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Clinical Assessment of Postoperative Complications Based On Clavien-Dindo Classification in Elective and Emergency Abdominal Surgeries

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Abstract: ***Aim: To evaluate the CDC system in the assessment of postoperative complications in elective and emergency abdominal surgeries. Material and methods: The study was performed on 88 patients who were scheduled to undergo emergency and elective abdominal surgery. Demographical data was recorded and detailed clinical examinations were performed in all the patients. Normal postoperative course and its management were recorded and evaluated. All complications were categorized according to the Clavien-Dindo classification (CDC). Results: The average age of the patients was 46.77±15.18 years. Among these subjects, 56.82% (n=50) and 43.18% (n=38) underwent elective and emergency abdominal surgery respectively. In subjects who underwent elective abdominal surgery, CDC system suggested that among 50 subjects, 32% (n=16) subjects had grade 0 complications whereas, 36% (n=18), 20% (n=10), 8% (n=04), and 4% (n=02) subjects had grade I, II, IIIb and IVa complications respectively. Furthermore, in patients who underwent emergency abdominal surgery (n=38) grade 0 was seen in n=4 (10.5%) patients whereas, n=14 (36.8%), n=8 (21.05%), n=6 (15.78%), n=4 (10.5%), and n=2 (5.26) had grade II, I, IVa, IIIb, and V complications respectively. Conclusion: CDC system can be useful in elective as well as in emergency abdominal surgeries for the assessment of postoperative complications.***

Keywords: Clavien Dindo classification, post-operative complications, Abdominal surgeries

1.Introduction

Mortality, morbidity, and reported outcomes followed by surgery are important variables that facilitate the assessment of the full risks and benefits of procedures. [1] Over the last decades, the mortality related to major abdominal surgeries has significantly decreased but morbidity remains high. [2-5] Various studies have reported the complication rates of around 30-60% in abdominal surgeries including pancreatic, hepatobiliary, colorectal, and upper gastrointestinal surgery. [6-12]

The most common and difficult aspect of complications is the suffering borne by a patient who enters the hospital anticipating an uneventful operation but is left suffering and compromised by the complication. [13] Therefore, reporting the surgical outcomes and postoperative complications in standardized format has an important role in the assessment of the quality and value of surgical interventions. [14] However, postoperative complications are not commonly reported due to logistical issues, the absence of a commonly accepted classification system, and the unavailability of a clear definition of postoperative complication. [15, 16]

Clavien-Dindo classification (CDC) is considered the most explanatory method for the categorization of complications. [17, 18] Initially Clavien et al. studied the classification in cholecystectomy cases based on the required treatment for the management of complications. [19] Further, this classification was modified by Dindo et. al. by developing a five-grade system of increasing severity which was termed as Clavien-Dindo classification system which was widely accepted in General Surgery and various subspecialities. [17, 19] The advantages of the CDC system are; it is simple, easy to understand, high acceptability, and reproducibility. [20]

However, this standard has its limitations including this classification is only suitable for general adverse events, the complications usually undefined and set of diagnostic principles, and its applicability depends upon its acceptance and applicability in different nations and surgical cultures. [20] Moreover, there is a paucity of data regarding the application of CDC classification in the assessment of abdominal surgery-related complications. Hence the present study was undertaken to evaluate the CDC system in the assessment of postoperative complications in elective and emergency abdominal surgeries.

2.Material and Methods

Post obtaining ethical approval the prospective observational study was held at the tertiary care centre at Kolhapur, Maharashtra from September 2019 to September 2021. A total of 88 subjects of either sex who were scheduled for open cholecystectomy, open CBD exploration, emergency exploratory laparotomies were incorporated in the study, and consent was obtained. The subjects undergoing laparoscopic surgeries, appendicectomy, elective gastrointestinal surgeries (expect open cholecystectomy and open CBD exploration), and abdominal wall hernias were excluded from the study.

Demographical data was recorded and detailed clinical examinations were performed in all the patients. Normal postoperative course and its management were recorded and evaluated. All complications were categorized according to the Clavien-Dindo classification (figure 1).

Statistical Analysis

Data were analysed using MS excel 2017. Continuous variables were shown in mean ± SD whereas, categorical variables were shown as percentage and frequency.

3.Results

The mean age of the subjects was 46.77±15.18 years ranging from 15 to 76 years. In the study participants 47.72% (n=42) and 52.28% (n=46) were female and males respectively. Most of the study participants underwent elective abdomen surgery (56.82%, n=50) followed by emergency abdomen surgeries (43.18%, n=38). The distribution of the study subjects based on age groups, gender, and type of surgery is shown in table 1.

