INTRODUCTION

Groin hernia repair is one of the most common surgical procedures performed globally, with more than 20 million patients undergoing groin hernia repair annually worldwide. Treatment of hernia is based on its presentation. Symptomatic, non-incarcerated hernias can be managed electively in patients healthy enough to undergo surgery. Nevertheless, the option of watchful waiting can be discussed for relatively asymptomatic, non-incarcerated hernias in older patients with multiple comorbidities. A hernia is said to have become incarcerated when unable to reduce the hernia mass into the abdomen. Whereas a hernia strangulation is when the blood supply to the herniated tissues is compromised. Hernia incarceration or strangulation is an indication of emergency surgery.

Duration of hernia repair surgery largely depends on the characteristics of the hernia (such as hernia type, size, site, and severity), characteristics of the patient (age, co-morbidity, etc), surgeon’s skill set, and technique used. Although some studies have shown that an emergency hernia repair surgery is often related with increased risk of small bowel resection and prolonged length of hospital stay compared to elective surgery, more evidence is needed to determine the risks and benefits of emergency hernia repair surgery. Furthermore, the latest guidelines recommended a tailored approach of emergencies according to patient- and hernia-related symptoms.

Cheng et al conducted a systematic review and meta-analysis on the association of operative duration and complications which then showed a significant increase likelihood of complications with prolonged operative duration an increase of 14% in the likelihood of complications for every 30 minutes of additional operating time. Linden et al examined the relationship between operating time of groin hernia surgery and its outcome, using recurrence as the indicator and found that increasing operating time decreases recurrence.

Although several studies have been conducted to identify factors affecting elective and emergency hernia repair outcomes, there has neither been a conclusion nor a recent study that analyzes the relationship between the operative duration and the outcome of the hernia repair surgery. This observational study aims to provide hernia repair surgeries data in Tangerang, Indonesia to pioneer a nationwide hernia study. Furthermore, another aim is that the data comparison provided in this study can become the groundwork for more advanced studies.

The Operative Duration of Elective and Emergency Hernia Repair Surgery: A Single Center Experience

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ABSTRACT

Background: This observational study aims to provide hernia repair surgery data in Tangerang, Indonesia, hoping to pioneer a nationwide hernia study. Furthermore, another aim is that the data comparison provided in this study can become the groundwork for more advanced studies.

Methods: We retrospectively reviewed our database at Siloam General Hospital between January 2021 and September 2022. We reviewed the cohort gender, age, type of hernia, type of surgery, and duration of hernia repair surgery.

Results: There was a total of 110 patients, with a predominance in the male gender (91.3%) compared to the female (8.7%). Dividing the patients into certain age groups, we also found that most hernia patients are > 60 years old. One hundred three patients (93.6%) were diagnosed with inguinal hernia, and 7 patients (6.4%) were diagnosed with a non-inguinal hernia. It was found that the duration of emergency surgery in patients with the inguinal hernia was 93.6 minutes, and non-inguinal patients were 118.2 minutes. Compared to the duration of elective surgery in patients with the inguinal hernia was 57.2 minutes, and non-inguinal patients were 67.7 minutes.

Conclusion: We did not find any appreciable differences in the length of the surgical procedure between the elective and emergency trial group. Additional research is encouraged to understand the significance of the operating duration in elective and urgent hernia repair procedures.

Keywords: elective surgery, emergency surgery, hernia repair surgery, operative duration.
METHODS

Study Design

A descriptive study was conducted to collect the data of patients who underwent hernia repair surgery at Siloam General Hospital Tangerang, Indonesia, between January 2021 and September 2022.

Study Setting and Population

Siloam General Hospital Tangerang, Indonesia is one of the best and most comprehensive hospital in the urban area. The included study population are patients of all ages who underwent hernia repair surgery, elective or emergency. Exclusion criteria is incomplete data of medical records. All of the data was extracted from medical records in September 2022. There was no applicable bias in this study.

