



## Assesment of Postoperative Complications In Elective Major Abdominal Surgeries By Clavein-Dindo Classification System In The Indian Hospital Setting.

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**ABSTRACT**

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 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.

So, Clavien-Dindo classification is the simplest way of reporting all complications. It allows us 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. Our main aim of study is to test the usefulness of Clavien-Dindo classification in patient undergoing the abdominal surgery.

A total of 100 cases diagnosed as abdominal pathology admitted in general surgical ward of JSS 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.

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.

### KEYWORDS

#### 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.<sup>2</sup>

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.<sup>5</sup>

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.<sup>4</sup>

In this study Clavien–Dindo classification has been used for as-

essment of postsurgical 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!<sup>6</sup>

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.

Clavien-Dindo classification of surgical complications

Grades	Definition
Grade I:	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions. Acceptable therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside
Grade II:	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included
Grade III:	Requiring surgical, endoscopic or radiological intervention
Grade III-a:	Intervention not under general Anaesthesia
Grade III-b:	Intervention under general Anaesthesia
Grade IV:	Life-threatening complication (including CNS complications) requiring ICU/ICU-management
Grade IV-a:	Single organ dysfunction (including dialysis)

Grade IV-b:	Multi organ dysfunction
Grade V:	Death of a patient
suffix D is added if patient had permanent disability at the time of discharge	

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.<sup>3</sup>

**METHODS AND DATA;**

All cases admitted between October 2013 to October 2014 under General surgery department of JSS HOSPITAL for major elective 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,
- Cholecystectomy, choledocholithotomy.
  - Whipples procedure and other pancreatic surgeries.
  - Gastrointestinal surgeries
  - Transhiatal esophagectomy
  - Spleenectomy
  - Nephrectomy, Nephrolithomy and Uretrolithotomy.

**EXCLUSION CRITERIA:**

- Previously operated abdominal surgery.
- Pregnancy with surgical problems.
- 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 postsurgical 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 Lifethreatening 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

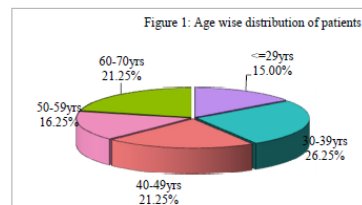
the respective grade of complication. This label indicates the need for a follow-up to fully evaluate the complication.

**RESULTS**

A total of 100 cases diagnosed as abdominal pathology admitted in general surgical ward of JSS 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: Age incidence:**

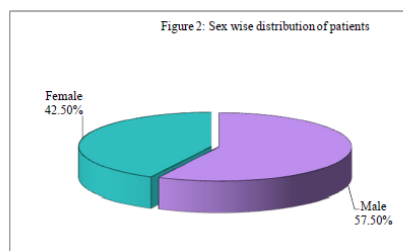
Age groups	No of patients	% of patients
<=29yrs	12	15.0
30-39yrs	21	26.3
40-49yrs	17	21.3
50-59yrs	13	16.3
60-70yrs	17	21.3
<b>Total</b>	<b>80</b>	<b>100.0</b>
<b>Mean</b>	<b>43.78</b>	



Ages between 30-39 years were the most common in our present study. out of 80 cases 21(26.25%) were from this group. Next common age group were 40-49 years and 60-70 years each being 17(21.25%) cases followed by 50-59 years age group, which constituted 13(16.25%) cases then <=29 years age group constituting 12(15%) cases.

**Table 2: Sex wise distribution of patients**

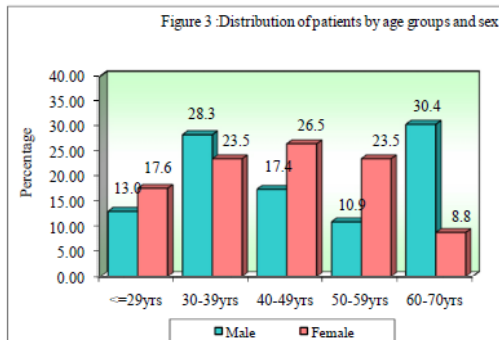
Sex	No of patients	% of patients
Male	46	57.5
Female	34	42.5
<b>Total</b>	<b>80</b>	<b>100.0</b>



Out of 80 cases studied, there were 46 (57.5%) male patients and 34(42.50%) female patients in this study male were predominate group.