Elective abdominal surgeries

Among 88 subjects 50 (56.82%) were undergone elective abdominal surgery. Based on CDC system, 32% (n=16) subjects had grade 0 complications whereas, 36% (n=18), 20% (n=10), 8% (n=04), and 4% (n=02) subjects had grade I, II, IIIb and IVa complications respectively. Detailed distribution of subjects according to type of elective abdominal surgery with CDC complication grades is illustrated in table 2.

Emergency abdominal surgeries

Among 88 subjects, 38 (43.18%) were undergone emergency abdominal surgeries. In these patients, grade 0 was seen in n=4 (10.5%) patients whereas, n=14 (36.8%), n=8 (21.05%), n=6 (15.78%), n=4 (10.5%), and n=2 (5.26) had grade II, I, IVa, IIIb, and V complications respectively. Detailed distribution of subjects according to the type of emergency abdominal surgery with CDC complication grades is illustrated in table 3.

4.Discussion

This study was conducted to evaluate the CDC system in the assessment of postoperative complications in elective and emergency abdominal surgeries. In this study, n=88 patients with an average of 46.77±15.18 years were studied. Among these subjects 56.82% (n=50) and 43.18% (n=38) were undergone elective and emergency abdominal surgery respectively. In subjects who underwent elective abdominal surgery, CDC system suggested that among 50 subjects, 32% (n=16) subjects had grade 0 complications whereas, 36% (n=18), 20% (n=10), 8% (n=04), and 4% (n=02) subjects had grade I, II, IIIb and IVa complications respectively. Furthermore, in patients who underwent emergency abdominal surgery (n=38) grade 0 was seen in n=4 (10.5%) patients whereas, n=14 (36.8%), n=8 (21.05%), n=6 (15.78%), n=4 (10.5%), and n=2 (5.26) had grade II, I, IVa, IIIb, and V complications respectively. This could imply that the CDC system can be useful in elective as well as in emergency abdominal surgeries for the assessment of postoperative complications. The CDC system defines surgical complications as any deviation from the ideal postoperative course that is not inherent in the procedure and does not comprise a failure to cure.

In this study, among n=88 subjects, n=50 had undergone elective abdominal procedures. All subjects had undergone (n=50) open cholecystectomy with CBD exploration According to the CDC system, 32% (n=16,) of patients who had undergone elective abdominal surgery had normal postoperative courses i.e., grade 0. Whereas, 36% (n=18), 20% (n=10), 8% (n=04), and 4% (n=02) subjects had grade I, II, IIIb and IVa complications respectively. These findings are similar to the previous reports. [22-26] This implies that the CDC system can be considered as a tool in the assessment of post elective abdominal surgery complications.

However, patients who have emergency surgeries usually differ from elective surgical patients. Even though there is less prevalence of emergency surgeries, the mortality and morbidities are more. [27] Here, among study participants, n=38 had undergone emergency abdominal surgeries. The most common type of emergency surgery was hollow viscus perforation (n=26) followed by acute intestinal obstruction (n=08), and splenectomy (n=04). In emergency abdominal surgery patients CDC system suggested normal course (grade 0) in n=4 (10.5%) patients whereas, n=14 (36.8%), n=8 (21.05%), n=6 (15.78%), n=4 (10.5%), and n=2 (5.26) had grade II, I, IVa, IIIb, and V complications respectively. These showed that CDC can be also applicable for patients undergoing emergency surgery which was similar to the study of Mentula PJ, and Leppäniemi AK. [21] However, it is essential to assess the status of preoperative organ dysfunction. The presence of preoperative organ dysfunction should be included in the final complication grade as an appendix suggesting that the subject had organ dysfunction before surgery. Moreover, severe bleeding or peritonitis may cause organ dysfunction, thus all postoperative organ dysfunctions should not be classified as complications. [21] In the current study, postoperative organ dysfunctions were not classified as complications if they were already present preoperatively i. e., the patient's condition remained unchanged in terms of organ dysfunctions. However, if a patient developed other postoperative complications that probably caused prolonged organ dysfunctions or worsening of organ dysfunctions, the complication was

classified as grade IV. Also, any progression of organ failure to death was classified as a grade V complication.

5.Conclusion

The present study establishes the role of the CDC system in the assessment of postoperative complications in patients undergoing elective and emergency abdominal surgeries. However, the limitation of the study was single-centred, limited sample size, and comparison among the type of surgeries was not performed. Further, a multicentre study with a large sample size including comparison among elective and emergency abdominal surgery-associated complications and their correlation with the CDC system will confirm the present study findings.

