

## Complications Associated With General Surgical Care: A Prospective Study

Dr. Vipin Raj\*

Senior Resident Department of Surgery, Shkm, GMC, Mewat, Harayana, India

### **Original Research Article**

**\*Corresponding author**

*Dr. Vipin Raj*

#### **Article History**

*Received: 11.05.2018*

*Accepted: 22.05.2018*

*Published: 30.05.2018*

#### **DOI:**

10.36347/sjams.2018.v06i05.029



**Abstract:** Exact figures which are needed for assessing surgical complications which are generally lacking leading to inaccurate assessment of morbidity and mortality in patients. In our study we prospectively collected and analyzed incidence and nature of complications associated with general surgery services at our Centre and formulated suitable measures needed for its prevention in future. Our study was a single observer prospective study and was done in all patients that were admitted and operated for any major and minor surgical procedure at our Centre in whom any sort of complications had occurred. . A total of 50 patients were included in our study over a period of 1 September 2017 to 31 marches 2018. In our study most common complications that occurred in patients is post-operative superficial surgical site infection that causes purulent discharge in 19(38%) patients followed by pulmonary complications, fatal complications in 1(2%) patient, life threatening complications in 4(8%) patients. Moderate and trivial complications accounted in 24(48%) and 21(42%) patients respectively. Hospitization and any sort of surgical procedure carries inbuilt risk to patients. Prevention of error is an important link between clinical quality improvement and risk management, including prevention of legal actions.

**Keyword:** complications, surgical care, surgical errors.

### **INTRODUCTION**

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 complications associated with surgical care procedures which are generally preventable problems but lack of aggressive and timely management contributes to increased mortality and morbidity and increased health care expenses and burden on society [1–13].

Complications generally represent flaws in surgical care [3], errors are not in-avoidable [14]. Interventions that are meant to reduce such problems needs data regarding incidence and nature of complications [12,13]. Audits, research and hospital reimbursement depend on accurate identification and coding of clinical diagnoses [15]. Exact figures are needed for assessing surgical complications which are generally lacking leading to inaccurate assessment of morbidity and mortality in patients [16, 17-20].

A recent institute of medicine (IOM) report has suggested that as many as 98 000 patients die annually in the United States as a result of medical error [21]. This report has been criticized because of its reliance on retrospective review of medical records by outside reviewers several years after the hospital admissions 22-24. Some [25, 26] have suggested that the report significantly overestimates the rate of medical error. Studies undertaken so far does not reliably differentiate between errors due to flaws in medical treatment or due to patient and disease factors

In our study we prospectively collected and analyzed incidence and nature of complications associated with general surgery services at our Centre and formulated suitable measures needed for its prevention in future.

### **MATERIALS AND METHODS**

Our study was a single observer prospective study and was done in all patients that were admitted and operated for any major and minor surgical procedure at our Centre. Patients were followed for over a 2-month period, through daily chart reviews, daily ward rounds by junior and senior members of surgical team and by telephonic and follow up consultation. A total of 50 patients were included in our study over a period of 1 September 2017 to 31 march 2018.

In our study to some extent the definitions of complications had a subjective component and vary between health care professionals. The parameters that were taken in consideration included demographic

information, admission and discharge data, operative interventions (if any), and all sort of major and minor complications. The American Society of Anesthesiologists (ASA) preoperative risk scores were recorded from the anesthetists' notes. Each adverse event was then classified as directly related to the operation (e.g. Intraoperative hemorrhage), indirectly related to the operation (e.g., urinary infection due to catheterization) or unrelated (e.g., medication error). Each complication was allocated to one of the following categories: death; surgical incision; infection; hemorrhage; related to a catheter or drain; a systemic disorder of respiratory, cardiovascular, gastrointestinal, genitourinary or central nervous system origin; medication error; or miscellaneous.