**Table 3: Distribution of patients by age groups and sex**

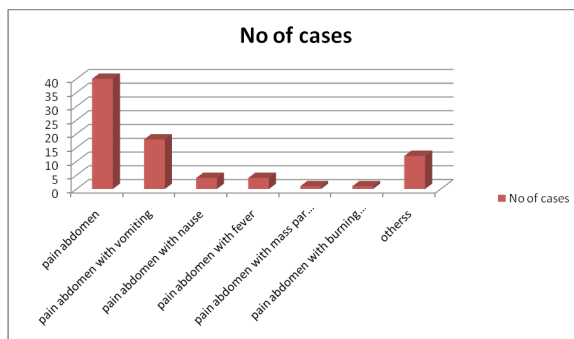
Age groups	Male	%	Female	%	Total	%
≤29yrs	6	13.0	6	17.6	12	15.0
30-39yrs	13	28.3	8	23.5	21	26.3
40-49yrs	8	17.4	9	26.5	17	21.3
50-59yrs	5	10.9	8	23.5	13	16.3
60-70yrs	14	30.4	3	8.8	17	21.3
Total	46	100.0	34	100.0	80	100.0
Mean	45.89		40.91		43.78	
SD	15.03		11.95		13.95	



In present study ,Among male most common were 60-70 year age group constituting 14(17.50%) cases followed by 30-39 year age group about 13(16.25%) cases,40-49 year age group 8(10%) cases, ≤29 year age group 6 (7.5%) cases and 50-59 year age group 5 (6.25%) cases respectively. Among female most common were 40-49 year age group consisting of 9(11.25%) cases followed by 30-39 year and 50-59 years age group each constitutes of 8 (10%) cases, ≤29 year age group of 6(7.5%) cases and 60-70 year age group of 3 (3.75%) cases respectively.

**Table 4 : 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%

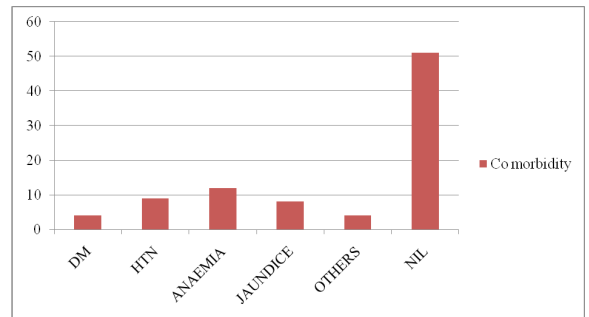


In our present study, out of 80 cases, 40 cases presented with only pain abdomen,18 cases presented with pain abdomen with vomiting,4 cases presented with pain abdomen with nausea,4 cases presented with pain abdomen with fever,1 case presented with pain abdomen with mass per abdomen,1 case presented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

and rest 12 cases presented with other symptoms.

**Table 5 : comorbidities of cases.**

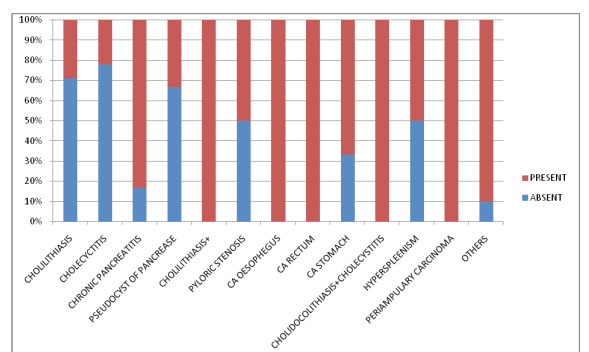
COMORBIDITY	No of cases	Percentage
DM	4	5
HTN	9	11.25
ANAEMIA	12	15
JAUNDICE	8	10
OTHERS	4	5
ABSENT	49	61.25



In our study out of 80 only 31 cases(38.75%) had comorbidities. Among which diabetes mellitus found in 4 cases(5%), 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 6 : Association between complications and diagnosis**

