

## COMPARISON OF POST-OPERATIVE OUTCOMES OF MASS CLOSURE CONTINUOUS TECHNIQUE VS HUGHES REPAIR IN PATIENTS UNDERGOING EXPLORATORY LAPAROTOMY

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**Abstract:** Surgical techniques for abdominal closure following exploratory laparotomy play a crucial role in determining postoperative complications. The mass closure continuous approach and Hughes repair are commonly employed methods with unique characteristics and outcomes. **Objective:** This retrospective comparative study aimed to evaluate the incidence of postoperative complications associated with the mass closure continuous approach and Hughes repair in patients undergoing exploratory laparotomy. **Methods:** The study was conducted at Nishtar Hospital Multan from July 2023 to December 2023. A total of 50 patients aged between 18 and 60 years of both genders, undergoing exploratory laparotomy, were included through non-probability sampling. Patients were treated either with the mass closure continuous technique or Hughes repair for abdominal closure. The mean operative time for each technique was recorded. The incidence of postoperative complications, including incisional hernia, wound infection, abdominal burst, and seroma, was assessed. Statistical analysis was performed using appropriate methods. **Results:** The mean operative time for the mass closure continuous technique was 16.32±2.1 minutes, significantly lower than that of Hughes repair ( $p < 0.0001$ ). Patients treated with Hughes repair demonstrated a significantly lower incidence of incisional hernia, wound infection, abdominal burst, and seroma compared to those treated with the mass closure continuous technique. **Conclusion:** Hughes's repair technique for abdominal closure following exploratory laparotomy is associated with reduced occurrence of postoperative complications, including incisional hernia and wound-related issues. Therefore, it may be considered a safe and effective option for abdominal closure in these patients.

**Keywords:** Abdominal Closure Techniques; Exploratory Laparotomy; Hughes Repair; Mass Closure Continuous; Postoperative Complications

### Introduction

Exploratory laparotomy is a crucial surgical operation in general surgery that involves accessing the abdominal cavity to detect and treat different intra-abdominal diseases (1, 2). The effectiveness of this technique depends not only on the correctness of the diagnosis and surgical expertise but also on the specific approach used to close the abdomen after the operation. The mass closure continuous approach and Hughes repair are two significant procedures extensively discussed and contrasted in recent research. The mass closure continuous approach employs a continuous suture pattern that spans all abdominal wall layers. The objective is to uniformly distribute tension and achieve a stable closure (3). On the other hand, Hughes's repair employs a method of closing the abdominal wall in layers, giving individual care to each layer, mainly focusing on the fascial layer (4). Both procedures have their supporters and distinct benefits. Still, it is crucial to thoroughly comprehend their comparative results after surgery to inform surgical decision-making and improve patient care. Previous research highlights the significance of abdominal closure methods in impacting patient results after exploratory laparotomy. The study conducted by Cochetti et al. (2020) highlights that the selection of closure method substantially impacts wound complications, infection rates, and overall healing. This underscores the necessity for more research to compare the effectiveness of various closure procedures (5). A further investigation by Kimura et al.

(2021) examines the biomechanical elements of abdominal closure, elucidating the distribution of tension and mechanical forces involved in different closure techniques (6). These studies demonstrate the intricate relationship between surgical procedures and patient outcomes, underscoring the importance of thorough research to inform evidence-based therapeutic practices. The present research compares the postoperative complications associated with the mass closure continuous approach and Hughes repair in patients with an exploratory laparotomy. The study seeks to evaluate the incidence of wound complications, infections, and overall healing, offering significant information to surgeons and healthcare practitioners to facilitate informed decision-making. This research aims to address the current gaps in the literature by providing a detailed overview of the pros and cons of each closure approach. The results of this study might potentially provide valuable information for evidence-based practices, improving the quality of patient care and better the outcomes after exploratory laparotomy.

### Methodology

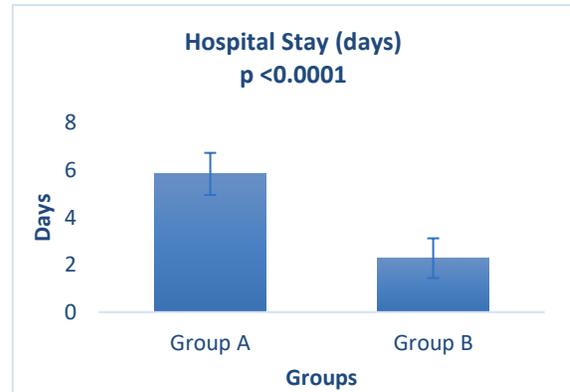
After the ethical approval from the institutional review board, this retrospective comparative study was conducted at Nishtar Hospital Multan from July 2023 to December 2023. Through non-probability sampling, 50 patients aged 18-60 years, both genders, undergoing exploratory laparotomy, were treated with either the mass closure

