

Incidence of post open appendectomy incisional hernia in Erbil City

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Abstract

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Background: since acute appendicitis is the most common presenting diseases in the surgical emergency departments, Appendectomy regarded as a common emergency surgical procedure that is done by the surgeons in the general surgery specialty. The complication of an incisional hernia development after open appendectomy is rare, found in about 0.12% of the appendectomy operations; interstitial type of incisional hernia complication following open appendectomy surgery is extremely rare condition, small number of reports found to deal with the incisional hernia development at the site of appendectomy in a range of (0.4-0.7%).

Objective: To assess the incidence of incisional hernia following open appendectomy in Erbil province – Kurdistan region- Iraq.

Patients and Methods: This retrospective study involved 598 cases between the period of first of July 2015 to 30th of April 2020, the cases presented with features of acute appendicitis, after admission and complete history taking, surgical intervention (open appendectomy) has been done for all of them, follow up for the diagnosis of the post appendectomy incisional hernia development done throughout revising the files and ID s of the patients and contacting them or their close relatives via personal mobile numbers, others re-consulted us for any operation site discomforts, any patient with suspicion of operation site problems asked to return to the outpatient surgical room for follow up and excluding or confirmation of operation site incisional hernia. The patients followed up for about 2-3 years after the operation days and contacting period with the patients or their close relatives to exclude incisional hernia development at open appendectomy site took about 6 months.

Results: Out of 598 cases included in this retrospective study, 286 cases were male and 312 cases were female, the ages ranged between 5 and 91 years old with a mean and Standard Deviation (SD) 24.13, the age group of up to 10 years old included 13 cases, 2nd decade age group included 258 cases, while the third age group (21 – 30 years old) was included 167 cases. Risk factors for development of incisional hernia assessed among all cases, 56.85% of all cases had at least one of the risk factors and the remaining 43.15% devoid of any risk factors, the risk factors distributed among constipation (19.4%), pregnancy among female patients (18.9%), followed by diabetes mellitus, chronic cough and heavy working occupations (4.85%, 4.52% and 3.34% respectively), and BPH and anemia with other

immunocompromised risk factors made only about 5.8%, only three patients (0.5%) developed incisional hernia after open appendectomy.

Conclusion: Post open appendectomy incisional hernia is rare in patients without risk factors of wound dehiscence, with minimizing the risk factors of incisional hernia and wound dehiscence, the incidence of open appendectomy wound incisional hernia can be minimized to lowest rate.

Keywords: Post appendectomy incisional hernia, appendectomy site hernia, hernia after open appendectomy

Introduction

The pain of Acute Appendicitis typically begins as a generalized or peri-umbilical abdominal pain that may radiates to the right lower part of the abdomen and mostly followed by nausea and /or vomiting anorexia, and fever [1]. Ultrasound scan of the Abdomen for the diagnosis of this emergency condition as a standard imaging study now well accepted worldwide, because it has high specificity and Sensitivity [2]. Any age groups of the human being can be affected by Acute appendicitis, but often affects the populations in their second and third decades of their lives [3], since acute appendicitis is the most common presenting diseases in the surgical emergency departments, Appendectomy regarded as common emergency surgical procedures that is done by the surgeons in the general surgery department [4]. Incisional hernia development after open appendectomy is rare, found in about 0.12% of the appendectomy operations [5]; interstitial type of incisional hernia complication following open appendectomy surgery is extremely rare condition [6], small number of reports found to deal with the incisional hernia development at the site of appendectomy in a range of (0.4-0.7%) [7], meanwhile the development of An incisional hernia after abdominal operations in general is one of the most common surgical complication, with an approximate rate of 35% [8].

Attention has been drawn for the first time in 1911 for the development of the inguinal hernia on the right side following appendectomy procedure with drained wound, many of these patients had not only hernia on right inguinal region but associated appendectomy scar site hernia observed as well. They found that there is clear Correlation between the development of inguinal hernia following appendectomy procedure and the weakness of the abdominal wall because of the injury to the hypogastric nerve and ilio-inguinal nerve [9].

In spite of the surgical technique development, surgical instruments and materials advancement, incisional hernia still is a significant complication after any abdominal operation [10]. The incidence of incisional hernia development after abdominal operation is generally estimated to be about 10% [11], the incisional hernia after abdominal surgeries will happen within the first five years after the operation; however this complication may develop after this period [12].