The severity of a complication was defined as "fatal" if no other cause of death could be ascertained; life threatening if life support (i.e., hemodialysis, mechanical ventilation, cardiac pacing, hemodynamic support) or emergency surgery was required to resuscitate the patient; moderate if other therapy was required (e.g., intravenous antibiotics); or trivial if it affected only physical or emotional comfort. Error was defined as an unintended act of omission or commission, or an act that did not achieve its intended immediate outcome. Each error was classified as an error in diagnosis, treatment, communication, or equipment/ systems failure.

We recorded whether each complication was noted in the progress notes of the patient's chart, and if so by whom (physician or nurse, or both), whether it was reported at weekly morbidity and mortality rounds and whether it was recorded on the face sheet of the final medical record. It is a requirement of our general surgery service that all deaths and complications to be presented at morbidity and mortality rounds. The face sheet documents admission diagnoses, operative

procedures and complications of illness and therapies that occur in hospital. Diagnoses and events are written on the face sheet by physicians and further completed and coded by health records personnel.

Complication were defined as any unintended, adverse outcome that occurred after a surgical procedure, was not caused by the underlying disease and resulted in impaired health. Impaired health broadly included abnormal physical and mental well-being.

Complications were classified into following categories

- Fatal- if no other cause of patient mortality could be found.
- Life threatening- if life support (i.e., hemodialysis, mechanical ventilation,

Cardiac Pacing, hemodynamic support) needed to resuscitate the patient.

- Moderate- if other therapy was required (e.g., intravenous antibiotics).
- Trivial- if it affected only physical or emotional comfort.

**Inclusion criteria**

All patients that were admitted and operated for any major and minor surgical procedure at our Centre in whom any sort of complications had occurred.

**Exclusion criteria**

- Patients refusing to be part of study.
- Patients referred to other center.

**OBSERVATIONS AND RESULTS**

**Table-1: Incidence, Nature and Complications**

Serial number	Type of complication	Number of patients	Percentage
1	Respiratory	13	26%
2	Surgical wound	19	38%
3	Genitourinary	4	8%
4	Catheter drain	4	8%
5	Cardiovascular	1	2%
6	Central nervous system	2	4%
7	Sepsis	2	4%
8	Hemorrhage	4	8%
9	Death	1	2%

**Table-2: classification of complications based upon severity**

Serial number	Type of complication	Number of patents	Percentage
1	Fatal	1	2%
2	Life threatening	4	8%
3	Moderate	24	48%
4	Trivial	21	42%

**Table-3: Incidence of types of Error**

Serial number	Type of error	Number of patients	Percentage
1	Misdiagnosis	3	6%
2	Late diagnosis	26	52%
3	Incorrect treatment plan	2	4%
4	Delay in treatment	11	22%
5	Error in monitoring of patients	7	14%
6	Technical error due to machinery failure	1	2%

**Table-4: Documentation of complications in patient's permanent medical record**

Serial number	Documentation in permanent medical record	Number of patients	Percentage
1	By attending doctor	41	82%
2	By staff nurse	7	14%
3	Missed	2	4%



**Image-1: midline post laparotomy scar with wound dehiscence**



**Image-2: soft tissue infection of scrotum showing skin loss**



**Image-3: Healed post mastectomy scar showing midline skin gap**

## DISCUSSION

In our study most common complications that occurred in patients is post-operative superficial surgical site infection that causes purulent discharge in 19(38%) patients followed by pulmonary complications like atelectasis, pleural effusion in a total of 13 (26%) patients. Genitourinary (eg UTI), Catheter drain related complications (eg purulent content from drain) Cardiovascular, Central nervous system, Sepsis Hemorrhage and mortality accounted 4(8%), 4(8%), 1(2%), 2(4%), 2(4%), 4(8%) 1(2%) patients respectively.

In our study we found fatal complications in 1(2%) patient, life threatening complications that could have been resulted in patient death accounted for in 4(8%) patients. Moderate and trivial complications accounted a majority of complications compromising in 24(48%) and 21(42%) patients respectively.

