

Assessment of Postoperative Complications in Abdominal Surgeries by Clavein-Dindo Classification System in the Indian Hospital Setting

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Abstract

Background: Complications occur in every surgical department, there is no surgery without any complication. So surgical complications need to be classified and evaluated. When a new surgical procedure is introduced or when several surgical approaches exist for one procedure, there is a need to compare outcomes and complication for each specific approach in a sound and reproducible way. A new classification was initiated by Clavien and Dindo which has been updated regularly. This classification is based on the type of therapy needed to correct the complication. The principle of the classification was to be simple, reproducible and applicable irrespective of the cultural background. The objective is aim of our current study is to critically evaluate this classification and to correlate the classification grades in each patient and each procedure and test the easy usability in the Indian hospital setting. **Subjects and Methods :** A total of 100 cases diagnosed as abdominal pathology admitted in general surgical ward of Narayana Hospital which required elective laparotomy were studied. This evaluation provides strong evidence that the classification is valid and applicable worldwide in many fields of surgery. No modification in the general principle of classification is warranted in view of its use in ongoing publications and trials. **Results:** This classification system helps in the exact analysis of each and every individual surgical postoperative complication by grading the complications and hence, lowering the occurrence of similar complications in the future surgical work. **Conclusion:** The Clavien-Dindo classification represents an objective and simple, way of reporting all complications in patients undergoing major abdominal surgeries. This classification system allows us to distinguish a normal postoperative course from any deviation and it satisfactorily distinguishes the severity of complications. Finally, according to our experience, this classification system seems to be of particular interest in comparing the various complications between different surgeries.

Keywords: Abdominal Surgery, Clavein Dindo, Appendicitis, Complications.

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Introduction

Surgical complications remain a frustrating and difficult aspect of the operative treatment of patients. Regardless of how technically gifted and capable surgeons are, all will have to deal with complications that occur after operative procedures and such complications are associated with lost work productivity, disruption of family life, and stress to employers and society in general. Frequently, the functional results of the operation are compromised by complications; in some cases the patient never recovers to the preoperative level of function. The most significant and difficult part 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.^[1,2]

In 1992, Clavien et al. proposed the Clavien classification system to grade post-operative complications. A modified version of the system (Clavien-Dindo) was published in 2004 which looked at the therapeutic consequences to rank complications. The modified system is divided into 7 grades (Grade I-V) with 2 sub-groups for grade III and IV with grade V representing the death of a patient. The system has been increasingly used in many fields of surgery and has been accepted as a valid and reproducible grading system. It is a simple, convenient, reproducible, comprehensive and logical system, which has been used in many parts of the world and by all grades of surgeons. His classification has been used in many centers as a tool for quality assessment in audits and every day practice, and it is increasingly used in the surgical literature.^[3-5]

In this study Clavien-Dindo classification has been used for assessment of post-surgical complications after major elective abdominal surgery.

1000 years before Celsus, the compilers of the Law code of the Babylonian king Hammurabi (c.1700 BC) were familiar with surgical complication, at least as a category of professional mishap, for the code stated that if surgeon took a bronze lancet to a patient who was of high status, and the patient died, then the surgeon's hand had to be cut off.^[6]

In 1992, Pierre-Alain Clavien, MD et al attempted to define and classify negative outcomes by differentiating complications, sequelae, and failures. complications are unexpected events not intrinsic to the procedure, whereas sequelae are inherent to procedure.

The classification was tested in a cohort of 6336 patients who underwent elective general surgery and conclude that the proposed morbidity scale based on the therapeutic consequences of complications constitutes a simple, objective, and reproducible approach for comprehensive surgical outcome assessment. This classification seems to be applicable in most parts of the world and may even be used by surgeons who are less experienced.^[3]

Subjects and Methods

All cases admitted between August 2019 to November 2020 under General surgery department of Narayana hospital for abdominal surgeries were included in the study. Patients were evaluated in the following ways, Accurate history was taken with respect to the presentation, co-morbid conditions, habits and thorough clinical examination on the basis of inclusion and exclusion criteria.

Inclusion criteria

All patients who admitted in general surgical department age more than 12 years who requires major abdominal surgeries were included Major abdominal surgeries included are,

1. Cholecystectomy, choledocholithotomy.
2. Whipples procedure and other pancreatic surgeries.
3. Gastrointestinal surgeries Transhiatal esophagectomy Splenectomy
4. Nephrectomy, Nephrolithomy and Uretrolithotomy.

Exclusion criteria

$\frac{1}{4}$ $\frac{1}{4}$ Previously operated abdominal surgery. $\frac{1}{4}$ $\frac{1}{4}$ Pregnancy with surgical problems. $\frac{1}{4}$ $\frac{1}{4}$ Emergency abdominal surgery.