Many factors has been implicated for the development of Incisional hernia after open appendectomy, such as: diabetes, obesity, female gender, advanced age, smoking, peritonitis, abscess, or phlegmon as the cause of the first operation, seroma or wound infection [13], technical factors such as the use of the interrupted suture technique for

closing the aponeurotic layer and the use of catgut suture materials for suturing the aponeurosis [14, 15].

The cause of incisional hernia development after appendectomy procedure through gridiron muscle-splitting technique is mostly due to wound infection in severely inflamed or gangrenous appendicitis with or without perforation and is associated with local purulent peritonitis [16]. Another cause of the development of such complication is the placement of drain through the incision site and tying the suture materials with tension while suturing the wound in the muscles of internal oblique and transverse abdominis causing muscle necrosis [6].

Two types of hernia may happen following open appendectomy procedure, the more common one is the hernia passing throughout all abdominal wall layers, while less common type is the interstitial hernia in which the defect is in the transverse abdominis and internal oblique muscle but the hernia will not pass through the aponeurotic layer of the external oblique muscle which is intact [6], this type of the incisional hernia is usually not diagnosed easily and often missed, this necessitate high index of suspicion, imaging studies such as ultrasound scan and sometimes CT scan as well [17].

As far as there is weakness of the fascia of the abdominal wall created by the herniation, Primary repair of such types of hernia is challenging, effective repair can be done via the use of synthetic mesh [18].

There are some surgical methods to close the abdominal wall defect: intraperitoneal onlay mesh (IPOM), IPOM-plus (when the mesh put after suturing the fascial defect), transabdominal preperitoneal (TAPP) repair

technique, or intracorporeal suturing of the defect [19–21]. There is no ideal choice between the mentioned techniques; hence, the knowledge of a wide range of surgical methods applied by surgeons of various skill levels is the ideal solution. Surgeon's choice is mostly depends on the size of the hernia defect. for the incisional hernias larger than 15 cm defect the laparoscopic approach is challenging, with a high complication rate as a result for these patients' open hernia repair techniques (the onlay, sub-layer (retromuscular), or inlay methods) are best alternatives [22,23]. For repairing smaller defects, laparoscopic procedures could be considered. Furthermore, when the hernia defect is less than 2 cm, the study [21] revealed that hernia defect suturing without the use of mesh is safe and feasible with low recurrence rate as well (4.1%).

Patients and Methods

This retrospective study involved 598 cases between the period of first of July 2015 to 30th of April 2020, the cases taken from east Erbil emergency hospital where presented with different features of acute appendicitis, after admission the names, ages genders, addresses, occupations, religions and phone numbers of them were taken as a part of basic history taking, they followed up with conservative management for several hours for the preparation of operation, surgical intervention has been done for all of them, those patients who respond to conservative treatments and discharged with medications and those who refused the operation to be done in our hospital for any cause (either chose laparoscopic intervention or consulted their own surgeons outside our hospital) excluded from the study, our

interventions were open appendectomy via classical Gridiron incision, specimens removed ranged between mild inflammation, appendicular mucocele and severely and gangrenous appendix with perforation and pelvic abscess, after the operation again follow up done for them in surgical wards for a period of 12 – 24 hours, hence complete history of past medical chronic diseases such as anemia, chronic cough, chronic constipation, benign prostatic hyperplasia BPH, other causes of wound dehiscence as diabetes, obesity, pregnancy status, heavy weight lifting with drug history and past surgical history taken, most of the cases discharged with uneventful post-operative period with providing instruction for oral intake, post-operative medication usage, and outpatient follow up with appointments for stitch removal and wound checking, follow up for the diagnosis of the post appendectomy incisional hernia development done throughout revising the files and ID s of the patients and contacting them via personal mobile numbers (those not answered also excluded in the study) for any discomfort, swelling, bulge and lump feeling at the operation sites, others re-consulted us for any operation site discomforts, any patient with suspicion of operation site problems asked to return to the outpatient surgical room for follow up and clinical examination with sending relevant and necessary investigations for excluding or confirming the appendectomy site status including, seroma, hematoma, foreign bodies and hernia, the follow up and period of observing the development of incisional hernia was ranged between 2-3 years after the operation and the contacting period with the patients or their

close relatives took a period of about 6 months.