Data Collection

We reviewed the cohort gender, age, type of hernia, type of surgery, and duration of hernia repair surgery. We classified our cohort to 4 different groups: (1) ≤ 1 year old, (2) 1 – 40 years old, (3) 40 – 60 years old, and (4) > 60 years old. Additionally, we differentiated out type of hernia into 2 groups, inguinal and non-inguinal. As mentioned earlier that current study objective is to examine the operative duration of elective and emergency hernia repair surgery, thus, we differentiated our type of surgery into elective and emergency.

Study Size

Sample size was calculated using descriptive study formula with \( Z_{\alpha} = 1.96 \), estimated proportion of emergency hernia repair surgery is 9%, and absolute precision is 20%. The total required sample size result is 80.

Data Analysis

Data collection was done by three investigators by searching through medical records. All data was compiled using Microsoft Excel. Measurement bias was minimized by double-checking and confirming medical records and operating theatre records.

Ethical Consideration

This study was approved by Siloam General Hospital Ethical Committee (September 2022). No personally identifiable information was collected and confidentiality was ensured. The electronic data is stored in a password-protected computer.

RESULTS

We found 110 patients with no incomplete data in the medical records. Male gender is predominant (91.3%) compared to female (8.7%). Dividing the patients into certain age groups, we also found that most hernia patients are > 60 years old. 103 patients (93.6%) were diagnosed with inguinal hernia and 7 patients (6.4%) were diagnosed with non-inguinal hernia. In the group of inguinal hernia patients, 6 patients (5.8%) underwent emergency surgery; and another 97 patients (94.2%) underwent elective surgery. Meanwhile, in the group of non-inguinal hernia patients, 1 patient (14.3%) underwent emergency surgery; and 6 patients (85.7%) underwent elective surgery. It was found that duration of emergency surgery in patients with inguinal hernia was 93.6 minutes and non-inguinal patients was 118.2 minutes. Compared to duration on elective surgery in patients with inguinal hernia was 57.2 minutes and non-inguinal patients was 67.7 minutes. Detailed patients’ characteristics of our cohort are presented in Table 1.

DISCUSSION

A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall. Its causes could be due to weakness of the basic design or the structures entering and leaving the abdomen, genetic weakness due to collagen, developmental failures, trauma (sharp and or blunt), weakness due to aging and pregnancy, primary neurological and muscle diseases, and excessive intra-abdominal pressure. Generally speaking, hernias can be classified based on their anatomical sites: ventral, inguinal, and femoral hernia. The European Hernia Society, moreover, distinguished abdominal wall hernias into primary and incisional. Incisional hernia commonly occurs due to laparotomy with incidence of 9.9% (compared to only 0.7% after laparoscopy) with recurrence rate ranging from 24-43% even with the use of mesh in its repair.

The number of emergency surgery in inguinal hernias was only 5.8% of the total inguinal hernia cases treated surgically. In contrast, emergency surgery in non-inguinal hernias accounted for 14.2% of the total non-inguinal hernia cases treated surgically. This showed that incarceration and/or strangulation risk is less in inguinal hernias. In a randomized controlled

