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Original Research Article

Factors affecting post-operative wound gaping and their outcome in obstetrical and gynecological abdominal surgeries

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ABSTRACT

Background: Postoperative wound gaping is a very traumatic event both for patient and treating doctor as it adds economical and psychological burden to the patient and the family. This study was conducted with the aim to find out the various factors affecting postoperative wound gaping and their outcome in obstetrical and gynecological abdominal surgeries.

Methods: This Retrospective observational study was carried out in the Department of Obstetrics and Gynecology at Peoples College of medical sciences and research Centre, Bhopal, India from 1st May 2014 to 31st October 2015.

Results: A total of 1310 patients underwent major obstetrical and gynecological abdominal surgeries, out of which 29 cases developed postoperative wound gaping with the percentage being 2.2%. The rate was found to be higher among the emergency obstetric case (51.7%). Associated risk factors being anemia (72%), obesity (65%), hypoproteinemia (62%) and diabetes (52%) among gynecological surgeries and prolonged rupture of membranes (53%), emergency LSCS and previous LSCS (47%) among the obstetric cases. The common causative organism was found to be *E. coli* (28.5%) followed by *acinetobacter* and *pseudomonas*.

Conclusions: Anemia, obesity, hypoproteinemia, diabetes, history of previous surgeries, emergency operations are the high risk factors for wound gaping in both obstetrics and gynecology surgeries. Correction of anemia, diabetes preoperatively, high protein diet and prevention of other risk factors like avoiding prolonged labor, use potent antibiotics in cases of rupture of membrane, timely intervention, provide well equipped wards with clean environment would be rewarding for better outcome of the surgery.

Keywords: Obstetrical and abdominal surgery, Wound gaping

INTRODUCTION

Today in laparoscopic world, we cannot deny the need of open abdominal surgeries for various abdominal and pelvic pathologies. Despite the various advances made in asepsis, operative procedures, sterilization and antimicrobial drugs, post-operative wound problems continue to be a major threat.¹ It's a very traumatic event both for patient and treating doctor as it adds economical and psychological burden to the patient and the family

members. A wound is a disruption in the continuity of the soft parts of the body structures.² A surgical wound may get infected by the exogenous bacterial flora, which may be present in the environmental air of the operation theatre or by the endogenous flora.³ Factors, which increase an individual's risk to post-operative wound gaping, include age, obesity, nutritional status, preoperative medical disorders like anemia, diabetes, jaundice, use of steroids, poor intraoperative preparation, emergency or elective surgeries, duration and type of surgeries, post-operative wound site contamination or

increase in intraabdominal pressure, infection etc. Still it is a preventable condition provided the factors responsible for gaping of wound are taken care of prior or after the mishap.

Keeping this in mind, the present study was conducted to know the incidence of postoperative wound gaping and for early recognition of the factors responsible with their socio demographic profile, to find out the percentage of wound gaping, various causes and factors related and the effect on the hospital stay of the patient.

METHODS

This was a retrospective observational record based study conducted in the Dept. of Obstetrics and Gynecology of Peoples college of medical sciences and research center, Bhopal from 1st May 2014 to 31st October 2015 after the approval from the Ethical committee. The study population consisted of 1310 patients who underwent surgery in the PCMS and RC. Patients underwent surgeries in other hospitals were excluded. It was conducted to find out the various causes and factors responsible for wound gaping and their possible outcome in last 18 months among the cases operated.

These were the patients who underwent obstetrical and gynecological abdominal surgeries either elective or emergency. The data was recorded from the file records including the method of wound closure either continuous or interrupted and their wound status was recorded on day 7th of surgery or earlier if indicated as per patient complain. The culture and sensitivity report of the wound swab was recorded and the treatment was given accordingly, these were the patients who required resuturing. Patient's progress and the response to drug treatment was monitored and the associated factors responsible were studied. If needed, secondary suturing was done and noted.

