

## Research Article

# Incisional Hernia following Abdominal Surgery in Children: A Single Centre Experience

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## Introduction

Incisional hernias may be defined as an abnormal defect in the abdominal walls located at areas of post-operative scars which is perceptible or palpable by clinical examination or imaging [1]. Incisional hernia is a well-known complication of abdominal surgery, both in laparoscopic and open surgeries [2]. Unlike in adults where incisional hernia has been extensively studied, such studies in children are sparse. Incidence and other associated factors in children are rarely studied [3]. Similar to all hernia, incarceration, bowel obstruction and strangulation can occur in incisional hernia. Incisional hernia in children may resolve over time but where this fails to happen, operative treatment may be required [3]. While the rate of incisional hernia is documented to be 10-50% in adults, the incidence of incisional hernia in children has been reported to be in the range of 1-3% [2]. Surgery involving stoma formation and neonatal surgeries have been correlated to the development of incisional hernia in children [4]. The wide variations in abdominal

## Abstract

**Background:** Although uncommon, incisional hernia is a well-known complication of abdominal surgery in children and data on incisional hernia in the pediatric age group are sparse. The aim of this study was to evaluate a single center's experience with regards to the incidence and outcome of incisional hernia in children.

**Materials and Methods:** This was a retrospective study of children aged 15 years and younger who developed incisional hernia following abdominal surgery, between January 2013 and December 2017, at the pediatric surgery unit of a tertiary hospital in Enugu, Nigeria.

**Results:** During the study period, a total of 1004 pediatric abdominal surgeries were performed. Out of this number, 31 patients developed incisional hernia: This accounted for an incidence rate of 3.1%. There was male predominance and the mean age at diagnosis of incisional hernia was 24 months. All the patients presented with a protrusion at or around the site of a previous surgical scar. Non-operative treatment (serial bandaging) was effective in most of the patients. There was no mortality.

**Conclusion:** Incisional hernia is a well-known complication of abdominal surgery. This study recorded the incisional hernia incidence rate of 3.1%. Non-operative treatment was successful in majority of the patients. Future studies should emphasis on the specific risk factors (surgeon/patient) that may predispose to incisional hernia.

**Keywords:** Children; Incisional hernia; Incidence; Laparotomy; Single center

approaches, patient's comorbidities and techniques for surgical closure may lead to broad range of incidence rates [5]. There is paucity of data relating to incisional hernia in children. The aim of this study was to evaluate a single center experience with regards to the incidence and outcome of incisional hernia in children.

## Materials and Methods

This was a retrospective study of children aged 15 years and younger who developed incisional hernia following abdominal surgery, between January 2013 and December 2017, at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. Children who have incisional hernia after abdominal surgery at a peripheral hospital before referral to ESUTH for treatment were also recruited into study. Children who are older than 15 years and those with congenital ventral hernia were excluded from this study. Diagnosis of incisional hernia was

made based on clinical and radiological findings. ESUTH is a tertiary hospital located in Enugu, South East Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km<sup>2</sup>. The hospital also receives referrals from its neighboring states. The information extracted included the age, gender, presenting symptoms, interval between surgery and incisional hernia development, method of treatment (non-operative/operative), complications of treatment and outcome of treatment. Ethical approval was obtained from the ethics and research committee of the hospital. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range.

## Results

### *Patients' demographics*

During the study period, a total of 1004 pediatric abdominal surgeries were performed. Out of this number, 31 patients developed incisional hernia and form the basis of this report: This accounted for an incidence rate of 3.1%. More males were affected. Details of the patients' demographics are shown in Table 1.

All the patients presented with a protrusion at the area of a previous surgical incision. In addition, 2 (6.5%) patients had

Parameters	Value
Gender	
Male	23 (74.2%)
Female	8 (25.8%)
Mean age at primary abdominal surgery	12 months (5 -14)
Mean age at diagnosis of incisional hernia	18 months (13-36)
Mean interval between surgery and incisional hernia development	6 months (3-12)

pain at the area of the incisional hernia. All the hernias were reducible; there was neither an obstruction nor incarceration. None of the patients presented as an emergency.

