

Study of early post-operative complications of major surgery in patients in tertiary care teaching hospital in Central India - A prospective observational study

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ABSTRACT

Background: Surgical complications can occur after any operation and will keep on occurring. Post-operative complication may be defined as any negative outcome as perceived by the surgeon or by the patient. It may occur intraoperatively, in the immediate post-operative period, or later on.

Materials and Methods: A prospective study of early post-operative complication in 100 patients, who underwent major surgery, was done in the department of surgery in a tertiary care teaching hospital, Indore. The present study was carried out prospectively with the following aims and objectives to study the incidence of early post-operative complications after major surgery and study the incidence of post-operative complications in relation to age, sex, and other factors which influence them.

Results: Incidence of post-operative complications is much higher in females 50%, but the incidence of mortality is equal 10%. The incidence of early post-operative complications is higher in patients undergoing emergency surgery (60%) as compared to patient of elective surgery (31.42%). It was evident that mortality in emergency group is higher (23.33%) than patient of elective surgery (4.2%).

Conclusion: Early post-operative complications after major surgery occurred in significant number and must be anticipated in time and proper measures instituted to control them. Incidence of early post-operative complications was significantly higher in emergency surgery than in elective surgery.

Key words: Elective surgery, emergency surgery, morbidity, mortality, post-operative complications, surgical complications

INTRODUCTION

The post-operative complications are always of concern to surgeons. The post-operative complications are of significance as many of them lead to prolonged disability and some end in death. Their recognition and management are surgeon's responsibility. Generally speaking, the majority of complications can be anticipated. Review of the experiences of large series of operative procedures provides a useful index of the frequency with which the various types of complications occur.

The knowledge enables the surgeons to institute measures before operation which reduce the hazard of surgical intervention. These pre-operative considerations include precision and accuracy in diagnosis, evaluation of associated diseases, and correction of abdominal stage whenever possible. Recognition of situation that cannot be improved is of utmost importance in the evaluation of the risk of an operation. The surgeon who develops good judgment in this vital area is better equipped to balance the patients' capacity to withstand the burden that surgery imposes

against the penalty that may be exacted by the natural course of the presenting conditions.^[1]

The morbidity of complication and the mortality rate associated with any major surgical procedure usually decrease as the frequency with which the operations performed increases. This reflects knowledge gained by all those who employ the procedure, providing that accurate records are kept and reports made so that what is observed and learned is well documented so that it can be communicated. In addition, clinical problems such as post-operative complications are today attacked from many approaches by many individuals capable of assisting in their solution.^[2,3]

For the purpose of description, the post-operative complications are divided into early and late. Early complications if neglected may be hazardous and increase hospitalization time and mortality in a given series of operations. But if they are known early and managed accordingly, will decrease the mortality and morbidity in postoperative phase. Therefore, the present study was carried out prospectively with the following aims and objectives:

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- a. To study the incidence of early post-operative complications after major surgery
- b. To study the incidence of post-operative complications in relation to age, sex, and other factors which influence them
- c. Correlation of post-operative complications with the nature of anesthesia, duration of operation, type of surgery, and in surgery above diaphragm or below diaphragm
- d. To study the incidence of mortality in early post-operative period and its relation to various factors such as age, sex, type of surgery, and other predisposing factors such as pre-operative health status and associated systemic diseases.

MATERIALS AND METHODS

A prospective study of early post-operative complication in 100 patients, who underwent major surgery, was done in the department of surgery in a tertiary care teaching hospital, Indore. Patients who underwent major surgery during the year 2014–2015 were taken for the study in the present series. Major surgery was considered when operation was done under anesthesia, where duration of surgery was prolonged and risk of complications was more or where the vital organ was operated on. Major surgeries are associated with an expected blood loss of >500mL, significant fluid shifts and typically, at least one night in hospital. It includes laparoscopic surgery (except cholecystectomy and tubal ligation); open resection of organs; large joint replacements; mastectomy with reconstruction; and spine, thoracic, vascular, or intracranial surgery.