Diagnosis	Complication absent	%	Complications present	%	Total	%
CHOLELITHIASIS	17	70.9	7	29.1	24	30.0
CHOLECYSTITIS	7	77.7	2	22.2	9	11.25
CHRONIC PANCREATITIS	1	16.7	5	83.3	6	7.5
PSEUDOCYST OF PANCREAS	4	66.7	2	33.3	6	7.5
CHOLELITHIASIS+CHOLIDOCOLITHIASIS	0	00	5	100.0	5	6.25
PYLORIC STENOSIS	2	50.0	2	50.0	4	5.0
CA OESOPHEGUS	0	00	3	100	3	3.75
CA RECTUM	0	00	4	100	4	5.0
CA STOMACH	1	33.3	2	66.7	3	3.75
CHOLIDOCOLITHIASIS+COLECYSTITIS	0	00	2	100.0	2	2.5
HYPERSPLENISM	1	50.0	1	50.0	2	2.5
PERIAMPULARY CARCINOMA	0	00	2	100.0	2	2.5
OTHERS	1	10	9	90.0	10	12.5
TOTAL	34		46		80	100.0

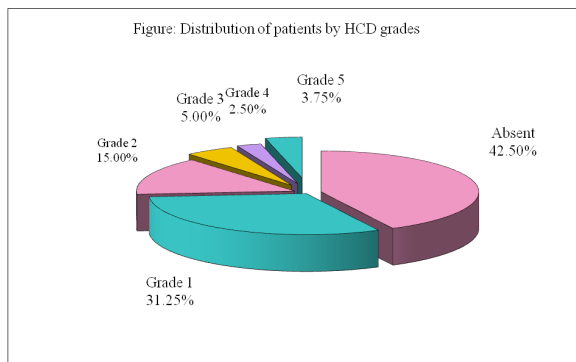


In our present study, out of 80 cases,24 cases were cholelithiasis cases among which 17 were free of complications and

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 pancreas 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 periamputary carcinoma and both developed complications.10 cases were of other diagnosis among which 9 cases developed complications and 1 case was free of complications.

**Table 10: Distribution of patients by Highest Clavin-Dindo(HCD) grades of complications.**

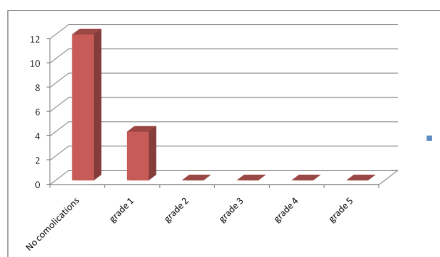
Highest Clavin-Dindo grades	No of patients	% of patients
Absent	34	42.5
Grade 1	25	31.25
Grade 2	12	15.0
Grade 3	4	5.0
Grade 4	2	2.5
Grade 5	3	3.75
Total	80	100.0



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 12:Complications of Laparoscopic cholecystectomy**

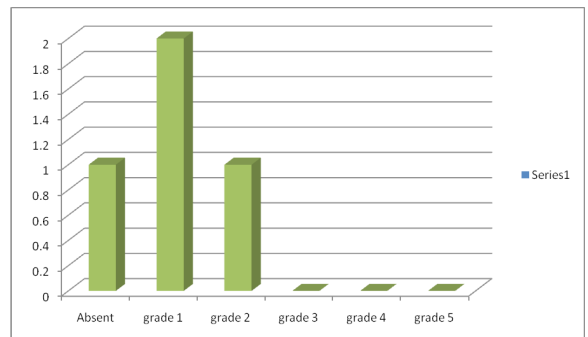
Complications	No of cases	Percentage
No complications	12	75%
Grade 1	4	25%
Grade 2	0	0
Grade 3	0	0
Grade 4	0	0
Grade 5	0	0
Total	16	100



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.

**Table13:Complications of Distal Gastrectomy**

	No of cases	Percentage
No complications	1	25%
Grade 1	2	50%
Grade2	1	25%
Grade 3	0	0
Grade 4	0	0
Grade 5	0	0
Total	4	



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.

**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<sup>1</sup>; 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.

**DISCUSSION**

To our knowledge, this is the first prospective study evaluating the usefulness of the Clavin-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, 8, 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 litera-

ture, the lack of a stratified grading system for complications after surgery has not allowed proper evaluation of the surgical outcome.

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 complicated patients required management in the ICU or interventional treatment.

Patients with a normal postoperative course (i.e. those with no complications) had a significantly shorter hospital stay than 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 treatment.

In 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. 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.

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