross-sectional study

Muhammad Talha Khan, Talha Akhtar, Muhammad Atif Yasin, Noman Ahmed Chaudhary, Abdullah Sadiq, Ahsan Tameez ud din

Abstract

Objective: To determine the incidence of complications in elective surgeries and to grade them according to the Clavien-Dindo Classification System.

Method: The cross-sectional study was conducted in the General Surgery Operation Theatre of Holy Family Hospital, Rawalpindi, Pakistan, from February to April 2018, and comprised patients undergoing elective surgeries. Age, gender, region of surgery, type and grade of complications, were recorded using Clavien-Dindo Classification proforma. Data was analysed using SPSS 23.

Results: Of the total 212 patients, 36(16.9%) had some complication. There were significantly more complications in people aged 40 years or above compared to those <40 years ($p < 0.05$). Of the total surgeries, 126(59.43%) were in the abdomino-pelvic region.

Conclusion: Peri-operative complications were found to be significantly related with age of the patient and the type of surgery.

Keywords: Classification, Peri-operative procedures, Operation theatres, General surgery, Quality of healthcare.

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Introduction

A complication is defined as "any deviation from the normal post-operative course".¹ In the face of rising costs and limited resources, there is a demand for better healthcare delivery which calls for the need of quality assessment tool.¹ According to the Lancet Commission on Global Surgery, 313 million surgeries are being carried out per year globally. While this seems like a huge number, <6% of these procedures are carried out in the poorer nations. Moreover, approximately 5 billion people do not have access to safe and affordable surgical care.² With such huge number of surgeries taking place, the incidence of no surgical complication at all is highly unlikely. The complication rate is approximately 3-17% in most developed countries, but in Pakistan it is a lot higher with an even higher mortality rate.^{3,4} However, the risk of surgical complications is poorly characterised and there is no standard way of classifying the surgical complications.⁵

Different classification systems have been devised by hospitals to document the surgical complications, but there is no system used universally. This makes reporting and comparing the data among healthcare facilities difficult. A globally used standardised quality assessment system will make the data reproducible and may help in decreasing the preventable causes of surgical complications.⁶ The Clavien-Dindo (CD) classification shows

Final Year MBBS Student, Rawalpindi Medical University, Rawalpindi, Pakistan.

Correspondence: Muhammad Talha Khan e-mail: dr.m.talhakhan@gmail.com

Table-1: Grades of the Clavien-Dindo Classification System.⁷

Grade I	No treatment
Grade II	Drug
Grade III	Intervention [a: under local anaesthesia, b: under general anaesthesia]
Grade IV	Organ Failure [a: single, b: multiple]
Grade V	Death

promise in this regard as it has been used most frequently all over the world.⁷

It utilises a five-grade system that categorises the complications by the therapeutic modality used to treat that particular complication (Table 1).⁷

Literature review indicated there was no study conducted in Pakistan using CD classification to grade peri-operative complications in surgeries. The current study was planned to determine the incidence of complications in elective surgeries and to grade them according to CD classification.

Patients and Methods

The descriptive cross-sectional study was conducted in the Surgical Operation Theatres 1-5 of Holy Family Hospital, Rawalpindi, Pakistan, from February to April 2018. After approval from the institutional ethics review committee of Rawalpindi Medical University, Rawalpindi, the sample size was calculated using the sampling formula cited in literature.⁸ Confidence interval (CI) of 95% ($Z=1.96$) was assumed and absolute precision was set at 5% ($d=0.05$), while prevalence (P) of surgical complications of was taken as 16.4%.¹ The sample was raised using non-random

Table-2: Distribution of Complications with Age and Type of Surgeries.

Type of Surgery	Age (years)	No. of patients in age group	Complications					Total
			None	Grade I	Grade II	Grade IIIb	Grade IVa	
Abdominopelvic	< 40	64	58	4	0	1	1	126
	≥ 40	62	48	4	6	4	0	
Head & Neck	< 40	26	20	3	0	1	2	34
	≥ 40	8	4	2	0	0	2	
Plastic	< 40	20	20	0	0	0	0	22
	≥ 40	2	1	1	0	0	0	
Trauma	< 40	16	13	2	1	0	0	19
	≥ 40	3	3	0	0	0	0	
Breast	< 40	8	6	2	0	0	0	11
	≥ 40	3	3	0	0	0	0	
Total		212	176	18	7	6	5	212

Note: There were no Grade IIIa, Grade IVb, or Grade V complications.

consecutive sampling technique and only included elective surgeries. Emergency surgeries and surgeries involving patients with co-morbidities were excluded. Data was recorded in a specially-designed proforma (Annexure).