Each case was studied under following heads from the available case records such as demographic data, presenting complaints, past illness, personal history, and general, local, and systemic examination findings. The study of investigations was done for the confirmation of diagnosis and screening of patients for associated diseases. A detailed study of operation notes for the type of operation, duration of operation, type of anesthesia, elective or emergency surgery, and any complications during operation or during recovery from anesthesia was noted. The appearance of complications was recorded in chronological order. The study was done correlating the various factors which influenced the mortality and morbidity in post-operative phase.

RESULTS

In the present study, 100 cases who underwent major surgery were included, of which 70 patients underwent elective surgery and 30 patients were operated in emergency. Of them, 80 were males and 20 were females. Of 100 cases, surgery below diaphragm was performed in 95 patients and above diaphragm was operated in 5 patients. Of 100 patients, complications occurred in 40 patients (40%) and the mortality was 10% of all operations [Table 1].

Table 1 shows that incidence of post-operative complications is much higher in females 50%, but the incidence of mortality is equal to 10%.

Table 2 shows that the incidence of post-operative complications is predominantly higher in patients below the age of 10 years

(80%) and patients above 51 years of age; similarly, mortality was high in patients under 10 years and above 51 years of age as compared to other age groups of patients.

Table 3 shows that incidence of post-operative complications is much higher in above diaphragm (60%) than in patients who underwent surgery below diaphragm (38.94%), and from the same table, it is also evident that the incidence of mortality is high in above diaphragm surgery (20%) than patients below diaphragm surgery (9.47%).

Table 4 shows that the incidence of early post-operative complications is higher in patients undergoing emergency surgery (60%) as compared to patient of elective surgery (31.42%). From Table 4, it is evident that mortality in emergency group is higher (23.33%) than patient of elective surgery (4.2%).

Table 1: Sex-wise distribution of surgical complications

Sex	Number of operation of total (%)	Number of complications (%)	Mortality (%)
Male	80 (80)	30 (37.5)	8 (10)
Female	20 (20)	10 (50)	2 (10)
Total	100 (100)	40 (40)	10 (10)

Table 2: Age-wise distribution of complications

Age - years	Number (%)	Complications (%)	Mortality (%)
0–10	5 (5)	4 (80)	3 (60)
11–20	13 (13)	4 (30.76)	-
21–30	20 (20)	4 (20)	1 (5)
31–40	16 (16)	5 (31.25)	1 (5)
41–50	21 (21)	8 (38.09)	2 (9.52)
51–60	15 (15)	8 (53.33)	1 (6.66)
61–70	8 (8)	6 (75)	2 (25)
>70	2 (2)	1 (50)	-
Total	100 (100)	40 (40)	10 (10)

Table 3: Type of surgery above or below the diaphragm

Type of surgery	Number of total (%)	Number of complications (%)	Mortality (%)
Above diaphragm	5 (5)	3 (60)	1 (20)
Below diaphragm	95 (95)	37 (38.94)	9 (9.47)
Total	100 (100)	40 (40)	10 (10)

Table 4: Type of surgery elective/emergency

Type of surgery	Number of total (%)	Number of complications (%)	Mortality (%)
Elective surgery	70 (70)	22 (31.42)	3 (4.28)
Emergency surgery	30 (30)	18 (60)	7 (23.33)
Total	100 (100)	40 (40)	10 (10)

Table 7 shows that the incidence of post-operative complications and mortality is higher in the patients who are associated with predisposing systemic disease.

Table 8 shows that post-operative complications are more in patient having systemic disease 72.72% as compared to patients who have no systemic disease 35.59% as well as it is evident that mortality is more in group of patients having systemic disease 27.27% and less in normal group of patients 7.8% [Figure 1].

