

Original article

A study of Burst Appendix, 200 Cases in DMCH.

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Abstract

Acute appendicitis is the most common surgical emergency, with 16% of the population undergoing appendectomy. Burst appendix is one of the complications of acute appendicitis and occurs 25% cases that is associated with increased morbidity and mortality and hence regarded as a surgical emergency.¹ This study focuses on the pattern of presentation, risk factors, accuracy of clinical diagnosis, morbidity and mortality of patients managed for perforated appendicitis in DMCH. This observational study was carried out in the department of surgery, Dhaka Medical College Hospital, Dhaka, from January 2012 to December 2012. Total 200 cases of suspected burst appendicitis were included in this study. Among the 200 cases of suspected burst appendix patients, majority of the cases 48% were of 25 – 34 years age group. Most of the cases 71% were male and 29% were female. Higher income group of patients are less sufferer 8%, origin of pain from umbilicus 74.50% and from RIF 25.50%, nausea in 71.89%, vomiting in 64.05%, anorexia in 32.67%, fever in 50.32%, diarrhea in 5.22% and abdominal distension in 8.49% cases. Tenderness over RIF was present in 100% cases, rebound tenderness was present 80.39% cases, rigidity over RIF was 84.96% patients, Cough test was positive 54.90% cases, Diffuse abdominal tenderness in 87.58% cases, Abdominal distention in 13.07% cases and absent of bowel sound in 40.52% cases. Maximum number of patients reported after 3-4 days of onset of symptoms. Ultrasonogram shows normal findings in 55.56% and suggesting ruptured appendicitis in 44.44% cases. Operative findings of those patients, 33.33% cases presented with only burst appendix without local sequel and 35.29% cases present with generalized peritonitis, 13.73% cases present with localized peritonitis, 10.46% cases present with localized abscess, 5.23% cases present with periappendiceal fluid collection and extraluminal appendolith present in 1.96% cases. Burst appendix present a challenge to the clinicians because it can be delay in diagnosis, result in delay in operation and can be developed fatal complication. So we emphasize on careful history taking and physical examination in such cases can make the difference between life and death.

Keywords: Burst appendix, Tenderness, abdominal distention.

Introduction

The appendix is a small, finger-shaped organ in the right lower quadrant of the abdomen. About 16% of the population undergoing appendectomy¹ due to its inflammation. The main cause of appendicitis, is a blockage inside it. This organ tends to get blocked by feces or due to some infections caused by bacteria or virus. As a result, pressure builds up inside it, the normal blood flow gets affected and it swells up. When it is badly inflamed and infected, there is a possibility of a perforated appendix and perforation occurs in 25% of cases¹. One of the major reasons for the perforation of the appendix is the delay in diagnosis and treatment of the acute appendicitis. Usually, the perforation may

happen after 36 hours of the onset of symptoms, but the chances are higher after 48 hours. This is a life-threatening condition, as bursting of the appendix can result in spread of the infection in the entire abdomen. So, surgery is indispensable and should be performed without any unnecessary delay. However, appendectomy can be complicated after the perforation of the appendix, as compared to the surgery which is performed to remove an inflamed appendix which is intact.

The symptoms and signs are more or less the same as appendicitis, but their intensity is more severe. The person with appendicitis will be having abdominal pain, especially in the right lower abdomen. As the

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appendix perforates, the pain may subside briefly. But, as the surroundings get infected and inflamed, the pain resurfaces and worsens with time. The area becomes tender and the muscles guard appears. Even a small movement that involves the digestive system (like coughing, sneezing, deep breaths or walking) can cause extreme pain High fever is another key symptom found in these patients once the appendix perforates. When there is only a minor swelling in the appendix, one gets a mild fever. The digestive system is badly affected due to this condition. It leads to improper bowel movements, and the patient may suffer from diarrhea. Signs of peritoneal irritation beyond the right lower quadrant indicates perforation. Digital rectal examination may reveals tenderness, boggy mass and mass in perforated cases. Peritonitis from a perforated appendix leads to shock if not treated.