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continuous technique or Hughes repair for abdominal closure. Patients below the age of 18 years undergoing laparotomy for reasons other than exploratory purposes are treated with other abdominal closure techniques. Patients were randomly divided into two groups: Group A, treated with mass closure continuous technique n=25, and Group B, treated with Hughes repair for abdominal closure. Patient records were acquired via electronic health records, surgical databases, or hospital archives. The data collection included demographic data, specific surgical procedure information, operational discoveries, the closure method, and pertinent post-operative results. The primary outcome encompassed wound complications, such as dehiscence, infection, and seroma development, as well as the duration of hospitalisation and the overall healing process. Patients were administered intravenous antibiotics and fluids for five days following the surgery. The wounds were examined for discomfort, discharge, infection, and dehiscence. Following discharge, patients had subsequent evaluations at our outpatient clinic at one week, two weeks, one month, four months and six months. During the fourth and sixth months, we conducted clinical examinations and utilised anterior abdominal wall ultrasound scans to assess the presence of incisional hernia. SPSS version 26 was used to analyse the collected data. Descriptive statistics was used to summarise patient demographics and baseline characteristics. The study compared the mass closure continuous approach with Hughes repair using rigorous statistical analyses, including chi-square tests for categorical variables and t-tests or non-parametric testing for continuous variables.

**Results**

The clinical and demographic parameters of the recruited participants are shown in Table 1. Age, gender distribution and BMI are not significantly different among the study groups. Mass closure has a mean operative time of 16.32±2.1 minutes, while Hughes repair has a significantly higher operative time with a p-value <0.0001. Incidence of incisional hernia, wound infection, abdominal burst, and seroma were significantly lower in patients treated with Hughes repair. Similarly, the length of hospital stay was significantly longer in Group A than in Group B.



**Figure 1: Comparison of Length of hospital stay between the groups**

**Table I: Clinical and demographic parameters of the study participants**

Parameters	Group A (n=25)	Group B (n=25)	P value
Age (years)	43.68±10.24	42.24±10.71	0.559
<b>Gender</b>			
Male	16 (64%)	19 (76%)	0.83
Female	9 ((64%)6%)	6 (24%)	
BMI (Kg/m2)	22.92±2.4	23±2.8	0.92
Operative time (minutes)	16.32±2.1	28.7±1.54	<0.0001
<b>Postoperative complications</b>			
Incisional hernia	8 (32%)	4 (16%)	0.043
Wound Infection	10 (40%)	3 (12%)	0.005
Abdominal burst	5 (20%)	1 (4%)	0.043
Seroma	13 (52%)	3 (12%)	<0.0001
Hospital stay (days)	5.84±0.89	2.28±0.84	<0.0001

**Discussion**

Incisional hernia and surgical site infections are the predominant problems that occur after midline laparotomy, with occurrence rates of 10-15% and 15-25%, respectively (7). Despite continuous endeavours to develop criteria for abdominal wall closure, there is still a lack of agreement on the most effective technique for sealing the abdominal wall following emergency laparotomy. Further investigation is recommended to examine this aspect, mainly because the majority of wounds in emergencies are deemed infected, which poses a higher risk of herniation. The risk assessment approach developed by Van Rmshorst might be employed (8, 9). The Hughes repair, named after Professor Hughes, has proven more effective than mesh repair in treating incisional hernia. Godara et al. have also examined this

approach, producing comparable findings (10). After reviewing the available data, the appraisal of Hughes repair as a procedure for primary closure in emergency laparotomy is restricted. While Rajasekaran et al. conducted a comprehensive assessment of primary closure, encompassing all patients who underwent emergency and elective laparotomy, our study only focused on the closure of emergency laparotomy cases. Despite variations in the criteria for inclusion, the findings indicate that Hughes repair is often successful in closing primary laparotomies, regardless of the reason for the laparotomy (11). The ongoing HART experiment is now examining the efficacy of the closure method in patients following elective cancer surgery. However, the outcomes are not yet accessible. These data will hopefully offer valuable insights regarding the technique's validity for closure (12).

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## Conclusion

Although Hughes's repair is linked to a reduced occurrence of incisional hernia and problems connected to the wound, the existing evidence remains restricted. It is premature to classify this method definitively as the gold standard for primary closure in emergency laparotomy. Nevertheless, this approach is deemed safe with minimal morbidity, advocating for more study on its application.

## Declarations

### Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

### Ethics approval and consent to participate

Approved by the department concerned. (Ref no. 21/22/NMC; Dated 10-08-22)

### Consent for publication

Approved

### Funding

Not applicable

## Conflict of interest

The authors declared absence of conflict of interest.

## Author Contribution

### DR SYED SAFI ULLAH (Resident)

*Study Design, Review of Literature.*

*Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.*

### PROF. MASOUD UR RAUF KHAN HIRAJ (Professor)

*Coordination of collaborative efforts.*

*Conception of Study, Final approval of manuscript.*

### DR MUHAMMAD FARKALEET SHAH (Resident)

*Manuscript revisions, critical input.*

*Coordination of collaborative efforts.*

### DR MUHAMMAD ZAKRIA (Resident)

*Data acquisition, analysis.*

*Manuscript drafting.*

### DR MUHAMMAD SHAHID (Resident)

*Data entry and Data analysis, drafting article.*

*Coordination of collaborative efforts.*

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