The factors which were studied under this study were age, obesity, diabetes, anemia with history of blood transfusion, hypoproteinemia, history of previous abdominal surgeries, presence of wound infection with other associated symptoms like fever, pain etc., depth of wound gape, day of wound gape and causative organism, resuturing done or not, day of operative correction, duration of hospital stay, reexploration required or not.

Statistical analysis

Statistical analysis was performed using SPSS 16.0 software. Unpaired t-test was used to analyze continuous data. Categorical data was compared using Chi-square test. $P < 0.05$ was taken as statistically significant. Relative risk was calculated for abnormal UA PI, UA RI, UA S/D, MCA PI and cerebral-umbilical PI ratio. Multivariate regression was used to analyze effect of multiple variables.

RESULTS

The study consisted of 1310 subjects who underwent obstetrical and abdominal gynecological surgeries (elective or emergency).

Postoperative wound gape was found in 29 patients out of 1310 who required resuturing. Various surgeries that were performed on the patients included cesarean sections, laparotomy and trans abdominal hysterectomy. Out of 29 cases with wound gape, 15 (52%) were obstetrics and 14 (48%) were gynecology cases.

Emergency obstetrics were more as compare to elective. Out of 15 obstetrics cases, 9 were emergency and 6 were elective cases. Gynecological cases were all elective. 45% of cases who developed wound gaping belonged to age group below 30 years, 21% in age 31-40 years and 34% in >40years (Table 1).

Table 1: Distribution of study subjects according to age.

Age (years)	Number (n)	Percentage
Below 30	13	45
31-40	6	21
>41	10	34

Anemia was the most common risk factor, associated with wound gaping is seen in 72% of cases followed by obesity (65%), hypoproteinemia (62%), diabetes (52%), and hypertension (41%) (Table 2). 58.6% patients required blood transfusions.

Multiparity (67%) was a common risk factor in both obstetrics and gynecology cases.

Table 2: Various risk factors associated with wound gape.

Risk factors	Number (n)	Percentage
Anemia	21	72
Obesity	19	65
Hypoproteinemia	18	62
Diabetes	15	52
Hypertension	12	41

In obstetrics cases, prolonged rupture of membranes (53%) and previous LSCS (47%) were the commonest risk factors, either in elective or emergency.

Out of 29 cases, 55% had organism growth in wound line culture but 45% were sterile. *E. Coli* was the commonest causative organism seen in 25% of cases followed by acinetobacter (19%) and pseudomonas (19%) (Table 3).

Most common day of wound discharge noticed was 5th and 7th day and most common day of wound gaping was

day10th (34%). Most of the patients were resutured on day 14th (24%). No association was found between the method (continuous or interrupted) of wound closure with the wound gaping.

Hospital stay of the patients with wound gape was prolonged on an average for 10 days.

Table 3: Distribution of organism responsible for wound gap.

Organism	Number (n)	Percentage
E.Coli	4	25
Acinetobacter	3	19
Pseudomonas	3	19
Others	6	38

DISCUSSION

Wound healing is a complex, intricate series of events influenced by internal and external conditions. Factors that influence the events of the wound-healing cascade are determined by deficiencies and comorbidities of the patient in addition to the environment of the wound. Topical and systemic treatment of the wound may be necessary to bring the wound to closure. Skilled assessment and a thorough understanding of the physiological requirements for wound healing enable the nurse to understand why some wounds heal quickly and others are slow to heal.^{4,5}

In our study based on the inclusion criteria, total 1310 operated patients were eligible for analysis, which underwent major abdominal surgeries in PCMS & RC. Postoperative wound gaping was found in 29 patients out of 1310 patients with an overall postoperative wound gaping incidence of 2.2%.

