## **Original Research Article**

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# A randomized controlled study to compare the efficacy of hughes abdominal repair with conventional abdominal closure-to reduce the incidence of incisional hernias in Indian population

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#### **ABSTRACT**

**Background:** Incisional hernia forms the most common delayed morbidity following midline laparotomy surgeriescausing mental trauma to the patient impairing their quality of life and scars the name and fame of the surgeon. So, the need for possible attributes on surgeon's aspect to prevent the incisional hernia is the need of the hour. We planned a randomized controlled trial to compare two different abdominal closure techniques to reduce the incidence of Incisional hernia following midline laparotomy incisions. We advocated Hughes abdominal repair which includes a series of two horizontal and two vertical mattresses within single suture whereby the tension load of suture is distributed both along and across the suture line.

**Methods:** 1:1 Randomized controlled trial in which the patient is blinded and obviously operating surgeon is non-blinded. Evaluating examiner and radiologist are blinded.100 patients who underwent emergency and elective midline laparotomies were enrolled in the study and intra-operatively randomized into two groups in 1:1 pattern. Ethical clearance obtained from the Institutional ethical committee. The primary outcome measure is the incidence of burst abdomen at the end of 15 days by the evaluating surgeon (non-operated surgeon who is blinded). The secondary outcome is the incidence of incisional hernia at the end of one year-evaluated by detailed clinical examination with radiological proof using CT abdomen.

**Results:** The incidence of incisional hernia is significantly low in Hughes abdominal repair than conventional abdominal closure.

**Conclusions:** Hughes abdominal wall closure is superior to conventional closure in both emergency and elective laparotomy cases, in prevention of wound dehiscence and Incisional hernias later. Present study encourages us that Hughes abdominal wall repair is comparable to mesh repairs. This study needs to be continued further to a vast sample size to perfectly assess the statistical significance.

Keywords: Hughes abdominal repair, Incisional hernia, Laparotomy

#### INTRODUCTION

Incisional hernia forms the most common delayed morbidity following midline laparotomy surgeriescausing mental trauma to the patient impairing their quality of life and also scars the name and fame of the surgeon. Also, this morbidity impairs the patient-doctor relationship though the incisional hernia may occur both due to surgeon's or patient's variables. So, the need for possible attributes on surgeon's aspect to prevent the

incisional hernia is the need of the hour. The most frequent complications following midline abdominal laparotomy include incisional hernias, which develop in 10-15 % of patients and surgical site infections in 15-25 % of cases.1 Le HuuNho R et al calculated the incidence of incisional hernias as 9.9 % following midline laparotomy surgeries.<sup>2</sup> We commonly use conventional method of closure which includes fascial closure which may be layered fascial closure or mass fascial closure, subcutaneous closure followed by skin closure. In this background of social burden caused by incisional hernias, we planned a randomized controlled trial to compare two different abdominal closure techniques to reduce the incidence of Incisional hernia following midline laparotomy incisions in our district teaching institution. We advocated Hughes abdominal repair which includes a series of two horizontal and two vertical mattresses within single suture whereby the tension load of suture is distributed both along and across the suture line. We randomized two groups in 1:1 randomized controlled (Far-Near-Near-Far, Far-Near-Near-Far) trial in which, Group A constituted Hughes abdominal repair and Group B constituted Conventional abdominal closure and studied on 100 patients who underwent midline laparotomies for different elective and emergency indications.

#### **METHODS**

1:1 Randomized controlled trial in which the patient is blinded and obviously operating surgeon is non-blinded. Evaluating examiner and radiologist are blinded. 100 consecutively enrolled patients who underwent emergency and elective midline laparotomies were enrolled in the study and intra-operatively randomized into two groups in 1:1 pattern. Ethical clearance obtained from the Institutional Ethical committee. Study design was Single centric, Blinded Randomized controlled trial.

#### Inclusion criteria

- Patients giving informed consent
- Patients aged above 18 years
- Midline elective/ emergency laparotomy incisions of more than 6 cms.

#### Exclusion criteria

- Patients below 18 years
- Mesh repairs
- Patients not willing and not in sound mind to give consent.

Procedure of the study was as following.

 Group A: The Hughes abdominal closure technique constitutes a series of two horizontal and two vertical mattresses within single suture whereby the tension load of suture is distributed both along and across the suture line. Hughes repair is also known as Cardiff

- repair which uses a graduated tension for easy approximation
- Group B: The conventional method of closure which includes mass fascial closure, subcutaneous closure followed by skin closure.