Late diagnosis in making definite diagnosis for our patient was a major flaw found in our study in a total of 26 patient followed by delay in initiating treatment in 11 patients, error in monitoring of patient during critical care was found in 7 patients while misdiagnosis, incorrect treatment plan which was not related to disease, technical error due to machinery failure and instruments failure was present in 3, 2, 1 patients.

Majority of complications related to patient's progress chart was recorded and documented by attending doctor which was found in 41 patients and by staff nurse complications were found in 7 patients. Complications were missed in 2 patients despite daily ward rounds.

Early in the 20th century, Codman [27] asserted that medical and surgical results should be monitored. This objective can be met most economically by the concentrating on complications that occurs in day to surgical practice. Incidence of

complications were found to be high but difficult to compare with groups due to because of a lack of uniform definitions and patient populations<sup>28</sup>, for example, in one study of general medical patients, a 5% complication rate was found[29], in contrast to another study that reported a 36% complication rate in a similar patient population. Similar problem was in our study due to lack of uniform population and small sample group. Our finding of so many complications may be explained by the prospective nature of this study; our intense daily investigation for all types of complications. We do not believe that the incidence of complications implies substandard care as majority of those complications were related to the operation only indirectly, having occurred remote from the operative site after operation, such as postoperative pneumonia in a patient with chronic lung disease. The influence of underlying conditions was reflected by the higher incidence of postoperative complications occurring in patients with higher preoperative American Society of Anesthesiologists (ASA) Scores. Given the complex nature of medical practice and paucity of systems designed to prevent error, a high error rate is disturbing but not surprising.

## CONCLUSION

Hospitalization and any sort of surgical procedure carries inbuilt risk to patients. Despite the dictum: "first, do no harm," there is a high prevalence of complications. Preventing these complications is important to improve the quality of care and reduce costs. To improve our ability to monitor and prevent complications we must develop systems that identify and record them more efficiently and take effective and aggressive measures to prevent them. Prevention of error is an important link between clinical quality improvement and risk management, including prevention of legal actions. Identifying the patients at high risk for complications should provide a focus for improvement of efforts.

