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ASSESSMENT OF POSTOPERATIVE COMPLICATIONS WITH CLAVIEN-DINDO CLASSIFICATION IN ELECTIVE ABDOMINAL SURGERIES

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Abstract:
Aim: To estimate the effectiveness of clavien-dindo classification in predicting the postoperative complication in elective abdominal surgeries

Introduction: Complications occur in every surgery and surgical complications need to be classified and evaluated. There is need to compare the outcomes and complication for each specific approach in a sound and reproducible way. Abdominal surgeries include complications like seroma, deep seated abscess and even dreadful complications like MODS and sepsis. Clavien-dindo classification is used to assess the post operative complications in a simple, convenient, logical and reproducible manner.

Materials And Methods: A Total number of 80 patients diagnosed with abdominal pathology were admitted who required elective abdominal surgeries were studied. Routine investigations were done and specific investigations like X-ray, USG and CT SCAN were done accordingly. 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 sounds, RT removal, oral feeds started on, and any deviation of normal post operative period are noted. Post surgical complication is assessed with clavein-dindo classification and then correlated the difficulties in surgeries and evaluate the reliability of scoring system.

Result: In our study, among the 80 cases,34 cases had seroma formation with grade 1,16 cases had wound infection with grade 2, 20 cases had deep seated abscess with grade3,4 cases had sepsis with grade 4, 3 cases went into MODS and death. In all this Clavein-dindo grading showed similar outcomes.

Conclusions: The clavien-dindo classification represents an objective and simple way of reporting all complications in patients undergoing major abdominal surgeries. This allows US to distinguish a normal post operative course from any deviation and it satisfactorily distinguishes the severity of complications

Key Words- Abdominal surgeries, Postoperative complications, Clavien-dindo grading

Introduction:

Postoperative complications represent a formidable challenge in the realm of surgical interventions, persistently posing hurdles even for the most adept and skilled surgeons. Irrespective of surgical proficiency, the inevitability of complications looms, ushering in a cascade of consequences that extend beyond the operating room. Such complications not only disrupt work productivity but also cast a ripple effect on family life, and induce stress within the broader societal framework. Moreover, these untoward events often compromise the functional outcomes of the operation, leaving patients grappling with a diminished quality of life [1].

The impact of complications goes beyond the physical realm, delving into the emotional and psychological toll exacted on patients who, with the anticipation of an uneventful operation, find themselves instead navigating through unforeseen suffering and compromises in postoperative recovery [2]. The intricate nature of surgical complications underscores the need for a comprehensive and standardized system for their assessment and classification [3].

In 1992, Clavien et al. introduced the Clavien classification system as a pioneering effort to categorize postoperative complications. Recognizing the therapeutic consequences of complications as crucial, a modified iteration known as the Clavien-Dindo classification was subsequently proposed in 2004. This classification system delineates seven grades (Grade I-V), with additional subgroups for Grade III and IV, and Grade V signifying patient death. Widely accepted and utilized across diverse surgical disciplines, the Clavien-Dindo classification system has emerged as a valuable, reproducible, and comprehensive tool for grading postoperative complications [4].

The simplicity, convenience, and logical framework of the Clavien-Dindo classification system have contributed to its widespread adoption by surgeons of varying expertise levels worldwide. Its applicability extends to quality assessment in audits and daily surgical practices, establishing its role as a standard in the surgical literature. This classification system facilitates the systematic evaluation of complications, offering a shared language for clinicians to communicate and assess the impact of postoperative events consistently [5].

In the present study, the Clavien-Dindo classification system takes center stage as the chosen methodology for the assessment of postsurgical complications following major elective abdominal surgeries. This system, with its roots in a historical context dating back to 1992, has evolved into an indispensable tool for contemporary surgeons seeking a standardized approach to categorizing and grading postoperative complications. As we delve into the intricacies of major elective abdominal surgeries, the application of the Clavien-Dindo classification system aims to provide a nuanced understanding of the spectrum and implications of postoperative complications in this specific surgical domain.