Statistical Analysis

Data entry for all the details of the ID of the patients and calculating the data including name, age, gender, address, occupations, date of admission and date of operation, risk factors for wound dehiscence, incisional hernia and wound infection, done throughout Microsoft Excel version 2010.

Results

Out of 598 cases included in this retrospective study, 286 cases (47.83%) were male and 312 cases (52.17%) were female Figure (1), the ages ranged between 5 and 91 years old with a mean and Standard Deviation (SD) 24.13, the age group of less than 10 years old included 13 (2.17%) cases (9 male and 4 female), 2nd decade of age group included 258 (43.14%) cases, while the third age group (21 – 30 years old) was included 167 (27.93%) cases, 112 (18.73%) of cases were among the age group of 31-40 years old, 41-50 years age group made about 5.18% of the total cases, meanwhile only 17 cases (2.84%) recorded among age groups more than 50 years old Table (1), male cases predominated only among the age group of less than 10 years old (more than two third vs. less than one third), in contrast to all other age groups where there is generally slight predominance of female incidence particularly among age groups of 41-50 and 51-60 where there is significant female predominance (58.17% vs. 41.83%) and (62.5% vs. 37.5%) respectively (figure 2), risk factors for development of incisional hernia assessed among all cases, 56.85% of all cases had at least one of the risk factors and the remaining 43.15% devoid of any risk

factors, the risk factors distributed as follows: constipation 19.4%, pregnancy among female patients within 6 months 18.9%, followed by diabetes mellitus, chronic cough and heavy working occupations (4.85% ,4.52% and 3.34% respectively), and BPH and anemia with other immunocompromised risk factors made only about 5.8% Figure (3), only three patients (0.5%) developed incisional hernia after open appendectomy Figure (4), one of them was 46 years old female, had past medical history of diabetes mellitus and she was obese (132 kg), operation done for her and the intra operative finding was

gangrenous appendicitis, following discharge after 24 hr with medical consultation for diabetes control she returned back after 5 days to the casualty for huge discharge from the wound site. The second case was 59 years old male patient with history of benign prostatic hyperplasia and refractory to treatment, meanwhile the third case was heavy smoker 42 years old male patient with history of chronic cough, he had an occupation of heavy worker, instruction provided to give up smoking and consultation done for treating the chronic cough.

Table (1): Distribution of the patients according to age groups

Age range	Number (%)	Male No. (%)	Female No. (%)
up to 10 years	13 (2.17)	9 (69.23)	4 (30.77)
11-20 years	258 (43.14)	125 (48.45)	133 (51.55)
21-30 years	167 (27.93)	78 (46.71)	89 (53.19)
31-40 years	112 (18.73)	54 (48.21)	58 (51.79)
41-50 years	31 (5.18)	13 (41.93)	18 (58.17)
51-60 years	8 (1.34)	3 (37.5)	5 (62.5)
more than 60	9 (1.5)	4 (44.44)	5 (55.66)
Total	598 (100.00)	286 (47.83)	312 (52.17)

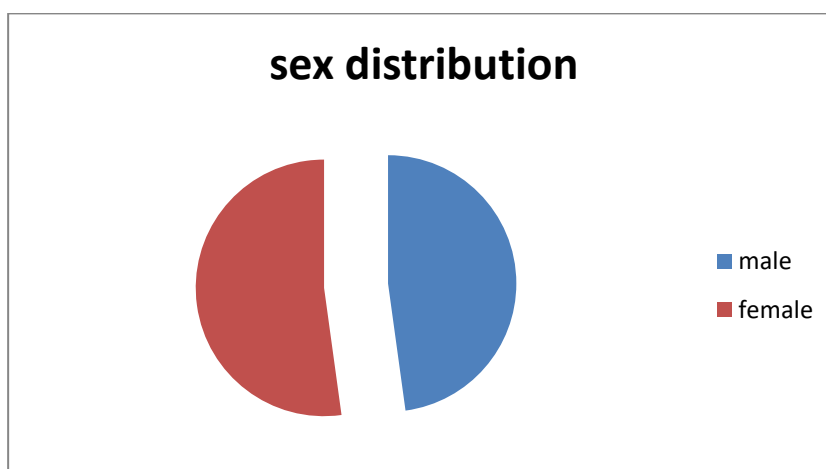


Figure (1): Distribution of the patients according to the percentage of sex distribution