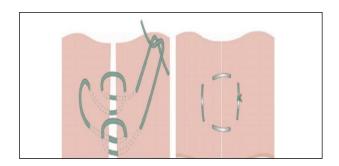


Figure 1: Hughes abdominal repair.

Same non-absorbable suture material was used in both groups.

Primary outcome measures the incidence of wound infection and abdominal wall dehiscence at the end of 15 days by the evaluating surgeon (non-operated surgeon who is blinded of the group).

Secondary outcome is the incidence of incisional hernia at the end of one year-evaluated by detailed clinical examination with radiological proof using CT abdomen.

### Follow up

All patients were discharged after suture removal on 10th postop day and were followed on 15<sup>th</sup> day and then monthly up to one year. Discharge was delayed in burst abdomen cases in both groups.

#### **RESULTS**

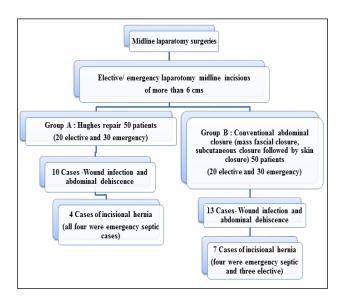


Figure 2: Course of the study.

There was little significant difference in postoperative wound infection in both groups. But the incidence of Incisional hernia after one year is 8 % in group A as compared to 14 % in group B. This incidence encourages us that Hughes abdominal wall repair is comparable to mesh repairs. No adverse event or drop outs were reported. This study needs to be continued further to a vast sample size to perfectly assess the statistical significance.

#### **DISCUSSION**

The most frequent complications following midline abdominal laparotomy include Incisional hernias, which develop in 10-15 % of patients and surgical site infections in 15-25 % of cases.1 Le HuuNho R et al calculated the incidence of incisional hernias as 9.9 % following midline laparotomy surgeries.<sup>2</sup> Various studies were done to reduce the incidence of Incisional hernias. Heger P et al studied a meta-analysis of systematic literature of various RCTs dealing with abdominal wall closure following midline laparotomy surgeries that have been published since 2010 and concluded that slowly absorbable mono filament suture material using a continuous suture technique provides the best results.1 This study also concluded that no evidence exists for emergency laparotomies to recommend a specific kind of suture technique or a specific suture material. Numerous meta-analyses have concluded that continuous mass fascial closure method to be superior closure method than layered closure method.3-5

In conventional abdominal closure, the primary advantage of layered closure is that as individual fascial layer is sequentially closed, the multiple strands exist, so that if a break, the incision is held intact by the remaining sutures. Whereas, Continuous fascial mass closure with a single closure allows the even tension distribution across the entire length of the suture which results in minimization of tissue strangulation. But, excessive tension if applied in layered closure, leads to tissue necrosis and resultant failure of closure. Agrawak CS et al has concluded that Interrupted abdominal wall closure prevents burst abdomen, in his randomized controlled trial comparing Interrupted X and conventional continuous closures in surgical and Gynaecological patients.6 We advocated the randomized controlled trial between conventional abdominal closure and Hughes abdominal closure method.

The Hughes abdominal closure technique constitutes a series of two horizontal and two vertical mattresses within single suture whereby the tension load of suture is distributed both along and across the suture line. Hughes method of abdominal wall closure is named after an eminent professor Hughes BR, who has initially proved this technique to be efficacious than mesh repair in treating Incisional hernias. Godaraetal proved that

Hughes abdominal repair is effective than mesh plasty in Incisional hernias.<sup>7</sup> In present study, we have compared Hughes method with conventional closure in primary suturing of midline laparotomy wounds and have seen that Hughes method of abdominal closure is advantageous in sequential closure with even distribution of suture tension thereby efficacious in prevention of abdominal dehiscence and later Incisional hernias. According to us, Hughes method of closure can be used as a preferential method of abdominal wall closure in all midline laparotomy incisions, even in cases more prone for incisional hernia due to patient factors such as abdominal sepsis.

#### **CONCLUSION**

Hughes abdominal wall closure is superior to conventional closure in both emergency and elective laparotomy cases, in prevention of wound dehiscence and Incisional hernias later. Present study encourages us that Hughes abdominal wall repair is comparable to mesh repairs. This study needs to be continued further to a vast sample size to perfectly assess the statistical significance.

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Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

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