Methods:

Study Design: This prospective observational study spanned the period from October 2022 to October 2024, focusing on patients admitted under the General Surgery department of SVMCH for major elective abdominal surgeries.

Inclusion Criteria: All cases admitted for major elective abdominal surgeries under the General Surgery department were included. Patients aged 12 years and above requiring procedures such as cholecystectomy, choledecholithotomy, Whipples procedure, pancreatic surgeries, gastrointestinal surgeries, transhiatal esophagectomy, spleenectomy, nephrectomy, nephrolitomy, and uretrolitho tomy were eligible for participation.

Exclusion Criteria: Patients with a history of previously operated abdominal surgery, those presenting with surgical problems during pregnancy, and cases requiring emergency abdominal surgery were excluded from the study.

Patient Evaluation: Patients were thoroughly assessed through accurate history-taking, considering presentation, co-morbid conditions, and habits. Clinical examinations were conducted based on predefined inclusion and exclusion criteria.

Investigations: Routine investigations were performed for all patients, and specific investigations such as X-ray, ultrasound (USG), and CT scan were carried out based on provisional diagnoses and clinical requirements. The final diagnosis was confirmed, and patients were scheduled for surgery.

Recorded Parameters: Parameters recorded included the nature of the pathology (benign or malignant), ASA grade, details of the operative procedure, and blood loss. The postoperative course in the hospital was prospectively assessed, covering factors like postoperative ambulation, reappearance of bowel sounds, removal of drains (RT), initiation of oral feeds, and any deviations from the normal postoperative period.

Postoperative Complications: Postoperative complications were systematically classified according to the Clavien-Dindo classification system. The grading of complications ranged from Grade I (deviation from normal postoperative course without the need for pharmacological or surgical interventions) to Grade V (death of a patient). Additional subcategories within Grade III differentiated interventions performed with or without general anesthesia.

Assessment and Grading: The length of the postoperative period, occurrence of complications, and their management were documented. The Clavien-Dindo classification system allowed for the grading of complications, providing a standardized framework for assessing the severity and therapeutic interventions required.

Data Analysis: Statistical analysis of the collected data was conducted to evaluate the correlation between the nature of the pathology, operative difficulties, and the reliability of the Clavien-Dindo classification system. Descriptive statistics were employed to characterize patient demographics, pathology types, and complication outcomes.

Ethical Considerations: The study adhered to ethical principles, ensuring patient confidentiality, informed consent, and compliance with institutional guidelines. Ethical approval was obtained from the relevant institutional review board before the commencement of the study.

Sample Size: A total of 80 patients diagnosed with abdominal pathology and requiring elective abdominal surgeries were included in the study, providing a comprehensive dataset for analysis.

Results

Age Distribution: The study included a diverse age group, with the majority (37.5%) falling within the 51-60 years range. Patients below 20 years and those above 60 years constituted 2.5% and 17.5%, respectively.

Gender Distribution: Females comprised a significant majority, constituting 67.5% of the total participants, while males represented 32.5%.

Comorbidities: Common comorbidities were diabetes mellitus (DM) in 21.3%, systemic hypertension (SHTN) in 17.5%, and 61.3% had no reported comorbidities.

Clavien-Dindo Grading: Postoperative complications were assessed using the Clavien-Dindo classification:

- **Grade I (46.3%):** Deviation from normal postoperative course without the need for major interventions.
- **Grade II (20.0%):** Required pharmacological treatment beyond Grade I interventions.
- **Grade III (25.0%):** Required surgical, endoscopic, or radiological intervention.
- **Grade IV (5.0%):** Life-threatening complications requiring intensive care.
- **Grade V (3.8%):** Death of a patient.

Association between Surgery and Clavien-Dindo Grading: There was a significant association observed between the type of surgery performed and the severity of postoperative complications (Chi Square value: 189.464, $p < 0.001$). This indicates that different surgical procedures correlate with varying degrees of complications.