Postoperative wound gaping was seen more in emergency obstetrics cases as compare to elective cases and the results were similar to the study by Malhotra R et al and Jahanara Rahman et al.^{6,7} Wound gaping was more common in patients below 30 years of age as maximum surgeries (cesarean sections) were done in this age group. Among obstetrics cases, the incidence was higher in patients with prolonged rupture of membranes (53%) and previous LSCS (47%), as found in study by Matin AS et al.⁸ Anemia (72%) was found to be the most common risk factor associated followed by obesity (65%), hypoproteneimia (62%) and uncontrolled diabetes mellitus (52%). 17 patients (59%) required blood transfusion. A strong relationship was found between anemia and wound infection in the study.⁸ Nisty RM et al also found a strong association between anemia and wound gaping.⁹

Hyperglycemia impairs many of the physiological processes involved in recovery from surgery. Alberti KG, Thomas DJ did their study on the management of

diabetes during surgery and found that uncontrolled sugars were associated with adverse outcomes. We in our study also found significant increase in wound gaping in uncontrolled diabetic patients.¹⁰

In our study, we found that the wound gaping was more commonly seen in multiparous (66.66%) women. Repeated childbirth, advanced age, malnutrition and anemia were the contributing factor. Results were similar with the studies by Matin AS et al and Jahanara Rahman et al.^{8,7} In our study, the most common day of wound infection/discharge noticed was 5th and 7th day and most common day of wound gape was day10th (34.48%) similar to the results by Matin et al that showed the appearance of infection between 6 and 10 post-operative days in more than half of the population. In the present study, E.Coli was the commonest causative organism seen in 25% of cases followed by acinetobacter (19%) and pseudomonas (18.75%). Similarly in studies by Higgins GA et al, E.Coli was the commonest organism found followed by klebsiella and pseudomonas species.¹¹

Some other interesting studies were also done on integrity of the wound and suture line. Houang ET et al used ampicillin combined with sulbactam or metronidazole for single-dose chemoprophylaxis in major gynecological surgery. Lanman TH et al studied vitamin C deficiency and wound healing. Sharma AS et al did a study to compare healing in postoperative wounds with occlusive gauze dressing and after omitting the dressing.¹²⁻¹⁴

Various other factors were studied, which were thought to affect wound. In our study, standard techniques of wound closure were followed in all the cases but no association was found with the type of closure similar to the study by McLean NR et al who found the similar incidence of wound infection with continuous or interrupted sutures.¹⁵ Kore S et al did comparison of closure of subcutaneous tissue versus non-closure in relation to wound disruption after abdominal hysterectomy in obese patients and concluded that closure of the subcutaneous tissue after abdominal hysterectomy of women with at least 2.5 cms of subcutaneous tissue lowers the overall rate of complications leading to disruption of the incision.¹⁶

Haddad V et al studied abdominal wound dehiscence and evisceration and the contributing factors so as to improve mortality. Their study is similar to our study in many respects and also aims to minimize mortality.¹⁷ Some other authors like Ramneesh G and Sheerin S et al did a prospective study of predictors for post laparotomy abdominal wound dehiscence on 50 patients and the results were similar to our study with high incidence in patients with anemia, obesity, low albumin and diabetes.¹⁸

Abdominal wound dehiscence after laparotomy is a surgical emergency with high morbidity and mortality leading to escalation in hospital costs and prolonged

illness. This complication can be avoided if the factors involved in wound dehiscence are properly addressed.

In our study we found out that anemia was the most common risk factor, associated with wound gaping is seen in 72% of cases followed by obesity (65%), hypoproteinemia (62%) diabetes (52%), and hypertension (41%). Multiparity (67%) was also a common risk factor. Thus our study is in close similarity with all the above studies.

CONCLUSION

Anemia, obesity, diabetes, hypoproteinemia, previous surgeries, emergency operations are the high risk factors for wound gaping in both obstetrics and gynecology surgeries. Correction of anemia, diabetes preoperatively and prevention of other risk factors like avoiding prolonged labor, use potent antibiotics in cases of rupture of membrane, timely intervention, provide well equipped wards with clean environment, high protein diet postoperatively, early mobilization would be rewarding for better outcome of the surgery.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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