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Original Research Article

A study on assessment of postoperative complications among major abdominal surgeries using Clavien-Dindo classification

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ABSTRACT

Background: Surgical team always tries to provide consistently low incidence of major complications for patient undergoing any operation. Clavien-Dindo (CD) classification is the simplest way of reporting all complications. The main aim of this study was to test the usefulness of Clavien-Dindo classification in patients undergoing the abdominal surgery. In this study Clavien-Dindo classification has been used for assessment of postsurgical complications after major abdominal surgery.
Methods: A total of 50 patients admitted to surgical wards for major abdominal surgery were evaluated through history, co-morbid condition and thorough clinical examination based on inclusion and exclusion criteria along with necessary investigations. Post-operative complications and management were recorded, and then postsurgical complication was classified based on Clavien-Dindo classification and assessed.
Results: Most of the patients who developed complications were in the age group of 40-50 years. Most of the patients (32%) belonged to grade 2 complications. Serum creatinine, blood urea and post-operative stay were found to have direct relation with Clavien-Dindo grade of complications.
Conclusions: The Clavien-Dindo classification represents an objective and simple way of reporting all complications in patients undergoing major abdominal surgeries and comparing the various complications between different surgeries. However, a definite statement on the clinical value of this classification system is not yet possible due to the small case number in this study, but the promising results should encourage further evaluation in larger cohort with the goal to possibly establish its validity as a standard clinical practice.

Keywords: Clavien-Dindo score, Major abdominal surgeries, Post-operative risk assessment

INTRODUCTION

Surgical team always tries to provide consistently low incidence of major complications for patient undergoing any operation. The occurrence of complications in surgical practice is an essential part in the life of all surgeons. This is today more important than any other time because of the development of new surgical subspecialties, the performance of complicated operations in challenging patients, the introduction of new surgical technologies, increasing numbers of emergency operations, etc. Complications are now used as a basis to evaluate the improvement in standard surgical procedures, for selection of management options, and to compare results in individual centres and among centers.[1] When a new surgical procedure is introduced or when several surgical approaches exists for one procedure, there is a need to compare outcomes and complication for each specific approach in a sound and reproducible way.[2-5]

Clavien-Dindo (CD) classification is the simplest way of reporting all complications.[5-7] It allows surgeons to distinguish between a normal postoperative course from any deviation and the severity of the complication and it may be useful for comparing postoperative morbidity in each patients.[6,8-11] A classification is useful only if it is widely accepted and applied throughout different countries and surgical cultures.[12-16] Morbidity was defined as all the non-fatal surgical and/or medical complications occurred during the patient's stay in hospital, in the 30-day period following the operation.[10,11,17,18] The main aim of this study was to test the usefulness of Clavien-Dindo classification in patients undergoing the abdominal surgery. In this study Clavien-Dindo classification has been used for assessment of postsurgical complications after major abdominal surgery. Emergency surgical patients are an important target group for quality improvement, and negative outcomes should be measured and classified in order to find more specific targets for quality improvement.[19-23] Hence, assessments of complications in emergency abdominal surgeries were also included in the study along with elective abdominal surgeries.

METHODS

This was a prospective cross-sectional study constitution 50 patients, done for a period of 24 months from October 2016 to September 2018. The study was conducted at department of General surgery, Mamata General Hospital, Khammam.

Inclusion criteria

All patients who were admitted in general surgical department of age more than 16 years for major abdominal surgeries and willing to participate in the study were included.

Exclusion criteria

Previously operated major abdominal surgery, pregnancy with surgical problems, complications developed 30 days after surgery and patients unwilling for the study.

All patients admitted to surgical wards for major abdominal surgery were evaluated through history, co-morbid condition and thorough clinical examination based on inclusion and exclusion criteria. Routine investigations were done in all cases along with specific investigations if any, depending upon the provisional diagnosis and their requirement. Post-operative complications and management were recorded, and then postsurgical complication was classified based on Clavien-Dindo classification and assessed. For those discharged prior to 30 days of post-operative period, telephonic interview was conducted and evaluated. All the patients were reviewed at the end of 30 days. All the data were recorded in the proforma of the individual patients and data entered in Microsoft excel software. Sample size was calculated by taking the prevalence as 67% with 95% confidence interval (Z=1.96), with a precision of 20%. The results and the relevant statistical data were obtained and analyzed by using statistical package for social science (SPSS).

RESULTS

A total of 50 cases diagnosed of abdominal pathology admitted in general surgical ward of Mamata General Hospital from October 2016 to September 2018 over 2 years, which required surgery were studied. Patients were investigated properly, and diagnosis was confirmed and posted for surgery. Post-operative course in hospital and any deviation from normal course and its management were recorded and analyzed. Most of the cases (28%) in the study belonged to age group 40-49 years. Followed by <29 years, 30-39 years, 50-59 years and >60 years. In this study, 48 patients (96%) presented with pain abdomen. Vomiting was found in 23 cases (46%), whereas nausea was complained by 19 (38%) patients.