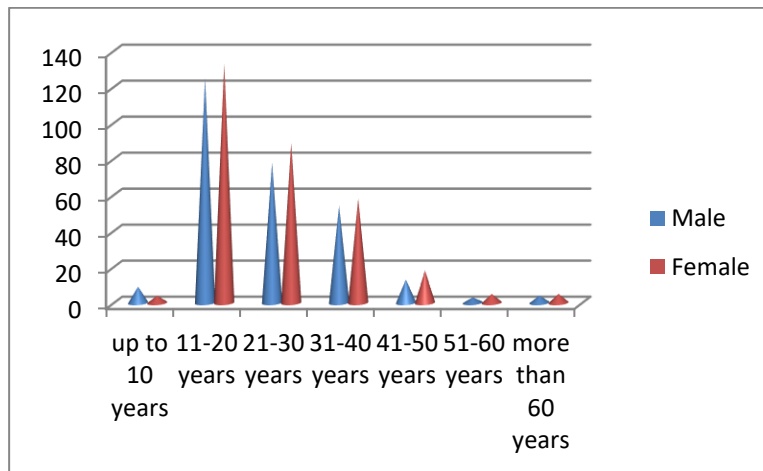


Figure (2): Distribution of the patients according to age group and sex incidence of acute appendicitis.

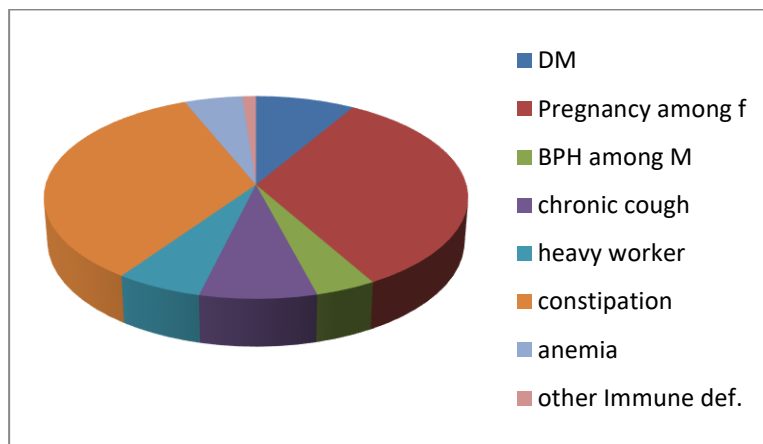


Figure (3): Percentage of the risk factors of wound dehiscence and incisional hernia among the patients

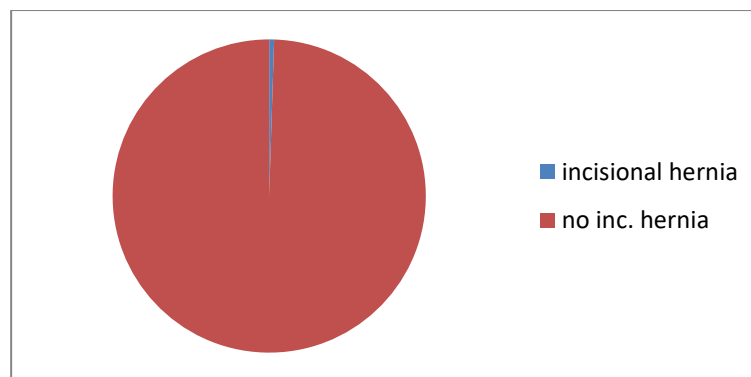


Figure (4): incidence of appendectomy wound incisional hernia among the patients

Discussion

This study reported the clinical findings of those cases presented to our emergency

hospital in Erbil city, so the results cannot be applied to all populations in other countries or other cities in our country. Most of the

cases were Iraqis (with minority from Iran, turkey, Lebanon and Syria) and very little number of Indian, Bangla, and Philippine, so the results may differ from other studies done in other countries or among other populations.