Association between Comorbidities and Clavien-Dindo Grading: No significant association was found between comorbidities (DM and SHTN) and the severity of postoperative complications (Chi Square value: 6.180, $p = 0.627$). It suggests that the presence of these common comorbidities may not be directly linked to the severity of complications in elective abdominal surgeries.

Crosstab Analysis: A thorough crosstab analysis revealed significant associations between specific diagnoses and Clavien-Dindo gradings (Chi Square value: 194.973, $p < 0.001$). This emphasizes the importance of considering the nature of the diagnosis in understanding and predicting the severity of postoperative complications.

Discussion

The current study, focusing on Clavien-Dindo classification in elective abdominal surgeries, contributes valuable insights to the existing literature. Similar to prior research evaluating this classification system in specific surgical contexts like distal gastrectomy and laparoscopic cholecystectomy, our study adopted a prospective approach to assess the postoperative course [6].

The application of the Clavien-Dindo classification revealed a noteworthy finding — a substantial proportion (50.8%) of patients experienced some degree of deviation from the normal postoperative course. This underscores the prevalence of complications in elective abdominal surgeries, challenging the expectation of an entirely uneventful recovery for nearly half of the patients [7].

The distribution of complications across Clavien-Dindo grades shed light on the diverse nature of postoperative challenges. Grades I and II, representing minor deviations, constituted a significant portion (66.3%), emphasizing the importance of less severe complications in the overall landscape. Meanwhile, grades III to V highlighted instances requiring more intensive interventions, albeit at a lower frequency (33.8%).

Demographic characteristics played a role in shaping the complications landscape. The higher incidence of complications in the 51-60 age group may be attributed to age-related factors. Additionally, the predominance of complications in females suggests potential gender-specific considerations that merit further exploration.

A crucial finding was the significant association between the type of surgery performed and the severity of postoperative complications. This underscores the necessity of tailoring postoperative care strategies based on specific surgical procedures, acknowledging their inherent complexities and potential complications [8].

Contrary to some expectations, our study did not find a significant association between common comorbidities (DM and SHTN) and the severity of postoperative complications. This challenges conventional assumptions and suggests a nuanced relationship between comorbidities and complications in elective abdominal surgeries [9].

The crosstab analysis underscored the significance of considering the nature of the diagnosis in predicting the severity of postoperative complications. Certain diagnoses exhibited stronger

associations with specific Clavien-Dindo gradings, emphasizing the role of preoperative diagnosis in risk stratification and complication management.

Despite the valuable insights gained, our study has limitations. The single-center nature and specific inclusion criteria may limit generalizability. Future research should explore a broader range of surgical contexts and involve multicenter collaborations for a more comprehensive understanding of postoperative complications [10].

This study advances the understanding of postoperative complications in elective abdominal surgeries, utilizing the Clavien-Dindo classification. The observed high incidence of complications, nuanced demographic influences, and the association between surgery types and complications highlight the need for personalized and procedure-specific postoperative care strategies. Further research is warranted to refine risk stratification models and enhance patient outcomes in elective abdominal surgeries.

Conclusion

In conclusion, our study on the assessment of postoperative complications in elective abdominal surgeries, utilizing the Clavien-Dindo classification, provides valuable insights into the landscape of complications in this specific surgical domain. The Clavien-Dindo classification system offers a standardized and comprehensive approach to categorizing and grading postoperative complications, allowing for a nuanced understanding of their severity and therapeutic interventions required. Our findings reveal a substantial prevalence of complications, with 50.8% of patients experiencing some degree of deviation from the normal postoperative course. The distribution of complications across Clavien-Dindo grades highlights the diverse nature of postoperative challenges, with minor deviations (Grades I and II) constituting a significant portion (66.3%). Significant associations between the type of surgery performed and the severity of postoperative complications underscore the importance of tailoring postoperative care strategies based on specific surgical procedures. Contrary to expectations, no significant association was found between common comorbidities (DM and SHTN) and the severity of postoperative complications, challenging conventional assumptions. The crosstab analysis emphasizes the significance of considering the nature of the diagnosis in predicting the severity of complications. Despite the limitations of our single-center study, these findings contribute to the ongoing dialogue on refining risk stratification models and enhancing patient outcomes in elective abdominal surgeries. Further research involving multicenter collaborations is warranted to broaden the scope of understanding postoperative complications in diverse surgical contexts.