Materials and methods: This was observational study and carried out in the department of surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh, from January 2012 to December 2012. Total 200 cases of suspected ruptured appendicitis were included in this study. We excluded children under the age of 15 years and Patients operated in the gynaecological department.

Some Operational definition, High income groups: Monthly income of guardian >20,000 taka. Middle income groups: Monthly income of guardian 10,000 - 20,000 taka. Low income groups: Monthly income of guardian <10,000 taka. Different types of variables evaluated like, Symptoms: Pain in abdomen, Nausea, Vomiting, Fever, diarrhea, Anorexia, Abdominal distention, Duration of symptoms. Signs: General examination (Dehydration, Temperature, Pulse, BP). Abdominal examination: (Tenderness in RIF, Diffuse tenderness, Rebound tenderness, Pointing sign, Rovsing's sign, Psoas test, RIF muscle rigidity, Abdominal distention, Obliteration of liver dullness, Bowel sounds.) Rectal examination : (Tenderness on right side, Tenderness on recto-vesical or recto-uterine pouch) Investigations: Laboratory findings, Plain x-ray abdomen, USG of whole abdomen. Operative findings: Site of perforation, Generalized peritonitis, Localized peritonitis, Localized abscess, Periappendiceal fluid collection, Extra luminal appendolith. Early postoperative complications: Fever, Wound infection, Pneumonia, Intra-abdominal abscess, Wound dehiscence Burst abdomen, Prolong paralytic ileus. Confounding variables: Age, Sex, Socioeconomic condition, Nutritional status.

Detailed information was obtained in each case. Complete history was taken either from patients or accompanying attendants. Thorough physical examination was done. Relevant investigations and operation notes were collected. All the information was recorded in the fixed protocol.

Collected data was classified, edited, coded and entered into the computer for statistical analysis by using SPSS.

Results:

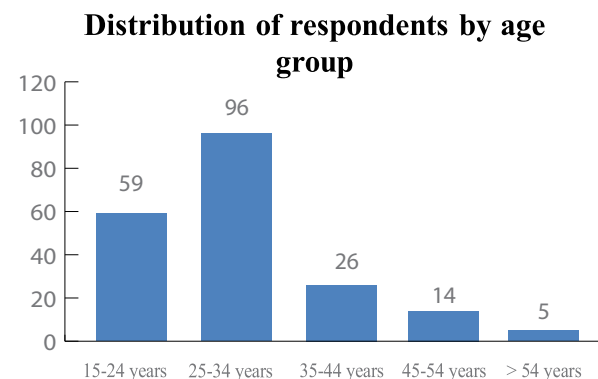


Figure 1: Age distribution of the study population

Figure shows age group distribution of the study population, majority of the cases 48% were of 25 – 34 years age group, 29.5% were of 15 – 24 years age group, 13% were of 35 – 44 years age group and other age group patients were few in number.

Distribution by sex

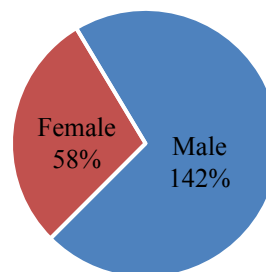


Figure 2: sex distribution of the patients

Figure 2 shows that most of the cases 71% were male and 29% were female.

Table 1: Socioeconomic status of the patients

Status	Numbers	Percentage
High income group	16	8
Middle income group	118	59
Low income group	66	33
Total	200	100%

Table shows socioeconomic status of the study population, 8% were from higher income group, 59% were from middle income group and 33% were from lower income group, classification was made from monthly income of guardian.

Table 2: Presenting symptoms of burst appendix

Symptoms	Number of patients	Percentage
Pain in abdomen	153	100%
Origin of pain	114	74.50%
Umbilicus RIF	39	25.50%
Shifting to RIF Whole abdomen	76	66.67%
Nausea	10	11.40%
Vomiting	110	71.89%
Anorexia	98	64.05%
Fever	50	32.67%
Diarrhoea	77	50.32%
Abdominal distention	8	5.22%
	13	8.49%

Table shows all the patients (100%) were presented with sudden onset of abdominal pain, 74.50% started around the umbilicus and then shifted to the right iliac fossa in 66.67% and whole abdomen in 11.40%.