Table 5: Distribution of cardiovascular, urinary, and wound complications in groups of major surgery elective/emergency

Complications	Number (%)
Cardiovascular complications	
Arrhythmias	1 (1)
Peripheral circulatory failure (other than hemorrhagic shock)	9 (9)
Hemorrhagic shock	2 (2)
Cardiac arrest	1 (1)
Total	14 (14)
Thrombophlebitis	6 (6)
Urinary complications	
Retention of urine	8 (8)
UTI	9 (9)
Uremia	1 (1)
Acute renal failure	1 (1)
Total	19 (19)
Wound complications	
Infection	13 (13)
Minor gaping	8 (8)
Burst abdomen	1 (1)
Total	22 (22)

UTI: Urinary tract infection

Table 6: Distribution of respiratory, gastrointestinal, and miscellaneous complications in groups of major surgery elective/emergency

Complications	Number (%)
Respiratory complications	
Pneumonia	7 (7)
Pleural effusion	2 (2)
Respiratory arrest	1 (1)
Pneumothorax	1 (1)
Total	11 (11)
Gastrointestinal complications	
Vomiting	6 (6)
Diarrhea	1 (1)
Peritonitis	2 (2)
Anastomotic leak	2 (2)
Fistulae	1 (1)
Total	12 (12)
Miscellaneous complications	
Toxemia and septicemia	5 (5)
Hyperpyrexia	1 (1)
Meningitis	1 (1)
Bed sores	1 (1)
Total	9 (9)

Table 9 shows that, in patients with hypertension, the incidence of post-operative complications is high 83.33%, whereas 33% had post-operative complications directly related to hypertension, and of them, 33% died indicating high mortality [Figure 1].

In patients with chronic lung disease, the incidence of post-operative complication was seen in 66.66%, whereas respiratory complications were present in 66% of these cases, the mortality was same as in hypertension that is 33% in patients with diabetes mellitus, high incidence of infection was observed (50%), but mortality in this group was nil.

Table 10 shows that post-operative complication and mortality are more in patients who are addicted as compared to the patients in whom there is no history of addiction.

Table 11 shows that the incidence of post-operative complication is significantly higher in patients with unsatisfactory health status (71.87%); similarly, the mortality is also significantly higher in the same group (21.87%), as compared with the morbidity and mortality of patients with satisfactory pre-operative health status (25% and 4.41% respectively) [Figure 2].

Table 12 shows that most of the patient (52.5%) developed single complication and two or more complications were seen in less number of patients. Table 12 also shows that there was high mortality (more than 50%) in patients who have more than one complication than in patients with single complication (9.5%).

DISCUSSION

Complications in surgery are always of concern to surgeon. There have been various studies on the different aspects of post-operative complications such as correlation of predisposing factors, risk groups of patients, relation to type of surgery and so on. The present study had 100 cases of major surgery for the assessment of incidence of early post-operative complications and their relation to various factors which influence the morbidity and

Table 7: Relation to predisposing systemic disease

Predisposing disease	Number of total (%)	Number of complications (%)	Mortality (%)
Present	11 (11)	8 (72.72)	3 (27.27)
Absent	89 (89)	32 (35.59)	7 (7.8)
Total	100 (100)	40 (40)	10 (10)

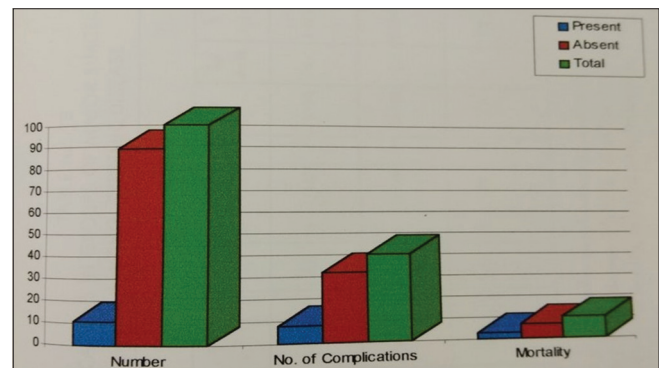


Figure 1: Predisposing systemic disease in relation to the incidence of complications and mortality

Table 8: Distribution of complications in groups of major surgery normal patients/patients having systemic disease