REFERENCES

1. Couch NP, Tilney NL, Rayner AA, Moore FD. The high cost of low-frequency events: the anatomy and economics of surgical mishaps. *New England Journal of Medicine*. 1981 Mar 12;304(11):634-7.
2. Leape LL, Brennan TA, Laird N, Lawthers AG, Localio AR, Barnes BA, Hebert L, Newhouse JP, Weiler PC, Hiatt H. The nature of adverse events in hospitalized patients: results of the Harvard Medical Practice Study II. *New England journal of medicine*. 1991 Feb 7;324(6):377-84.
3. Leape LL, Lawthers AG, Brennan TA, Johnson WG. Preventing medical in-jury. *Qual Rev Bull* 1993;19:141-9.
4. Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, Newhouse JP, Weiler PC, Hiatt HH. Incidence of adverse events and negligence in hospitalized patients: results of the Harvard Medical Practice Study I. *New England journal of medicine*. 1991 Feb 7;324(6):370-6.
5. Bedell SE, Deitz DC, Leeman D, Delbanco TL. Incidence and characteristics of preventable iatrogenic cardiac arrests. *Jama*. 1991 Jun 5;265(21):2815-0.
6. Steel K, Gertman PM, Crescenzi C, Anderson J. Iatrogenic illness on a general medical service at a university hospital. *New England Journal of Medicine*. 1981 Mar 12;304(11):638-42.
7. Leape, L. L. (1994). Error in medicine. *JAMA-Journal of the American Medical Association-US Edition*, 272(23), 1851-1856.
8. Couch NP, Tilney NL, Moore FD. The cost of misadventures in colonic surgery: a model for the analysis of adverse outcomes in standard procedures. *The American Journal of Surgery*. 1978 May 1;135(5):641-6.
9. Dubois RW, Brook RH. Preventable deaths: who, how often, and why?. *Annals of Internal Medicine*. 1988 Oct 1;109(7):582-9.
10. Schimmel EM. Hazards of hospitalization. *Ann Intern Med* 1964;60:100-10.
11. McLamb JT, Huntley RR. The hazards of hospitalization. *South Med J* 1967;60:469-72.
12. Friedman M. Iatrogenic disease: addressing a growing epidemic. *Postgrad Med* 1982;71:128-9.
13. Barr DP. Hazards of modern diagnosis and therapy: the price we pay. *JAMA* 1965;159:1432-6
14. Persson A. Do House Officers Learn From Their Mistakes?. *JAMA*. 1991 Jul 24;266(4):512-.
15. Hsia DC, Ahern CA, Ritchie BP, Moscoe LM, Krushat WM. Medicare reimbursement accuracy under the prospective payment system, 1985 to 1988. *Jama*. 1992 Aug 19;268(7):896-9.
16. Clavien PA, Sanabria JR, Strasberg SM. Proposed classification of complications of surgery with examples of utility in cholecystectomy. *Surgery*. 1992 May;111(5):518-26.
17. Pomposelli JJ, Gupta SK, Zacharoulis DC, Landa R, Miller A, Nanda R. Surgical complication outcome (SCOUT) score: a new method to evaluate quality of care in vascular surgery. *Journal of vascular surgery*. 1997 Jun 1;25(6):1007-15.
18. Gawande AA, Thomas EJ, Zinner MJ, Brennan TA. The incidence and nature of surgical adverse events in Colorado and Utah in 1992. *Surgery*. 1999 Jul 1;126(1):66-75.
19. Veen MR, Lardenoye JW, Kastelein GW, Breslau PJ. Recording and classification of complications in a surgical practice. *The European journal of surgery*. 1999 Jan 1;165(5):421-4.
20. Pillai SB, Van Rij AM, Williams S, Thomson IA, Putterill MJ, Greig S. Complexity-and risk-adjusted model for measuring surgical outcome. *British journal of surgery*. 1999 Dec 1;86(12):1567-72.
21. Donaldson MS, Corrigan JM, Kohn LT, editors. *To err is human: building a safer health system*. National Academies Press; 2000 Apr 1.
22. Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, Newhouse JP, Weiler PC, Hiatt HH. Incidence of adverse events and negligence in hospitalized patients: results of the Harvard Medical Practice Study I. *New England journal of medicine*. 1991 Feb 7;324(6):370-6.
23. Leape LL, Brennan TA, Laird N, Lawthers AG, Localio AR, Barnes BA, Hebert L, Newhouse JP, Weiler PC, Hiatt H. The nature of adverse events in hospitalized patients: results of the Harvard Medical Practice Study II. *New England journal of medicine*. 1991 Feb 7;324(6):377-84.
24. Thomas EJ, Studdert DM, Burstin HR, Orav EJ, Zeena T, Williams EJ, Howard KM, Weiler PC, Brennan TA. Incidence and types of adverse events and negligent care in Utah and Colorado. *Medical care*. 2000 Mar 1;38(3):261-71.
25. McDonald CJ, Weiner M, Hui SL. Deaths due to medical errors are exaggerated in Institute of Medicine report. *Jama*. 2000 Jul 5;284(1):93-5.
26. Hayward RA, Hofer TP. Estimating hospital deaths due to medical errors: preventability is in the eye of the reviewer. *Jama*. 2001 Jul 25;286(4):415-20.
27. Codman EA. The product of a hospital. *Surg Gynecol Obstet* 1914;18:491-6
28. Fleming ST. Complications, adverse events, and iatrogenesis: classifications and quality of care measurement issues. *Clinical performance and quality health care*. 1996;4(3):137-47.
29. Lakshmanan MC, Hershey CO, Breslau D. Hospital admissions caused by iatrogenic disease. *Arch Intern Med*. 1986 Oct 1;146(10):1931-4.