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Original Research Article

Thickness of subcutaneous fat in the right iliac fossa as a predictor of surgical site infection in open appendicectomy- a single centre prospective study

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ABSTRACT

Background: Acute appendicitis is the acute inflammation of appendix accounting to 7-10% of acute abdomen cases. The complications vary from surgical site infection to enterocutaneous fistula and stump appendicitis. The surgical site infections after appendicectomy are postoperative nosocomial infections affecting the incision site, deeper tissues and organs at the operative site within 30 days of surgery. The study was aimed at predicting subcutaneous fat thickness causing surgical site infection in open appendicectomy wounds.
Methods: This prospective study was conducted in Trichy SRM Medical College Hospital and Research Centre, Tamil Nadu from January to June 2021 in 82 patients. Patients who underwent open appendicectomy for uncomplicated acute appendicitis were included. Patients underwent preoperative Ultrasound abdomen to measure the subcutaneous fat thickness in right iliac fossa and was correlated with post operative surgical site infection for 1 month. The subcutaneous fat thickness was divided into three groups; I- 5.5 mm and below, II- 5.5 to 7.5 mm and III- more than 7.5 mm.
Results: The results show that there was an increased association of surgical site infection in patients with increased subcutaneous fat thickness at incision site with mean of 6.25 and SD of 1.49.
Conclusions: The study showed that subcutaneous fat thickness is a predictor for development of surgical site infection in open appendicectomy wounds. The subcutaneous fat thickness association in causing surgical site infection in open appendicectomy wounds is of linear association.

Keywords: Acute appendicitis, Open appendicectomy, Subcutaneous fat thickness, Surgical site infection, Ultrasound abdomen

INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdomen accounting to 7-10% of cases.[1] Acute appendicitis is the acute inflammation of appendix which is common in young individuals. The sex predilection is more to females than male. The complication of acute appendicitis includes gangrenous appendix, early mass formation and perforated appendix, where the later carry high mortality accounting to 5% of cases.

McBurney was the first to report appendicectomy as the treatment for acute appendicitis and surgery has been the standard treatment strategy for acute appendicitis since 1889. The diagnostic workup for appendicitis could be improved by using clinical scoring systems that involve physical examination and evaluating inflammatory markers. Many simple scoring systems have been used to aid in predicting the risk of acute appendicitis, but none has been widely accepted as a standard algorithm. The further invention of various radiological imaging

techniques has led to rethink on non-operative management of acute appendicitis.

The most common post operative complication of appendicectomy include surgical site infection (SSI). SSIs after appendicectomy are postoperative nosocomial infections affecting the surgical incision site, deeper tissues and organs at the operative site within 30 days after appendicectomy.[2] Surgical site infection following appendicectomy is a serious concern that increases financial burden for both the healthcare system and the patient. It also has a serious negative impact on the patient's health-related quality of life.

Surgical site infections can be due to various causes like malnutrition, severe sepsis, aseptic surgical practice. However the subcutaneous fat pad thickness in the right iliac fossa as a predictor of surgical site infection in open appendicectomy and its correlation studies is minimal.[3] The study was aimed at predicting the subcutaneous fat thickness causing surgical site infection in open appendicectomy wounds.

METHODS

This prospective study was conducted in Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamil Nadu for a period of 6 months from January 2021 to June 2021 with sample size of 82 after obtaining Ethical committee clearance. Patients who underwent open appendicectomy for uncomplicated acute appendicitis in our hospital and satisfying the inclusion criteria were included in the study. Patients diagnosed to have acute appendicitis underwent preoperative ultrasound abdomen to measure the subcutaneous fat thickness in right iliac fossa and was correlated with post operative surgical site infection for a period of 1 month. The subcutaneous fat thickness was divided into three groups; I- 5.5 mm and below, II- 5.5 to 7.5 mm and III- more than 7.5 mm.

Inclusion criteria

Patients diagnosed to have uncomplicated acute appendicitis.

Exclusion criteria

Immunocompromised patients, previous abdominal surgeries, complicated acute appendicitis.

Statistical analysis

The data were analyzed using the SPSS version 22.0 (SPSS, Chicago, IL, USA). Continuous parametric variables were presented as the mean±SD, whereas nonparametric data were presented as 5% to 95% confidence intervals. Unpaired t-tests were used to compare parametric variables and the chi-square test for nonparametric data. Categorical data were analyzed by the tests and contingency tables. Univariate and multivariate logistic regression analyses were performed to identify possible predictors of postoperative surgical site infection

RESULTS

Age

In the given sample size of 82 the age was divided as less than 20, 20-40 years and more than 40 years. The number of subjects in age group of less than 20 years were 26 and in age group of 20-40 years were 43 and in age group of more than 40 years were 13.

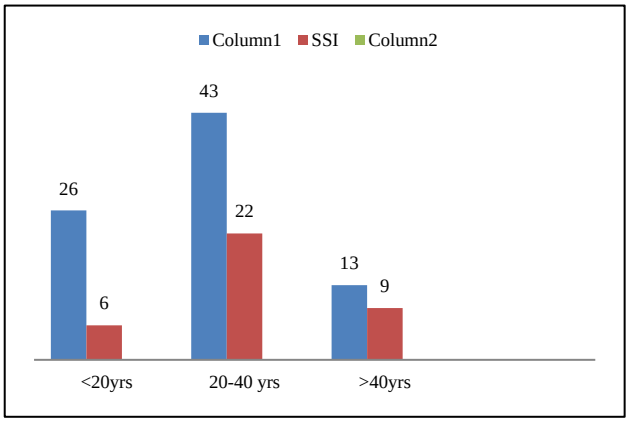

Figure 1: Age distribution with correlation with SSI association.