Presence or absence of systemic disease	Total cases	Complications								
		Total (%)	CVS (%)	Respiratory (%)	Urinary (%)	GIT (%)	Thrombophlebitis (%)	WC (%)	Miscellaneous (%)	Mortality (%)
Normal patient	89	32 (35.59)	9 (10.11)	7 (7.86)	13 (14.09)	8 (8.98)	4 (4.49)	15 (16.85)	6 (6.74)	7 (7.8)
Patient having systemic disease	11	8 (72.72)	5 (45.45)	4 (36.36)	6 (54.54)	4 (36.36)	2 (18.18)	7 (63.63)	3 (27.27)	3 (27.27)
Total	100	40 (40)	14 (14)	11 (11)	19 (19)	12 (12)	6 (6)	22 (22)	9 (9)	10 (10)

CVS: Cardiovascular system, GIR: Gastrointestinal tract, WC: Wound complications

Table 9: Predisposing systemic disease in relation to the incidence of complications and mortality

Disease	Number in 100 cases (%)	Complication directly related to disease (%)	Total complication (%)	Mortality (%)
Hypertension	6 (6)	2 (33)	5 (83.33)	2 (33.33)
Chronic lung disease	3 (3)	2 (66)	2 (66.66)	1 (33.33)
Diabetes mellitus	2 (2)	1 (50)	1 (50)	-
Total	11 (11)	5 (45.45)	8 (72.72)	3 (30)

Table 10: Complications in relation to addiction

Addiction	Number of the total (%)	Number of complications (%)	Mortality (%)
Present	13 (13)	7 (53.84)	3 (23.07)
Absent	87 (87)	33 (37.93)	7 (8.04)
Total	100 (100)	40 (40)	10 (10)

mortality. Of 100 patients subjected to major surgery, 70 (70%) underwent elective surgery and 30 (30%) had emergency surgery. Morbidity in major surgery during early post-operative phase was reported to be 47% by Simley and 40.9% by JAMA.^[4] In the present series, the incidence of early post-operative complications was 40%.

Age- and Sex-Wise Correlation

Szezepanski (1973) stated that the incidence of post-operative chest complications following major surgery is more in younger age group and also in old-age group.^[5] In the present series, the incidence of post-operative complications was high in very young and in age group above 50 years [Table 1].

Elective Versus Emergency

Incidence of early post-operative complication is high in patients who are subjected to surgery in emergency. Bhansali and Sethna reported the incidence of 59% post-operative complications in patients who underwent surgery for acute abdominal emergencies. They reported an incidence of 58.8% of early post-operative complications in patients who underwent emergency exploratory laparotomy. In the present series an incidence of 60% postoperative complications was observed in patients, which was much higher than the incidence of 31.42% for elective surgery group. Patients undergoing emergency surgery mostly had unsatisfactory health status. Dehydration and anemia were two most important factors to these added in some was toxemia and malnutrition.^[6,7]

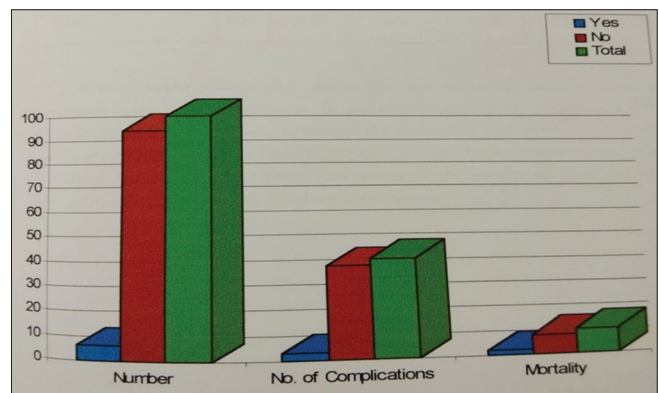


Figure 2: Complications in relation to previous major operations in the past

Cardiovascular Complications

Walsh *et al.* showed that there was considerable heterogeneity in the literature regarding cardiac monitoring, types of arrhythmias considered, and potential associations investigated, thus hindering interpretation.^[8] The available data suggest that new-onset arrhythmias affect about 7% of patients following major non-cardiothoracic surgery. These arrhythmias are often associated with other underlying complications.^[9-11] In the present series, one patient (1%) developed arrhythmia postoperatively because no patient had pre-existing myocardial disease.