Table 3: Physical signs of burst appendix

Signs	Number of patients	Percentage
General examination		
Dehydration	60	39.21%
Pulse		
<100/m	81	52.94%
>100/m	72	47.05%
Blood pressure		
Normal (> 90/60 mmHg)	142	92.81%
Hypotension (<90/60 mmHg)	11	7.19%
Temperature	76	49.67%
Normal >99 °F	77	50.32%
Abdominal examination		
Tenderness in RIF	153	100%
Diffuse abdominal tenderness	134	87.58%
Rebound tenderness	123	80.39%
Cough test	84	54.90%
Pointing sign	5	3.26%
Rovsing's sign(+ve)	40	26.14%
Psoas test(+ve)	50	32.67%
RIF muscle rigidity	130	84.96%
Abdominal distention	20	13.07%
Bowel sound absent	62	40.52%
Obliteration of liver dullness	4	2.6%
Digital rectal examination		
Tenderness on right side	15	9.80%
Tenderness on recto-vesicle or recto-uterine pouch	12	7.84%

Table shows tenderness in RIF in all the patients.

Table 4: Duration of symptoms of burst appendix patients

Duration of symptoms before attending to hospital (Days)	Number of patients	Percentage
<1	4	2.61%
1	6	3.92%
2	22	14.38%
3	59	38.56%
4	48	31.38%
>4	14	9.15%
Total	153	100%

Table shows maximum number of patients reported after 3-4 days of onset of symptoms.

Table 5: Leucocytes count of burst appendix patients

Cell count	Number of patients	Percentage
Leucocytes count		
<11×10 ⁹ /L	64	41.83%
>11×10 ⁹ /L	89	58.17%
Neutrophil count		
>70%	105	68.63%
<70%	48	31.37%

Table shows leucocytes count >11×10⁹/L is 58.17% and neutrophil count >70% is 68.63%.

Table 6: Plain x-ray of abdomen in erect posture of burst appendix patients

Findings	Number of patients	Percentage
Normal	96	62.75%
Intestinal obstruction (multiple air fluid level in small bowel)	42	27.45%
Peritonitis (ground glass appearance)	11	7.19%
Free gas shadow under doom of diaphragm	4	2.61%
Total	153	100%

Table shows plain x-ray abdomen in erect posture is normal in 62.75%, intestinal obstruction in 27.45%, peritonitis in 7.19% and free gas shadow under doom of diaphragm in 2.61%.

Table 7: Ultrasonogram of abdomen of burst appendix patients

Findings	Number of Patients	Percentage
Normal findings	85	55.56%
Suggesting burst- appendicitis	68	44.44%
Total	153	100%

Ultrasonogram shows normal findings in 55.56% and suggesting ruptured appendicitis in 44.44%.

Table 8: Operative findings of burst appendix

Type of findings	Number of patients	Percentage
Burst appendix without local sequel	51	33.33%
Generalized peritonitis	54	35.29%
Localized peritonitis	21	13.73%
Localized abscess	16	10.46%
Periappendiceal fluid collection	8	5.23%
Extra luminal appendolith	3	1.96%
Total	153	100%

Table shows that 33.33% cases presented with only burst appendix without local sequel and 35.29% cases present with generalized peritonitis. 13.73% cases present with localized peritonitis, 10.46% cases present with localized abscess, 5.23% cases present with periappendiceal fluid collection and extra luminal appendolith present in 1.96% cases.

Table 9: Site of perforation of appendix

Site	Number of patients	Percentage
At the tip	72	47.06%
At the base	47	30.72%
At the body	29	18.95%
At the base with involvement of caecum	5	3.27%
Total	153	100%

Table shows that appendix was perforated at the tip of appendix in 47.06% of patients, at the base of appendix in 30.72% of patients, at the body of appendix in 18.95% of patients and at the base with involvement of caecum in 3.27% of patients.