Out of 50 cases in this study only 13 cases (26%) had comorbidities. Among which diabetes mellitus (DM) found in 8 cases (16%), hypertension (HTN) in 7 cases (14%), anemia in 2 cases (4%), jaundice in 1 cases (2%), CVS disease in 2 cases (4%), respiratory disease in 6 cases (12%). Rest 37 cases (74%) were free of comorbidities. The details of the surgical procedures and complications are depicted in Figure 1. Other operations depicted in the chart were a case of subtotal cholecystectomy for gall bladder perforation, 1 case of mesenteric cyst excision with appendectomy, 1 case of peritoneal toilet for sealed off duodenal perforation and another case of trans-abdominal posterior bladder wall repair, all of which developed complications. 1 case of colpopexy of ascending colon and caecum did not develop any complication.

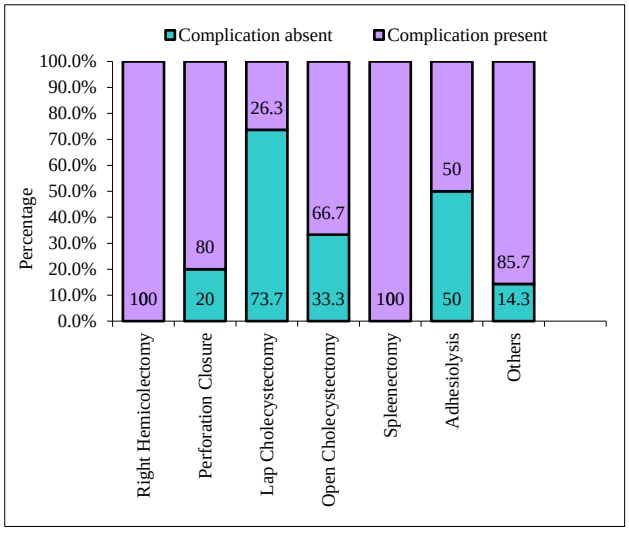

Figure 1: Comparison of complications with type of surgery.

In this study, 1 case (2%) developed wound complications in the form of superficial surgical site infection, 5 cases (10%) developed respiratory complications most common being basal atelectasis requiring ventilator support, 4 cases (8%) developed cardiovascular complications, 3 cases (6%) developed renal complication as acute kidney injury, 4 cases (8%) developed single organ dysfunction, and 1 case expired post operatively. None of the cases developed permanent disability. In present study, out of 50 cases, 31 cases (62%) had complications in their post-operative course, among which grade 1 constitutes 10 cases (20%), grade 2 constitutes 16 cases (34%), grade 4 constitutes 4 cases (8%) and grade 5 constitutes 1 case (2%) and rest 19 cases (38%) were free of complications and had normal post-operative course. The details of complications in the study according to CD classification are depicted in and Figure 2.

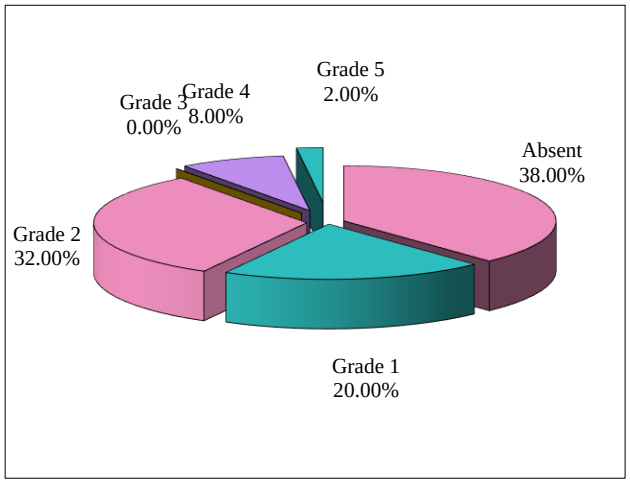

Figure 2: Distribution of patients by CD grades.