An epidemiological feature of acute appendicitis is the marked incidence variation according to sex and age, previous studies that showed the highest incidence rate in patients in their teens [24, 25 and 26] this result is nearly the same as our study result when more than 43% of the cases recorded among this group Table (1). Other studies showed that acute appendicitis can affect any age groups, but it usually affects people aged between 10 and 30 years [3], again this result is very close to our results that showed more than 71% of all cases belonging to the age groups between 10 and 30 years old Table (1). Male to female ratio of acute appendicitis ranged from 2.2:1 to 3.3:1. This result varied widely in our study which showed nearly equal incidence in spite of slightly female predominance (47.83 % male vs. 52.17% female). In spite of several studies that show declining the incidence of appendicitis with increasing age [24, 27] which is concordance with the result of our study that showed only 17 cases (2.84%) of the patients belonging to the age groups of more than 50 years old recorded in our study Table (1), however studies have showed an increased incidence in the 60 year and above population. For example, Roger et al. reported rising the incidence of complications of acute appendicitis particularly perforated appendicitis in the 60 year and above population for people of Asian or African descent [28] in contrast to our study which

revealed only 9 cases (1.5%) among all 598 cases belonging to the age group of more than 60 years old, this may be due to restricted capacities of our hospital in regards to anesthetic and ICU with RCU issues to deal with complicated surgical conditions and those patients having multiple comorbidities, hence they refused to do operation in our hospital and they discharged on their responsibilities to consult other surgeons and to do the operation in private hospitals. increased incidence in the 55–79-year-old male population found in the study of Lee et al. [25], meanwhile male and female among the age group of more than 60 years old are nearly equally affected in our study (4 cases Vs. 5 cases) Figure (2) and Table (1).

Studies reported that Males have 1.4 times higher incidence than females for presenting the symptoms of acute appendicitis among all age groups [29], this result has also discrepancy with our study result that showed the affection of acute appendicitis is nearly equal in the incidence between two genders in spite of slight female predominance (52.17% Vs. 47.83%) Figure (1).

Found that teen age group In the United States has the highest incidence of acute appendicitis [30] this finding was also observed in our study when the age group of 10-20 years old made up about 43.14% of the total cases among the sample. Acute Appendicitis is uncommon in extreme age groups (below 5 years and above 50 years of age)[31], other studies showed that Acute Appendicitis is known to be the disease of young age groups, and only 5-10% of cases will occur among old age groups [32-34] these results are also observed in our study since only 2.17% of our cases were below

age of 10 years, we think that one of the reasons of our finding of low report of those cases below 10 years is due to the presence of another hospital in the city which is special for pediatric diseases and pediatric operations, so most of the pediatric cases may consult the emergency department of that hospital where the operation done for them by the pediatric surgeons, again in our study only 1.5% of our cases were above 60 years old, however, the incidence of the disease among this age group seems to be increasing because of the recent rise in the life expectancy [32-34] but this finding not observed in our study it may be due to lack of rise in life expectancy in our country.

In our study only we focused on the development of post open appendectomy incisional hernia as a complication of the procedure with a result of only 0.5% of all cases affection by this complication which is very close to a median incidence of another studies and reports which showed a range of (0.4-0.7%) [7], other studies recorded only 0.12% affection rate of the incisional hernia following open appendectomy procedure [5], our explanation of the higher rate of the complication in comparison to the mentioned study is the presence of the factors related to the patients themselves and disease factors apart from the technical, theater and surgeons factors since all 3 cases who developed the complication had risk factors for wound dehiscence and incisional hernia formation (particularly intra-abdominal hypertension and wound infection), apart from the recorded three cases no other incisional hernia recorded in our study, interstitial type of incisional hernia after open appendectomy procedures is extremely rare

complication [6], this sub-type of the incisional hernia not found in our study.

To our knowledge one of the main strong points of our study is that it is the first study done among Iraqis patients about the post open appendectomy incisional hernia, further studies need in the future to determine the main risk factors causing such hernia in order to prevent their occurrence.

Conclusions

Post open appendectomy incisional hernia is rare in patients without risk factors of wound dehiscence, Through good pre-operative preparation and post-operative management of the patients in combination to providing instruction to those post-operative patients who have obvious risk factors of wound dehiscence and incisional hernia, post open appendectomy inguinal hernia can be prevented or reduced to a minimum range.

Recommendations

To minimize the incidence of incisional hernia at the surgical site of open appendectomy, it is crucial to prevent or treat the reversible risk factors of wound dehiscence.

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Ethical clearance: Ethical approval was obtained from the College of Medicine / University of Diyala ethical committee for this study.

