Original Article

Incidence of abdominal incisional hernia in developing country: a retrospective cohort study

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Abstract: Objective: To estimate the incidence of abdominal incisional hernia in developing countries. Methods: This population-based retrospective cohort study identified all patients with abdominal surgery between 2006 to 2011 in Aden Public Hospital, Aden, Yemen and the Second Hospital Affiliated with Dalian Medical University, Dalian, China. The cohort was followed from their first until 1 year after their last abdominal surgery within the inclusion period or until the first of the following events: hernia repair, death, emigration, second abdominal surgery. For patients who had a hernia repair, hospital records regarding the surgery and previous abdominal surgery were tracked and manually analyzed to confirm the relationship between hernia repair and abdominal surgery. Results: We identified 2096 patients who had abdominal surgery during the inclusion period and 51 cases were excluded. During follow-up, 80 of these patients who had a hernia requiring repair were analyzed. Of these 20 had infected incision and 80 had non-infected incision. The incidence is significantly higher in infected incision (20/202) than that in non-infected incision (60/1843). There were no any differences in the incidence between Aden and Dalian. Conclusions: The overall incidence of abdominal incisional hernia requiring surgical repair within 1 year after abdominal surgery was 80/2045 in a population from Aden and Dalian. Infected incision is prone to occur incisional hernia during the follow-up period.

Keywords: Incidence, causes, abdominal wall incisional hernia, Aden

Introduction

Abdominal incisional hernia is very common clinically with an incidence of 3% to 20.6% [1, 2]. Infection of the incision will increase the rate of hernia up to 23% [3, 4]. Abdominal incisional hernia will lead to splitting the fascia layer and formation of abdominal wall mass for intra-abdominal tissues or organs sticking out from split, which will severely affect patients life [5]. However, different area has different incidence. Till now, there are no data about the incidence of abdominal incisional hernia in developing countries. In this study, we selected two represented city, Aden of Yemen and Dalian of China, to estimate the incidence of incisional hernia in developing countries.

Methods

This two-center, retrospective cohort study carried out on 2096 patients with abdominal surgery in Aden Public Hospital and the Second Affiliated Hospital with Dalian Medical University from January 2006 to December 2011. Patients involved were diagnosed according to European practice guidelines for the treatment of inguinal hernia [6]. The cohort was followed from their first abdominal surgery until 1 year after their last abdominal surgery in the inclusion period for an event of hernia repair. All patients must be above 18 years old and have full records. Both sexes were included. The main inclusion criterion was an abdominal surgery between January 1, 2006 and December 31, 2011 in in-patients with no history of previous abdominal surgery and cases should have validation records. Before study initiation, the following exclusion criteria were defined: Diastasis recti without hernia, cases without intact and validation information.

Ethics statement

The results of the study were reported following the STROBE recommendations for strengthening the reporting of observational studies in epidemiology [7, 8]. Patient records and the data-set were anonymity before analysis.
Statistics

All statistical analyses were done with SPSS software, version 11.0. Continuous variables are presented as the mean ± SD. The comparability of the characteristics between the 2 study groups was evaluated using a Student t test for continuous variables and the chi-square test. P values of < 0.05 were considered statistically significant, and all tests were 2 tailed.

Results

A total of 2096 patients had abdominal surgery between January 2006 and December 2011. Of these, 82 were identified as having a subsequent hernia repair performed within 1 year after their abdominal surgery within the inclusion period. Analysis of hospital records excluded 51 cases. Of these, 39 had a history of previous abdominal surgery, 9 had no validation records, 2 hernias were not in the abdominal incision, 1 had diastasis recti without hernia. A total of 2045 cases of abdominal surgery and 80 hernias were included in the analysis. This study population comprised 986 males (57.2%) and 1059 females (42.8%), with a mean age of 49 ± 7.3 years. There were 202 cases with infected incision and 1843 with non-infected incision. In 20 cases the hernias occurred in an infected incision, in 60 cases in a non-infected incision.

In Aden Public Hospital, 1152 patients with abdominal operation were included. Of these, 109 cases had infected incision and 1043 cases non-infected incision. In 11 cases the hernias occurred in an infected incision, 1 had diastasis recti without hernia. In 39 cases the hernias occurred in an infected incision cases and in 43 cases in non-infected incision. In the Second Affiliated Hospital with Dalian Medical University, 893 patients with abdominal operation were included. Of these, 93 cases had infected incision and 800 cases non-infected incision. In 9 cases the hernias occurred in an infected incision cases and in 17 cases in non-infected incision.

Study design and flow including information are illustrated in Figure 1. Baseline characteristics are shown in Table 1.
Incisional Hernia in Aden and Dalian

The incidence of hernia is 80/2045 in total, 54/1152 in Aden and 26/893 in Dalian. The incidence of hernia is significantly higher in infected incision than that in non-infected incision (20/202 vs 60/1843, \( P < 0.05 \)) ([Table 2; Figure 2A, 2D]). There are no significantly differences in incidences of incisional hernia between Aden and Dalian. (Table 3; Figure 2B, 2C).

Discussion

This study found that: 1) a total incidence of 3.91% of developing an incisional hernia after an abdominal operation in developing countries and 9.90% in infected incision. 2) The incidence was significantly higher in infected incision than that in non-infected incision (9.90% vs 3.26%). 3) There were no significant differences in the incidences of incisional hernia between Aden of Yemen and Dalian of China (4.69% vs 2.91% in overall, 10.1 % vs 9.68% in infected incision).

The incidence of incision hernia was 3.91% within the first year after abdominal surgery in developing country, which is near the lower limited value of previous reports [1, 3, 4]. Our study thereby provided the epidemiological data of incisional hernia of Aden and Dalian in developing countries. However, it cannot be ruled out that patients who developed and incisional hernia within the first year after an abdominal surgery postponed repair of various reasons.

In this study, we also confirmed that infection of the incision can lead to incisional hernia with a higher incidence [3, 4]. We found no statistically significant differences between Aden and Dalian. Based on this study, the prevention of incision infection is very important for patients with abdominal surgery in Aden and Dalian.

Limitations

The development of incisional hernias may also be influenced by factors such as incision type,
BMI and co-morbidities such as hypertension and diabetes as well as mal-nutrition [3]. Unfortunately these variables were not available in all patients and we did not analyze these data. Also, two centers are not enough to reflect the status of all developing countries.

Disclosure of conflict of interest

None.

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