Grade 1 cases had mean BMI of 23.86, grade 2 had mean BMI of 22.71, grade 4 cases had mean BMI of 20.55 and grade 5 case has BMI of 23.01. Mean BMI was more in grade 1 cases compared to grade 2 and 4 cases. Mean serum creatinine was 1.13 mg/dl (0.6±0.58 to 4.0±0.58). Grade 1 and grade 2 cases had mean serum creatinine of 1.23 mg/dl. Grade 4 cases had mean serum creatinine of 1.67 mg/dl. Grade 5 case had serum creatinine of 1.2 mg/dl. We observed in the study that higher is the preoperative value of serum creatinine, more is the incidence of patients falling into higher grade of CD classification of complications. Mean serum creatinine in the study was 1.13±0.58 mg/dl. Mean blood urea levels were found to be 34.38±14.54 mg/dl. It was also observed that when the blood urea was higher, the grade of CD complications was also higher. It was observed that mean of TLC was 4468.38 cells/mm^3. TLC was higher as the grade of complication was also high. There was slight decrease in TLC in grade 4 complications, but that can be attributed to the lower number of cases in grade 4 complications being only 4 cases. Higher the grade greater was the post-operative stay.

DISCUSSION

The Clavien-Dindo grading system is objective and simple because the data recorded in our database were easily converted into this new classification. First, it is noted that using this system, the rate of patients with any deviation from the normal postoperative course was high (62%); only 38% of the patients had an uneventful postoperative course. This is because emergency abdominal surgeries were included in the study along with elective abdominal surgeries. The common age group in the present study was 40-49 years (28%), followed by <29 years and 30-39 years. Comparison of various surgical procedures performed compared to other studies was shown in Table 1. Results of present study are comparable to the study by Vignesh et al done on 80 cases where common age group was 30-39 years with 26.3%, followed by 60-70 years and 40-49 years both with 21.3% cases.[2]

Table 1: Comparison of various surgical procedures performed.

Surgical procedure	Present study (%)	Vignesh et al[2] (%)	Mentula et al[6] (%)
Laparoscopic cholecystectomy	38	20	12.4
Open cholecystectomy	6	20	3.2
Splenectomy	16	2.5	0
Adhesiolysis	4	0	2.2
Perforation closure	22	0	2
Abdomino-perineal resection	0	5	0
Colonic resection	2	0	9.7
Other procedures	14	52.5	70.6

Patients with comorbidities in this study was 26% and of them, 85.7% presented with post-operative complications. Of these, most of the cases had diabetes mellitus followed by hypertension. Among the cases studied, there were no cases with grade 3 complications. Grade 5 complication was seen only in 1 case (2%) that was operated for hollow viscous perforation on emergency basis. Patient was brought to the hospital in a state of toxaemia and was with acute kidney injury and intraoperatively found to have anterior caecal wall perforation with faecal peritonitis. Right hemicolectomy and ileo-transverse anastomosis was done to the patient but he expired on second postoperative day from multi organ dysfunction. In the present study, the complicated patients were also more frequently in grade 2, constituting about two-thirds of the complicated patients requiring only pharmacological treatment, whereas one-third of the complicated patients required management in the ICU or interventional treatment.

Patients with comorbidities in this study were 26% and of them and 85.7% presented with post op complications. Of these, most of the cases had diabetes mellitus followed by hypertension. Present results are similar to the study by Vignesh et al where 38.75% and 72.9% presented with complications.[2] Most of the cases in this study had anaemia (15%) followed by hypertension (11.3%) and jaundice (10%). Contrary to our results it was observed that decrease in BMI was associated with increase in CD grade of complications. Mean BMI which was 23.81 in grade 1 compared to 20.55 in grade 4. In this study there were no grade 3 complications and only 1 grade 5 complication was observed. The details of comparison of post-operative events of various studies are depicted in Table 2.

Table 2: Comparison of post-operative events.

Post op events	Present study	Vignesh et al[2]
ICU stay	52	6.25
Ventilator support	8	6.25
Blood transfusion	36	23.75
Post op fever	6	12.5

In this study, mean post-operative stay was 9.9±4.77 days. Comparison of post-operative events is shown in Table 2. Patients without complications had a mean post op stay of 6.89 days. In study by Vignesh et al, of 80 cases, patients with no complications had a mean post op stay of 6.1±3.7 days. Post-operative stay was relatively less in the current study compared to the study by Vignesh et al despite including emergency surgeries.[2] The length of the hospital stay significantly increased for grades II-III, demonstrating that the CD classification is a useful tool for distinguishing among the increased grade of severity of the complications. Moreover, this result suggests that patients undergoing interventional treatment had a greater clinical impact on the length of hospital stay than patients who needed only medical treatment.

CONCLUSION

In conclusion, the CD classification represents an objective and simple way of reporting all complications in patients undergoing major abdominal surgeries. This classification system allows the surgeon to distinguish a normal postoperative course from any deviation and it satisfactorily distinguishes the severity of complications. This classification system seems to be of particular interest in comparing the various complications between different surgeries.

However, a definite statement on the clinical value of this classification system is not yet possible due to the small case number in this study, but the promising results should encourage further evaluation in larger cohort with the goal to possibly establish its validity as a standard clinical practice.

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