Cardiac arrest constitutes a rare fatal complication of all occurring postoperatively. In the present series, one patient (1%) developed cardiac arrest postoperatively who died immediately.^[12-16] Various studies had reported an incidence of 0.8-4.5% of myocardial infarction (MI) in post-operative phase. The number of subjects undergoing major non-cardiac surgery who are at risk for perioperative MI is growing worldwide. It has been estimated that 500,000-900,000 patients suffer major perioperative cardiovascular complications every year, with consequent heavy, long-term prognostic implications and costs.

Table 11: Complications in relation to pre-operative general condition of patients

Pre-operative general condition	Number of the total (%)	Number of complications (%)	Mortality (%)
Satisfactory	68 (68)	17 (25)	3 (4.41)
Not satisfactory	32 (32)	23 (71.87)	7 (21.87)
Total	100 (100)	40 (40)	10 (10)

Table 12: Complications per patients and relation to mortality

Frequency of complication per patient	Number of 40 complicating patients (%)	Mortality (%)
Single complication	21 (52.5)	2 (9.5)
Two complications	6 (15)	1 (16.66)
Three complications	5 (12.5)	2 (40)
More than three complications	8 (20)	5 (62.5)

Acute MI complicates a relevant number of noncardiac surgical procedures and is associated with an unfavorable short- and long-term prognosis.^[17-19] In the present series, MI occurred in 1 (1%) patient who was above 60 years of age [Table 6].

Levin and Tarantino reported 9% incidence of post-operative hemorrhagic shock in extensive abdominoperineal resection and had discussed the various factors resulting in it.^[20] In the present series, 2% of patients developed alarming hemorrhage. The low incidence in the present series was because operation done in whom the risk of hemorrhage was very little, and during operation, almost complete homeostasis was achieved which prevented hemorrhage.

Lodha and Kapoor suggested that, apart from hemorrhagic shock, the shock of septicemia and toxemia was one of the most important causes of morbidity and mortality in post-operative phase.^[21] In the present series, 9 patients (9%) developed peripheral circulatory failure resulting from causes other than hemorrhage. In five patients, it was related to anesthesia, surgical manipulations, hypoxia, and trauma acquired during or just after surgery.

Bostedt *et al.*^[22] suggested that peripheral circulatory failure of septicemia and toxemia is mostly associated with hemorrhagic necrosis of intestinal mucosa, aggravating the syndrome of shock. In the present series, shock of septicemia was present in 5% of patients of all patients developing peripheral circulatory failure excluding hemorrhage.

The study had mentioned that surgery predisposes the patients to thrombophlebitis because of direct trauma to the veins or pressure from the retractor, dressings, or abdominal binders. It had stated that even a prick of hypodermic needle in a vein produces small area of inflammation. Factors which aggravate the phenomenon are prolonged infusion, especially of dextrose solution and blood. Traumatic events can also initiate a thrombophlebitic reaction. In addition, the persistence of significant reflux into a vein that has been treated with a sclerosing agent can lead to phlebitis. More commonly, phlebitis occurs if perforator veins in the region of sclerotherapy are not diagnosed and treated.^[23-25] In the present series, 6 (6%) patients had thrombophlebitis due to prolonged

infusion of intravenous fluids, especially in emergency group of patients in whom dehydration was almost invariably present and who needed prolonged parenteral nutrition therapy.