## Method of Treatment

Thirty (96.8%) patients were treated non-operatively which involved serial bandaging for a period of 12 weeks and 4 weekly reviews in the outpatient clinic. One (3.2%) patient had operative treatment. The operative treatment entailed primary approximation of the widened fascia. Synthetic material (mesh) was not used for the repair.

## Complications of Treatment

The patients who had non-operative treatment had no complications. They were treated on outpatient basis. The single patient who had surgery developed post-operative surgical site infection that required prolonged wound dressing and antibiotics.

## Outcome of Treatment

All the patients achieved good recovery and were discharged home. There was no mortality.

## Discussion

Incisional hernia is a well-known complication of abdominal surgery and its incidence has been reported to increase when there is post-operative wound infection [6]. Incisional hernia is a type of ventral hernia and results from weakness of abdominal fascial covering [7]. Generally, incisional hernias result from failure of proper wound healing which may result from wound infections, midline incisions, anemia and poor nutritional status. The pathogenesis of inguinal hernia development is that a traumatized tissue loses its structural integrity, allowing protrusion of an organ or viscera into a region that is not the normal position. Repeat trauma of tissues, as seen with redo/reversal surgeries, would cause weakening of the abdominal wall increasing the risk of incisional hernia formation. Brook et al reported the increased occurrence of incisional hernia following closure of loop ileostomy [8].

In the present study, the incidence of incisional hernia is comparable to that of Mullassery et al [2]. However, Schattenkerk recorded a higher incidence while Tanaka et al recorded a lower incidence of incisional hernia [3, 4]. The differences in the incidence of incisional hernia may be explained by the different cohort of patients recruited by the studies. For instance, emergency septic cases such as typhoid intestinal perforation are more likely to lead to higher incidence of incisional hernias. In the index study, there were more incisional hernias in males. This is consistent with the report of other series on incisional hernia in children [3, 4]. The exact reason for the male predominance is not known. However, the fact that more males were operated upon during the study period may offer an explanation. The mean age of the patients at primary surgery of 12 months recorded in the present study is comparable to the report of a study conducted in United Kingdom [2]. The age at initial surgery may be dependent on the pathology involved. For instance, intussusception is known to be more common in infants. The interval between

the initial surgery and development of incisional hernia varies widely depending on a number of factors. Generally, incisional hernias are most likely to occur within 3 to 6 months post-surgery but can happen at any time.

All the patients presented with a swelling at or around the area of the previous surgical scar. The occurrence of incisional hernia indicates the development of weakness of the sutured abdominal wall caused by mechanical overload, defective wound healing, and/or inadequate scar formation [7]. Other clinical features which may be found include abdominal pain, tenderness, vomiting and abdominal distension especially when there are complications such as obstruction and strangulation.

Incisional hernia in children may not require operative treatment. One study from Netherlands discussed the role of an initial non-operative treatment [3]. The high level of growth hormone in children is believed to be important in the healing of incisional hernia. When operative treatment is performed, primary approximation of the healthy fascia and muscles can be performed. However, when the fascial defect is wide, synthetic material (mesh) may be used. Non-operative treatment of incisional hernia was successful in most of our patients. The drawback of non-operative treatment of incisional hernia is the prolonged period of treatment and the risk of hernia complications such as obstruction or strangulation during the period. Surgical site infection may result from operative treatment of incisional hernia, as recorded in the index study. Juvany et al documented the impact of surgical site infection on the outcome incisional hernia repair [9]. Outcome of incisional hernia repair is generally good. None of our patients expired. Other studies also did not register mortalities following incisional hernia repair [3, 4].

## Conclusion

Incisional hernia is a well-known complication of abdominal surgery. This study recorded the incisional hernia incidence rate of 3.1%. Non-operative treatment was successful in majority of the patients.

## Limitations of the study

1. Specific abdominal pathologies necessitating the initial surgeries that led to the incisional hernia were not documented. Risk factors were missing.
2. This is a single centre experience which may not be

generalized.

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