This study shows that emergency and elective surgeries performed in our hospital developed low-grade complications, with the most common grade being a grade I. Relatively less high-grade complications were recorded which were more common in emergency surgeries compared to elective surgeries. CDC system can be useful in elective as well as in emergency abdominal surgeries for the assessment of postoperative complications.

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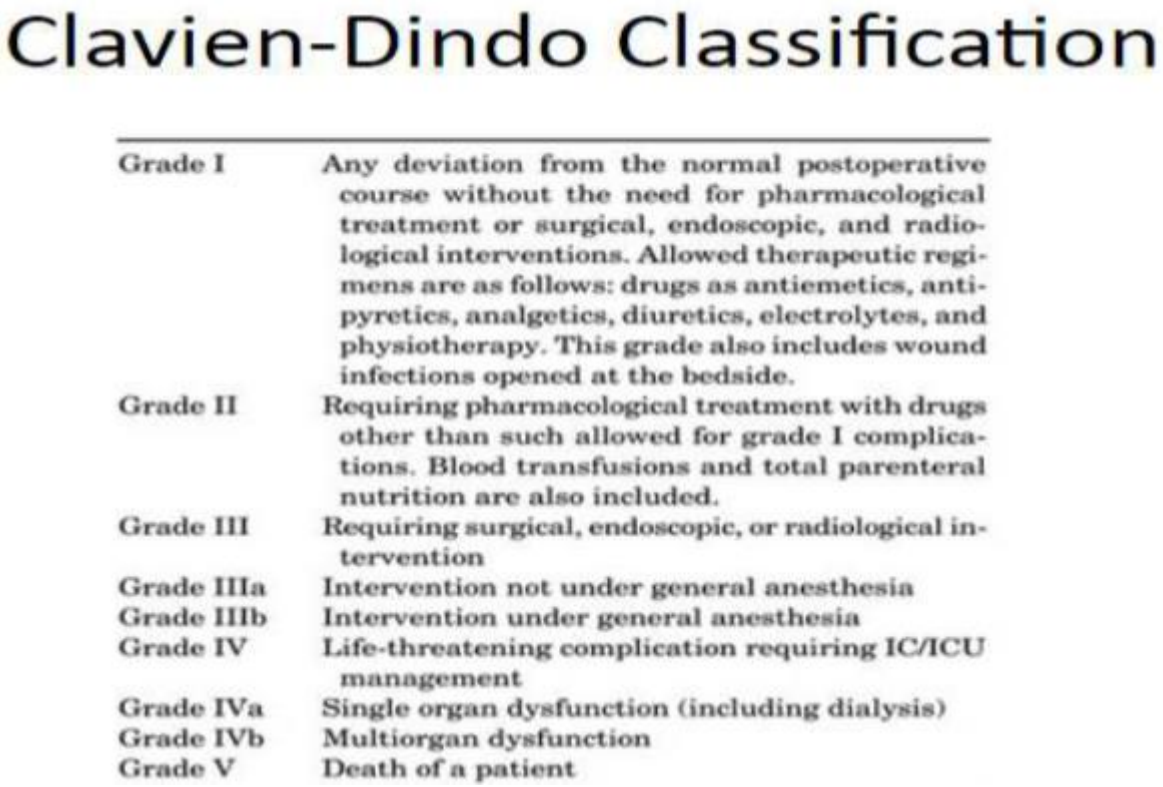

Figure 1: Clavien-Dindo classification

Table 1: Distribution of study subjects based on gender, age, and type of surgery

Variables	Subcategories	Frequency (n)	Percentage (%)
Gender	Male	46	52.28
	Female	42	47.72
Age (years)	<20	04	05
	20-40	30	34
	41-60	30	34
	>60	24	27
Type of surgery	Elective	50	56.82
	Emergency	38	43.18

Table 2: Distribution of study subjects based on the type of elective abdomen surgery and CDC system

Type of surgery	Frequency	CDC grades (n)
Open Cholecystectomy with CBD exploration	50	0 (16) I (18) II (10) IIIb (04) IVa (02)

Table 3: Distribution of study subjects based on the type of emergency abdomen surgery and CDC system

Type of surgery	Frequency	CDC grades (n)
Hollow viscus perforation	26	0 (04) I (06) II (08) IIIb (04) IVa (04)
Acute intestinal obstruction	08	II (04) IVa (02) V (02)
Splenectomy	04	I (02) II (02)