Post-operative pulmonary complications (PPCs) occur in 5–10% of patients undergoing non-thoracic surgery and in 22% of high-risk patients. PPCs are broadly defined as conditions affecting the respiratory tract that can adversely influence the clinical course of the patient after surgery. Prior risk stratification, risk reduction strategies, performing short duration and/or minimally invasive surgery, and use of anaesthetic technique of combined regional with general anaesthesia can reduce the incidence of PPCs. Atelectasis is the main cause of PPCs. Atelectasis can be prevented or treated by adequate analgesia, incentive spirometry (IS), deep breathing exercises, continuous positive airway pressure, mobilization of secretions, and early ambulation. Pre-operative treatment of IS is more effective. The main reason for post-operative pneumonia is aspiration along the channels formed by longitudinal folds in the high volume, low-pressure polyvinyl chloride cuffs of the endotracheal tubes. Use of tapered cuff, polyurethane cuffs, and selective rather than the routine use of nasogastric tube can decrease chances of aspiration. Acute lung injury (ALI) is the most serious PPC which may prove fatal.^[26]

PPCs are common, costly, and increase patient mortality. Changes to the respiratory system occur immediately on induction of general anesthesia: Respiratory drive and muscle function are altered, lung volumes reduced, and atelectasis develops in >75% of patients receiving a neuromuscular blocking drug. The respiratory system may take 6 weeks to return to its pre-operative state after general anesthesia for major surgery. Risk factors for PPC development are numerous, and clinicians should be aware of non-modifiable and modifiable factors to recognize those at risk and optimize their care.^[27,28]

There is a wide spectrum of pulmonary complications which are as follows: ^[27,28]

- Atelectasis resulting in post-operative hypoxemia (the most common complication)
- Pneumonia, bronchitis
- Bronchospasm
- Exacerbation of previous lung disease
- Pulmonary collapse due to mucus plugging of the airways
- Respiratory failure with ventilatory support >48 h
- ALI including aspiration pneumonitis, transfusion-related ALI, and acute respiratory distress syndrome
- Pulmonary embolism.

In the present series, 11% incidence of all post-operative complications was that of chest complications similar to that of the previous workers. In emergency group of surgery, however, the incidence of post-operative chest complications is much higher 23.33% and this is due to the preponderance of various

predisposing factors such as lack of assessment and management of co-existing pulmonary disease, upper abdominal surgery, peritonitis, and septicemia as confirmed by different studies. Post-operative chest complications occurred mostly in the first half of the 1st post-operative week and are due to less expansion of chest due to pain, decreased lung compliance, and abdominal dressing.^[29]

In the present series, 7 patients of 11 patients developed lung complications within 3 days of operations. It was observed that there was a predominance of infective lesions in contrast to non-infective lesions like pneumonia in the present series. Persistent bacterial peritonitis has been described as one of the most important predisposing factors leading to respiratory complications. This is attributed to diminished respiratory excursion due to shallow breathing, inhibited sighing, raised diaphragm, and due to the fact that abdominal movements, caused pain in peritonitis.^[30]

Post-operative Wound Infections

Anielski and Barczyński *et al.*^[31] post-operative wound infection is one of the most essential problems in surgical department related to surgery. The occurrence of infection depends on different factors related to both, the patient and his disease, and treatment organization as well.

1. The time of hospitalization was twice longer in the infected group of patients with infected wounds in comparison to the control group.
2. Male sex, longer pre-operative stay in hospital, duration of operation longer than 1 h, emergency mode of operation, contaminated and dirty infected operation in traditional wound classification system, and open (passive) drainage were statistically significant factors which influenced the occurrence of post-operative wound infection.

Surgical site infections (SSIs), previously known as wound infections, remain one of the most common adverse events that occur with hospitalized surgical patients or after outpatient surgical procedures despite many advances in preventive techniques. SSIs typically present with localized cellulitis (erythema, warmth, and tenderness) and purulent discharge. With deep infections, there may be sternal instability, chest pain, and systemic upset. Wound swabs and blood cultures (two sets) should be obtained before antimicrobials are given. If mediastinitis is suspected, a contrast computed tomography scan of the chest may be performed to confirm the diagnosis. However, most surgeons elect to proceed directly to re-exploration, as it is diagnostic, provides tissue or pus for culture, and is therapeutic.^[32] Infections after surgical procedures (operations) can cause pain, poor wound healing, need for further treatment including antibiotics, longer hospital stays, and increased health-care costs. Post-operative infections may cause severe problems, including failure of the surgical procedure, other surgical complications, sepsis, organ failure, and even death. Some persons are at higher risk of developing post-operative infections than others.^[33-36]

In the present series, the criteria for labelling a wound infected were erythema around wound, induction of redness, or presence of pus in the stitches or frank pus. The overall incidence of wound infection was 13%. The incidence of wound infection was higher in patients who underwent emergency surgery (23.33%) than in patients of elective surgery (8.57%) [Table 5]. The factors ascribed

for the high incidence of wound infections in the above group were malnutrition, anemia, dehydration, and abdominal surgery.