Table 1. Patient characteristics and types of hernia.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Elective (n = 103)</th>
<th></th>
<th>Emergency (n=7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Mean ± standard deviation</td>
<td>Frequency</td>
<td>Mean ± standard deviation</td>
</tr>
<tr>
<td>Gender</td>
<td>Male (n)</td>
<td>94 (91.3)</td>
<td>37.01 ± 30.53</td>
<td>7 (100)</td>
</tr>
<tr>
<td></td>
<td>Female (n)</td>
<td>9 (8.7)</td>
<td></td>
<td>0 (0)</td>
</tr>
<tr>
<td>Age</td>
<td>Overall (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 1 year old (n)</td>
<td>22 (21.4)</td>
<td>1 (14.2)</td>
<td>1 (14.2)</td>
</tr>
<tr>
<td></td>
<td>1 – 40 years old (n)</td>
<td>30 (29.1)</td>
<td>3 (42.9)</td>
<td>3 (42.9)</td>
</tr>
<tr>
<td></td>
<td>40 – 60 years old (n)</td>
<td>20 (19.4)</td>
<td></td>
<td>6 (85.8)</td>
</tr>
<tr>
<td></td>
<td>&gt; 60 years old (n)</td>
<td>31 (30.1)</td>
<td></td>
<td>1 (14.2)</td>
</tr>
<tr>
<td>Surgical duration</td>
<td>Overall (minutes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inguinal (n)</td>
<td>97 (94.2)</td>
<td>91.20 ± 36.50</td>
<td>6 (85.8)</td>
</tr>
<tr>
<td></td>
<td>Non-Inguinal (n)</td>
<td>6 (5.8)</td>
<td>88.75 ± 30.94</td>
<td>1 (14.2)</td>
</tr>
</tbody>
</table>
trial conducted by Fitzgibbons in 2006 compromising a total of 1627 patients undergoing hernia repair surgery showed that intention-to-treat analyses at 2 years revealed that both groups experienced similar rates of activity-interfering discomfort (5.1% for watchful waiting vs. 2.2% for surgical repair; difference 2.86%; 95% confidence interval, 0.04% to 5.77%; p =0.52). Acute hernia incarceration without strangulation occurred in one watchful-waiting patient (0.3%) within 2 years. Watchful waiting is a viable choice for males with inguinal hernias that are only mildly symptomatic. It is safe to put off surgical repair until symptoms worsen because acute hernia incarcerations are uncommon. The duration of surgery is understandably longer in emergency than elective surgeries, with difference of 97.14 ± 56.48 minutes in inguinal hernia repair surgeries and 255 ± 0 minutes in non-inguinal hernia repair surgeries.

Risk factors for hernia incarceration/strangulation include female gender, femoral hernia and a history of hospitalization related to groin hernia. Femoral hernias carry a higher risk of strangulation when compared with inguinal hernias. In the Swedish and Danish hernia registries, 36–39% of femoral hernias were emergently repaired versus 5% of inguinal hernias. However, this was not the case in our population as all female patients in this study underwent elective hernia repairs. According to Tatar et al., elderly individuals with an incarcerated hernia are more likely to indicate organ resection. They connected this circumstance to the older patients’ complaints going unheard and the late onset of significant illnesses. In our study group, the number of patients with hernia at 18–40 years old (53 cases) only differed slightly from above 40 years old (57 cases).

As to our knowledge this is the first study of patient demographics and operative duration of elective and emergency hernia repair surgery in Indonesia. While our data cannot represent the nationwide statistics of hernia patients, we hope this study can start a nationwide database. There was no applicable bias in this study.

The previous study has discussed about certain risk factors pertaining to hernia, its patients characteristics, risk of complications, and surgical treatments, also association between operative duration and outcome had been studied before. This study adds a discussion of Unprecedented hernia patients demographic data and operative duration of elective and emergency surgery in Tangerang, Indonesia, review and comparison to other previous studies.

Further studies investigating the operative duration in elective and emergency hernia repair surgeries are encouraged to identify its significance. Then, the operative duration management by the surgeon can be improved accordingly.

CONCLUSION

Between the elective and emergency trial group, we did not find any appreciable differences in the length of the surgical procedure. Additional research is encouraged to understand the significance of the operating duration in elective and urgent hernia repair procedures.

DISCLOSURE

Ethical approval
Siloam General Hospital Ethical Committee approved this study (September 2022).

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Conflicts of Interests
The authors declare no conflicts of interest.

Authors’ contributions
Conception and design of study: Natalia Maria Christina, Valeska Siulinda Candrawinata. Acquisition of data, analysis and interpretation of data: Natalia Maria Christina, Valeska Siulinda Candrawinata, Christine Nathalia, Ivory Seiko, Ivy Nydia Yuwono. Drafting the manuscript, revising the manuscript critically for important intellectual content: Natalia Maria Christina, Valeska Siulinda Candrawinata, Christine Nathalia, Ivory Seiko, Ivy Nydia Yuwono. Approval of the version of the manuscript to be published: Natalia Maria Christina, Valeska Siulinda Candrawinata. All authors have read and agreed to the final manuscript.

REFERENCES