Routine investigation will be done and specific investigation like x-ray, USG and CT scan will do depending upon the provisional diagnosis and their requirement and then diagnosis is confirmed and posted for surgery. Parameters like Benign or

Malignant condition, ASA grade, operative procedure, Blood loss are recorded and prospectively postoperative course in the hospital is assessed. Parameters like post-operative ambulation, reappearance of bowel sound, RT removed on, oral feeds started on, and any deviation of normal post-operative period are noted. length of post-operative period, post-operative complication and management recorded and then post-surgical complication classified based on Clavien-Dindo classifications.

Grading of complications

Complications were graded according to Clavien-Dindo classification. Grade I are any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions Allowed therapeutic regimens are: drugs as anti-emetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside. Grade II are Requiring pharmacological treatment with drugs other than such allowed for grade I complications Blood transfusions and total parenteral nutrition are also included. Grade III are Requiring surgical, endoscopic or radiological intervention Grade III a are Intervention not under general anaesthesia, Grade III b includes Intervention done under general anaesthesia. Grade IV are Life threatening complication (including CNS complications) requiring IC/ ICU management. Grade Iva are Single organ dysfunction (including dialysis), Grade IV are Multi organ dysfunction and Grade V are Death of a patient. Suffix "d" If the patient suffers from a complication at the time of discharge, the suffix "d"(for "disability") is added to the respective grade of complication. This label indicates the need for a follow-up to fully evaluate the complication.

Results

A total of 80 cases diagnosed as abdominal pathology admitted in general surgical ward of Narayana Hospital which required elective laparotomy were studied. Details regarding the age, sex, address, presenting symptoms, physical signs and systemic examination done. Investigated properly and diagnosis is confirmed and posted for elective laparotomy. Operative blood loss and any complications were recorded. Post-operative course in hospital and any deviation of normal post-operative course and its management was recorded and analysed.

[Table 1] Ages between 30-39 years were the most Common in our present study. Out of 80 cases 21(26.25%) were from this group.

Out of 80 cases studied there were 46 (57.5%) male patients and 34 (42. 5%) female patients in this study with male predominant groups. [Table 2]

In our study out of 80 only 31 cases (38.75%) had comorbidities. Among which diabetes mellitus found in 4 cases (5%),

Table 1: Distribution of Study subjects based on the Age incidence

Subjects and Methods	Subjects and Methods	Subjects and Methods
• 2 9yrs	12	15.0
30-39 yrs	21	26.3
40-49 yrs	1”	21. 3
50-59 yrs	13	16.
60-70 yrs	17	21. 3
Total	80	100.0
Mean	43.78 years	

Table 2: Sex wise distribution of patients

Gender	No of Patients	%
Male	46	57.4
Female	34	42.5
Tots		100.0

Table 3: symptoms complex of disease.

Symptoms	No of cases	Percentage
Pain abdomen	40	50%
Pain abdomen with vomiting	18	22.5%
Pain abdomen with nausea	4	5%
Pain abdomen with fever	4	5%
Pain abdomen with mass per abdomen	1	1.25%
Pain abdomen with burning micturition	1	1.25%
Others	12	15%

hypertension in 9 cases (11.25%), anaemia in 12 cases (15%), jaundice in 8 cases (10%) and others in 4 cases (5%).others includes Ascites in 1 case, Epilepsy in 1 case, COPD in 1 case and Trivial TR in 1 case. Rest 49 cases (61.25%) were free of comorbidities. [Table 3]

In our present study, out of 80 cases, 40 cases presented with only pain abdomen,18 cases presented with pain abdomen with vomiting,4 cases presented with pain abdomen with nausea,4 cases presented with pain abdomen with fever,1 case presented with pain abdomen with mass per abdomen,1 case presented with pain abdomen with burning micturition

In our present study, out of 80 cases, 24 cases were cholelithiasis cases among which 17 were free of complications and 7 developed complications. 9 cases were cholecystitis among which 7 cases were free of complications and 2 cases developed complications.6 cases were chronic pancreatitis among which 5 developed complications and 1 case was free of complications. 6 cases were pseudocyst of pancrease among which 2 developed complications and 4 were free of complications.5 cases were of cholelithiasis with choledocolithiasis and all

developed complications. 4 cases were of pyloric stenosis among which 2 were free of complications and 2 developed complications. 3 cases were of Carcinoma of oesophagus and all 3 developed complications. 4 cases were of Carcinoma rectum and all developed complications.3 cases were of carcinoma stomach among which 2 developed complications and 1 case was free of complications.5 cases were choledocolithiasis with cholecystitis and all developed complications. 2 cases were of hypersplenism among which 1 case developed complications and 1 case was free of complications. 2 cases were of periampulary carcinoma and both developed complications. 10 cases were of other diagnosis among which 9 cases developed complications and 1 case was free of complications.