The patients were followed by the anaesthetist on duty during the peri-operative and early post-operative period. The complications faced, if any, during this period were graded using the CD classification System.⁷ If more than one complication occurred, the highest grade was recorded. Data was analysed using SPSS 23. Descriptive analysis was done by calculating frequencies and percentages, and by cross-tabulations.

Results

Of the total 212 patients, 93(43.9%) were males and 119(56.1%) were females. The overall mean age was 32.38±17.96 years. Of all the surgeries, 126 (59.43%) were abdomino-pelvic, 34(16.03%) head and neck, 22(10.38%) plastic, 19(8.96%) limbic, and 11(5.20%) were breast surgeries. Complications arose in 36(16.98%) cases; 18(50%) Grade I, 7(19.4%) Grade II, 6(16.6%) Grade IIIb, and

Table-3: Cross-tabulation between Age Groups and Complications (p=0.029).

Age Group (in years)	Complications		Total n (%)
	Yes n (%)	No n (%)	
< 40	17 (12.7)	117 (87.3)	134 (100)
≥ 40	19 (24.4)	59 (75.6)	78 (100)
Total	36 (16.9)	176 (83.1)	212 (100)

Table-4: Cross-tabulation between Genders and Complications (p=0.509).

Gender	Complications		Total n (%)
	Yes n (%)	No n (%)	
Male	14 (15.1)	79 (84.9)	93 (100)
Female	22 (18.5)	97 (81.5)	119 (100)
Total	36 (16.9)	176 (83.1)	212 (100)

**Annexure: Clavien-Dindo Classification
Complication Grading Proforma.**

Patient's Serial No. _____
 Age _____
 Surgical Procedure _____
 Region _____
 Complication Yes / No _____
 Peri-operative Complications (if yes):

Complications	Grades
1.	
2.	
3.	
4.	

5(13.9%)Grade Iva (Table 2).

There were significantly more complications in those aged >40 years compared to those aged <40 years (p=0.029) (Table 3). The difference in terms of gender was not significant (p=0.509) (Table 4).

Discussion

The study was unique in the local context and its importance cannot be overestimated. In public hospitals, due to the huge number of patients, documentation is generally not done properly which may impact patient care in the long term. During the current study, it was noticed that post-operative notes were poorly kept and there was no set proforma for documentation. This was consistent with a study conducted in Karachi.⁹

The current study showed complication rate of 16.9% which was almost similar to a cohort study.¹ This may be due to the fact that the current study included only elective surgeries in which complication rates are usually lower.

Grade I complications were most common, and there was no mortality. A similar trend was reported earlier.¹ The current study also showed that patients aged >40 years had significantly increased risk of surgical complications. However, the cut-off was quite low compared to the studies

that took older patients aged >65 years.¹⁰⁻¹³ This raises concerns and calls for improvement in surgical care as even the middle-aged patients were found to be at a greater risk of surgical complications. This data will be helpful in preparing for and predicting the outcome of surgeries in our patient population as these patients require more critical monitoring during peri-operative and the recovery period.

The current study showed non-significant complication distribution between the genders, but this result is in contrast to various other studies where one gender faced significantly greater risk of complications compared to the other.^{14,15} These results can vary by the type of surgery being performed. This might also be due to the fact that the current study excluded patients with co-morbidities.

The current study has some limitations. The possibility of under-reporting of minor complications cannot be denied. Also, data was limited only to elective surgeries in operation theatres of a teaching hospital where surgical environment and techniques are better. These results might not be applicable in the emergency surgeries or in peripheral hospitals where complication rates might be higher.

It is recommended that documentation of surgical procedures should be done more carefully and should encourage the use of grading surgical complications in all surgical setups. A table of CD classification may be added in the post-operative notes to aid in the documentation process.

Conclusion

Elective surgeries had lower complication rates and Grade I complications were most commonly observed. The complication rates were significantly higher among those aged >40 years.

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