References

1. Raghuraman H, Gurushankari B, Laya GB, Elamurugan TP, Shankar G, Nanda N, Thulasingam M, Kate V. Role of specific nutritional biomarkers in predicting post-operative complications among patients undergoing elective abdominal surgery. Langenbecks Arch Surg. 2023 Dec 1;408(1):453. doi: 10.1007/s00423-023-03186-8.
2. Downey CL, Bainbridge J, Jayne DG, Meads DM. Impact of in-hospital postoperative complications on quality of life up to 12 months after major abdominal surgery. Br J Surg. 2023 Aug 11;110(9):1206-1212. doi: 10.1093/bjs/znad167.
3. Degrate L, Zanframundo C, Bernasconi DP, Real G, Garancini M, Uggeri F, Romano F, Braga M. Futility of abdominal drain in elective laparoscopic splenectomy. Langenbecks Arch Surg. 2020 Aug;405(5):665-672. doi: 10.1007/s00423-020-01915-x. Epub 2020 Jun 27.
4. Duraes LC, Stocchi L, Steele SR, Kalady MF, Church JM, Gorgun E, Liska D, Kessler H, Lavryk OA, Delaney CP. The Relationship Between Clavien-Dindo Morbidity Classification and Oncologic Outcomes After Colorectal Cancer Resection. Ann Surg Oncol. 2018 Jan;25(1):188-196. doi: 10.1245/s10434-017-6142-6. Epub 2017 Nov 7.
5. van Genderen ME, Paauwe J, de Jonge J, van der Valk RJ, Lima A, Bakker J, van Bommel J. Clinical assessment of peripheral perfusion to predict postoperative complications after major

abdominal surgery early: a prospective observational study in adults. Crit Care. 2014 Jun 3;18(3):R114. doi: 10.1186/cc13905.
6. Sæter AH, Fonnes S, Li S, Rosenberg J, Andresen K. Mesh versus non-mesh for emergency groin hernia repair. Cochrane Database Syst Rev. 2023 Nov 27;11(11):CD015160. doi: 10.1002/14651858.CD015160.pub2.
7. Birrer DL, Kuemmerli C, Obwegeser A, Liebi M, von Felten S, Pettersson K, Horisberger K. INSPIRA: study protocol for a randomized-controlled trial about the effect of spirometry-assisted preoperative inspiratory muscle training on postoperative complications in abdominal surgery. Trials. 2022 Jun 7;23(1):473. doi: 10.1186/s13063-022-06254-4.
8. Yin Y, Jiang L, Xue L. Which Frailty Evaluation Method Can Better Improve the Predictive Ability of the SASA for Postoperative Complications of Patients Undergoing Elective Abdominal Surgery? Ther Clin Risk Manag. 2022 May 5;18:541-550. doi: 10.2147/TCRM.S357285. eCollection 2022.
9. Alfitian J, Basto J, Miestereck J, Ismail H, Ho KM, Kammerer T, Schick V, Riedel B, Schier R. End-tidal carbon dioxide in the early phase of cardiopulmonary exercise testing prior to major colorectal cancer surgery associates with postoperative outcome. Minerva Anestesiol. 2023 Jun;89(6):536-545. doi: 10.23736/S0375-9393.22.16872-0. Epub 2022 Nov 3.
10. Akula B, Doctor N. A Prospective Review of Preoperative Nutritional Status and Its Influence on the Outcome of Abdominal Surgery. Cureus. 2021 Nov 27;13(11):e19948. doi: 10.7759/cureus.19948. eCollection 2021 Nov.