Conflict of interest: Nil

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نسبة حدوث فتق جراحي بعد عملية استئصال الزائدة الدودية المفتوحة في محافظة

أربيل

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المخلص

خلفية الدراسة: بما أن التهاب الزائدة الدودية الحاد هو الأكثر شيوعاً بين الأمراض في أقسام الطوارئ الجراحية، واستئصال الزائدة الدودية كإجراء جراحي طارئ شائع يتم إجراؤه بواسطة الجراحين في تخصص الجراحة العامة. مضاعفات الفتق الجراحي بعد استئصال الزائدة الدودية المفتوحة أمرًا نادرًا، حيث يوجد في حوالي 0.12% من الحالات عمليات استئصال الزائدة الدودية؛ النوع الخلاقي من الفتق الجراحي بعد جراحة استئصال الزائدة الدودية المفتوحة نادرة للغاية، تم العثور على عدد قليل من التقارير حول الفتق الجراحي في موقع استئصال الزائدة الدودية التي تبلغ (0.4-0.7%).

اهداف الدراسة: لتقييم حدوث الفتق الجراحي بعد عملية استئصال الزائدة الدودية المفتوحة في محافظة أربيل – إقليم كردستان – العراق.

المرضى والطرائق: شملت هذه الدراسة بأثر رجعي 598 حالة خلال الفترة من الأول من تموز 2015 إلى 30 نيسان 2020، الحالات زاروا المستشفى بسبب الاعراض وعلامات التهاب الزائدة الدودية الحاد، بعد ادخالهم المستشفى وأخذ التاريخ الكامل للحالة، والتدخل الجراحي (استئصال الزائدة الدودية المفتوحة). تم إجراؤها لجميعهم، ومتابعة الحالات استئصال الزائدة الدودية، حدوث الفتق الجراحي خلال مراجعة ملفات وهويات المرضى والاتصال بهم أو بأقاربهم المقربين عبر أرقام الهواتف المحمولة الشخصية، أعاد مرضى الآخرون استشارتنا بشأن أي اعراض حدثت في مواضع جروح العمليات، يطلب من أي مريض يشبهه في وجود مشاكل في موقع العملية القيام بذلك العودة إلى غرفة استشارية الجراحية للمرضى للمتابعة وتشخيص حالاتهم والتأكد من حدوث أو عدم حدوث الفتق الجراحي أو أي مضاعفات أخرى في موقع العملية. تمت متابعة المرضى لمدة 2-3 سنوات بعد أيام العملية وفترة الاتصال مع المرضى أو أقاربهم المقربين لاستبعاد حدوث الفتق الجراحي في موضع العملية استغرق حوالي 6 أشهر.

النتائج: من أصل 598 حالة شملتها هذه الدراسة بأثر رجعي، 286 حالة ذكراً و312 حالة إناثاً، تراوحت أعمارهم بين 5 و91 عاماً بمتوسط وانحراف معياري (SD 24.13) سنة، للفئة العمرية ما دون عمر 10 سنوات شملت 13 حالة، والفئة العمرية في العقد الثاني شملت 258 حالة أما الفئة العمرية الثالثة (21 – 30 سنة) فقد شملت 167 حالة. عوامل الخطر لتطويع الفتق الجراحي التي تم تقييمها بين جميع الحالات، 56.85% من جميع الحالات كان لديها على الأقل واحد من عوامل الخطر والباقي 43.15% خالية من أي عوامل خطر تتوزع عوامل الخطر عليها الإمساك (19.4%)، يليه الحمل بين المرضى الإناث (18.9%)، بسبب مرض السكري والسعال المزمن والمهن الشاقة (4.85%) و 4.52% و 3.34% على التوالي، وتضخم البروستات الحميد وفقر الدم مع غيرها، عوامل الخطر المناعية لوحظت في حوالي 5.8% من المرضى فقط، ثلاثة مرضى فقط (0.5%) أصيبوا بفتق جراحي بعد عملية استئصال الزائدة الدودية المفتوحة.

الكلمات المفتاحية: الفتق الجراحي بعد عملية استئصال الزائدة الدودية أمر نادر، مع التقليل من عوامل الخطر من الفتق الجراحي وتفرز الجرح يمكن تقليل الفتق الجراحي الناتج عن جرح الزائدة الدودية إلى أقل معدل.

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