The SSI was noted in 6 subjects in age group of <20 years with 22 in group of 20-40 years and 9 in group of more than 40 years.

Sex

In the present study with sample size of 82, 59 subjects were males and 23 were females. The incidence of SSI among gender were 26 in males and 11 in females.

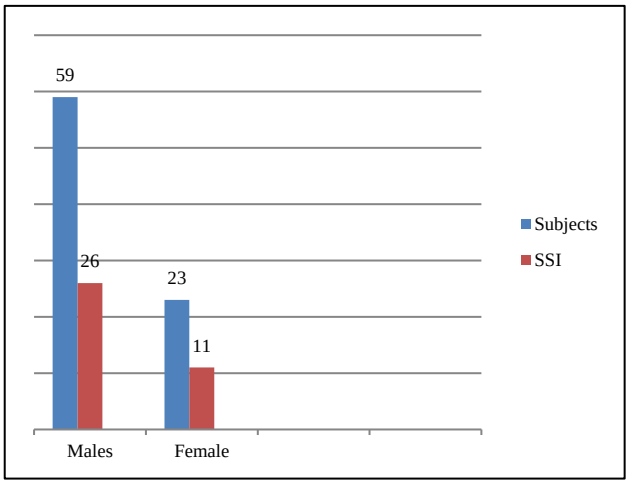

Figure 2: Sex distribution with SSI correlation.

Subcutaneous fat thickness

The present study divided the fat thickness in 3 groups: group I- thickness of less than 5.5 mm; group II- 5.5-7.5 mm; group III- thickness of more than 7.5 mm.

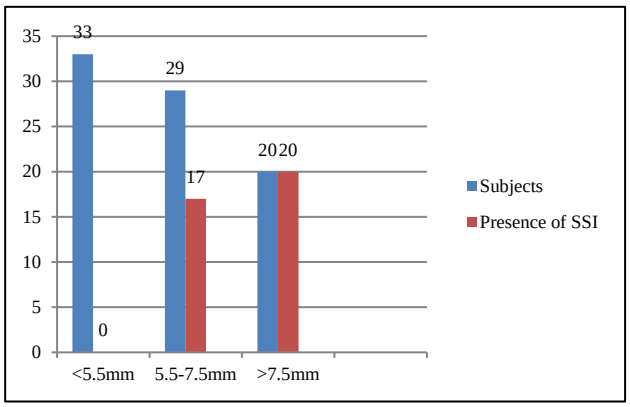

Figure 3: Correlation of SSI with subcutaneous fat thickness.

Table 1: Subcutaneous fat thickness on USG (in mm).

SSI	Mean	N	SD	Min.	Max.
N	5.10000	45	0.686890	3.800	6.500
Y	7.67027	37	0.867584	5.700	9.400
Total	6.25976	82	1.498959	3.800	9.400

In the present study, the incidence of SSI was nil in group I, 17 in group II and 20 in group III 0%, 58.6% and 100% respectively.

DISCUSSION

Acute appendicitis is the most common cause of acute abdomen. The incidence accounts to 7-10%. The acute appendicitis is the acute inflammation of appendix. The presentation is more common in young age group individuals affecting more of females.[4] The diagnosis of acute appendix is by clinical, biochemical and radiological methods.[5]

There are various clinical-biochemical scoring system present but none of them is widely accepted. The complications of acute appendicitis vary from early postoperative such as surgical site infection to late post operative such as enterocutaneous fistula and stump appendicitis.[6]

Surgical site infection is defined as the post operative wound site infection which can be further classified as early (upto 30 days) to late (upto 6 months).

The surgical site infections after appendicectomy are postoperative nosocomial infections affecting the incision site, deeper tissues and organs at the operative site within 30 days after the surgical procedure. Surgical site infections can be due to various causes like malnutrition, severe sepsis, aseptic surgical practice.[7] However, the subcutaneous fat pad thickness as a predictor of surgical site infection in open appendicectomy and its correlation studies is minimal. The study was aimed at predicting subcutaneous fat thickness causing surgical site infections in open appendicectomy wounds.[8] Surgical site infection following appendicectomy is a serious postoperative concern that increases the financial burden for both the healthcare system and the patient. It also has a negative impact on the patient's health-related quality of life.[9]

The studies correlating subcutaneous fat thickness and surgical site infection is minimal.[10] In this study the association of surgical site infection with subcutaneous fat thickness was studied. The results show there was an increased association of SSI in patients with increased subcutaneous fat thickness at incision site with mean of 6.25 and SD of 1.49.

The study shows the increased incidence of appendicitis among males when compared with females. Among 59 males, 26 males developed Surgical site infections. Out of 23 females, 11 developed surgical site infections. Out of 33 patients who had subcutaneous fat pad thickness belonging to group I (<5.5 mm), none of them developed surgical site infection. Out of 29 patients with subcutaneous fat pad thickness belonging to group II (5.5-7.5 mm), 17 developed surgical site infection. Out of 20 patients with subcutaneous fat pad thickness belonging to group III (>7.5 mm), all 20 patients developed surgical site infection which is significant.

This study has certain limitations. Ultrasound is operator dependent, so standardization for the measurement of subcutaneous fat thickness is essential and it was performed by different radiology residents. Surgical site infections can be caused by other factors which were not evaluated in this study. Other postoperative complications were not analysed and complicated cases were excluded in our study.

CONCLUSION

The study showed that subcutaneous fat thickness is a predictor for the development of surgical site infection in patients with acute appendicitis who underwent open appendicectomy in our hospital. The subcutaneous fat thickness association in causing surgical site infection in open appendicectomy wounds is of linear association.

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