Severe non-wound infections are of uncommon occurrence following uncontaminated and elective surgery; in contrast, the incidence is much higher in cases of contaminated and emergency surgery.^[36-38] Sangrasi reported an incidence of 1.6% non-wound infection complications.^[39] Septicemia was the most common complication observed in 5% of cases in this group which was due to pelvic abscess or other forms of infections. In the present series, the incidence of non-wound infection complications was 9% [Table 6]. In contrast to other study, it was very high and was partly attributed to a large number of emergency abdominal surgery and also due to malnutrition, anemia, dehydration, and presence of focus of infection in body. About 5.71% of patients of elective surgery group developed non-wound infection complications were observed in emergency surgery group. High mortality was due to septicemic peripheral circulatory failure and associated factors like pneumonia.

Wound Complications

Wound gaping

Incidence of wound gaping as reviewed in literature is very significant after elective surgery but is high for surgery of lower abdomen, colon, and colorectal resection, and as in later group, it was found up to 10%.^[40-43] Factors responsible for wound gaping are similar to that of wound dehiscence but act in less severity.^[44] Minor gaping was observed in the present series (8%) occurred mostly in cases of laparotomy in whom infection predisposes wound gaping [Table 5].

Wound dehiscence

The study had concluded that, in spite of careful closure, 1% of all wounds disrupt.^[45-47] Factors predisposing wound dehiscence are chronic cough, malnutrition, anemia, peritonitis, type of incision, type of closure, and type of disease. In the present series, 1% of patient developed wound dehiscence who belonged to emergency group of surgery and which was associated with uremia [Figures 3 and 4]. Many workers have reported delayed wound healing and burst abdomen with uremia and renal failure.^[45,46,48]

Wound dehiscence occurs because the distracting forces in a wound exceed the holding forces. Critical analysis of these forces indicates that pressure necrosis from sutures is the primary factor in wound dehiscence. Other factors play a secondary role, either in delaying the healing of a wound or in increasing the stress on it. To prevent pressure necrosis, a mechanically sound method of cradling the entire wound in a series of wide-biting encircling retention sutures, 2.5 cm apart, is described. Each retention suture is tied loosely with a measured tension sufficient to hold the wound together while avoiding pressure necrosis.^[49]

CONCLUSION

Post-operative complications are always a concern to surgeon. The present study was the study of early post-operative complications in 100 patients who underwent major surgery in the department of surgery, in a tertiary care teaching hospital, Indore. The study had been done with the aims and objectives of knowing the incidence of early post-operative complications following major surgery, correlation of various factors which affect the morbidity and mortality in post-operative phase, and



Figure 3: Secondary suturing



Figure 4: Wound dehiscence with fecal fistula

to study the incidence of mortality in major surgery and the factors influencing it.

Observations were made and discussed in the light of available literature, and following conclusions were drawn. Early post-operative complications after major surgery occurred in significant number and must be anticipated in time and proper measures instituted to control them. The incidence of early post-operative complications was significantly higher in emergency surgery than in elective surgery. Associated diseases, especially hypertension, chronic lung disease, and diabetes mellitus, predispose the patient for the increased incidence of early post-operative complications, and the mortality was also high in these patients. Major risk factor was unhealthy pre-operative status, especially dehydration, anemia, malnutrition, electrolyte imbalance, and infection, which significantly increase the morbidity and mortality of post-operative complications. Morbidity and mortality were more in very young patients due to low birth weight, emergency surgery, technical error, and the fact that children were more prone to complications of anesthesia and in patients over 50 years of age. Morbidity and mortality of post-operative complications increase with age.

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