In our study, out of 80, 46 cases(57.5%) had complications in their post-operative course, among which grade 1 constitutes 25 cases (31.25%),grade 2 constitutes 12 cases (15%),grade 3 constitutes 4 cases (5%),grade 4 constitutes 2 cases(2.5%) and grade 5 constitutes 3 cases(3.75%).and rest 34 cases(42.5%) were free of complications and had normal post-operative course.

Table 4: Association between complications and diagnosis

Diagnosis	Complication absent	%	Com- present	plications %	To tal	%
Cholelithiasis	17	70.9	7	29.1	24	30.0
Cholecystitis	7	77.7	2	22.2	9	11.25
Chronic Pan- Creatitis	1	16.7	5	83.3	6	7.5
Pseudocyst Of Pancrease	4	66.7	2	33.3	6	7.5
Cholelithiasis+ Cholidocolit- Hiasis	0	0	5	100.0	5	6.25
Pyloric Stenosis	2	50.0	2	50.0	4	5.0
Ca Oesophageus	0	0	3	100	3	3.75
Ca Rectum	0	0	4	100	4	5.0
Ca Stomach	1	33.3	2	66.7	3	3.75
Cholidicolithi- Asis+ Cole- cystitis	0	0	2	100.0	2	2.5
Hypersplenism	1	50.0	1	50.0	2	2.5
Periampulary Carcinoma	0	0	2	100.0	2	2.5
Others	1	10	9	90.0	10	12.5
Total	34		46		80	100.0

Table 5: Symptoms complex of disease.

Symptoms	No of cases	Percentage
Pain abdomen	40	50%
Pain abdomen with vomiting	18	22.5%
Pain abdomen with nausea	4	5%
Pain abdomen with fever	4	5%
Pain abdomen with mass per abdomen	1	1.25%
Pain abdomen with burning micturition	1	1.25%
Others	12	15%

Complications of Laparoscopic cholecystectomy

In our present study, 16 (20%) cases underwent laparoscopic cholecystectomy among which 12 cases were free of complications and 4 cases developed grade 1 complications.

Complications of Distal Gastrectomy

In our present study, 4 cases underwent distal gastrectomy among which 1 case was free of complications and 2 cases developed grade 1 complications and 1 case developed grade 2 complication.

Discussion

To our knowledge, this is the first prospective study evaluating the usefulness of the Clavien-Dindo classification, a grading system designed to classify postoperative course after distal gastrectomy, laparoscopic cholecystectomy according to the

treatment used for complications. In this classification, grades I and II include only a minor deviation from the normal postoperative course which can be treated with drugs, blood transfusions, physiotherapy and nutrition, while grades III and IV require surgical, endoscopic or radiologic intervention, and intermediate care or ICU management.^[7-9]

This grading system was objective and simple because the data recorded in our database were easily converted into this new classification. First, we noted that using this system, the rate of patients with any deviation from the normal post-operative course was very high (50.8%); only 49.2% of the patients had an uneventful postoperative course. In the literature, the lack of a stratified grading system for complications after surgery has not allowed proper evaluation of the surgical outcome.^[10,11]

In the present study, the complicated patients were also more frequently in grades I and II, constituting about two-thirds

of the complicated patients requiring only pharmacological treatment, whereas one-third of the patients defined as complicated in the Clavien-Dindo grading system. Thus, in our opinion, this grading system seems to be useful in recognizing a normal postoperative course from a complicated one; nevertheless, patients with no complications and patients with grade I are similar because grade I did not include particular pharmacologic treatment but only wound infections which opened at bedside. The length of the hospital stay significantly increased for grades II-III, demonstrating that the Clavien-Dindo 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. Patients with a normal postoperative course (i.e. those with no complications) had a significantly shorter hospital stay than treatment.^[12-14]

The Clavien-Dindo classification represents an objective and simple, way of reporting all complications in patients undergoing major abdominal surgeries. This classification system allows us to distinguish a normal postoperative course from any deviation and it satisfactorily distinguishes the severity of complications. Finally, according to our experience, 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 is not yet possible due to the small case number, but the promising results should encourage further evaluation in larger cohort with the goal to possibly establish a standard classification.^[15]

Conclusion

Growing demand for health care, rising costs, constrained resources, and evidence of variations in clinical practice have triggered interest in measuring and improving the quality of health care delivery. For a valuable quality assessment, relevant data on outcome must be obtained in a standardized and reproducible manner to allow comparison among different centers, between different therapies and within a center over time. Objective and reliable outcome data are increasingly requested by patients and payers (government or private insurance) to assess quality and costs of health care.

Conclusive assessments of surgical procedures remain limited by the lack of consensus on how to define complications and to stratify them by severity. However, the classification system has not yet been widely used in the surgical literature.

Therefore, the aim of the current study was 3-fold: first, to propose an improved classification of surgical complications based on our experience gained with the previous classification; second, to test this classification in a large cohort of patients who underwent general surgery; and third, to

assess the reproducibility and acceptability of the classification through an international survey.

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