Table 10: Diagnostic accuracy

Diagnosis	Number of patients	Percentage
Correct diagnosis	153	76.5%
Incorrect diagnosis	47	23.5%
Total	200	100%

Depending on clinical features accuracy of clinical diagnosis is 76.5%.

Table 11: Initial outcome of burst appendix

Outcome	Number of patients	Percentage
No complication	52	33.98%
Fever	74	48.37%
Wound infection	70	45.75%
Wound dehiscence	29	18.95%
Burst abdomen	11	7.18%
Pneumonia	4	2.61%
Intra-abdominal abscess	1	0.65%
Prolong paralytic ileus	44	28.76%

Table shows that patients discharged from hospital without any complication was 33.98%. Fever in 48.37%, wound infection in 45.75%, wound dehiscence in 18.95%, burst abdomen in 7.18%, pneumonia in 2.61%, intraabdominal abscess in 0.65% and prolong paralytic ileus in 28.76% cases.

Discussions

Appendicitis is the most common abdominal surgical emergency and most common complication of acute appendicitis is burst appendix. The diagnosis of burst appendix remains mostly on the basis of clinical manifestation as like acute appendicitis. The problem in making a clinical diagnosis of burst appendix is that in addition to appendicitis, there other possible surgical and non-surgical causes of lower abdominal pain. The signs and symptoms associated with appendicitis have been found to have sensitivity between 16 and 100 percent and specificity between 36 and 95 percent.² Therefore other diagnostic modalities such as plain abdominal radiographs,^{3,4} ultrasonography⁵ and CT scan of abdomen have been clinically employed to aid in clinical evaluation but none has demonstrated a clear advantage over a careful history and clinical examination.⁶

In this present series, I have studied only 200 cases of clinically diagnosed ruptured appendicitis and admitted in different surgical units of Dhaka Medical College hospital during the period from January 2012 to December 2012 about one year.

There had been many studies on the same and related subjects in home and abroad with various results. The following pages describe the comparative studies of the present study with other studies done in the century and elsewhere.

Figure 1 shows age group distribution of the study population, majority of the cases 48% were of 25 – 34 years age group, 29.5% were of 15 – 34 years age group, 13% were of 35 – 44 years age group and other age group patients were few in number.

Figure 2 shows that most of the cases 71% were male and 29% were female.

Table 1 shows socioeconomic status of the study population, 8% were from higher income group, 59% and 33% were from middle and lower income group respectively. It is generally believed that the lesser cellulose content of the diet may be related to the incidence of acute appendicitis. Enamul Kabir⁷ was reported, 72.73% of patients were from middle income group, 25.55% of patients were from high income group and 2.22% of patients were from low income group. In our country, because of urbanization, food habit also changing. They are taking less cellulose content diet. So, incidence of acute appendicitis or burst appendix is increasing in middle and low income group of people.

Table 2 shows that pain was present in hundred percentage cases. Nausea, vomiting and fever were present in majority of the cases. Diarrhea was present 5.22% patients. In Enamul Kabir⁷ Showed that abdominal pain was present in 100% of patients, nausea, vomiting and fever were 52.22%, 42.22% and 52.22% of patients respectively. Shafiq⁸ showed that abdominal pain was present in 100% of patients, nausea was present in 52% of patients, vomiting was present in 47% of patients and fever was present in 72% of patients. In another study Shoaib⁹ showed that pain in abdomen was present in 100% of patients, nausea, vomiting and fever were present in 94%, 80% and 91% of patients. In this study showed that pain in abdomen was present in 100% of patients, nausea was present in 71.89% of patients, vomiting was present in 64.05% of patients and fever was present in 50.32% of patients.

Table 3 shows that dehydration was present in 39.21% cases, tachycardia in 47.05% cases, hypotension in 7.19% cases and raised temperature in 50.32% cases. Tenderness over RIF was present in 100% cases. Cough test was positive in 54.90% cases, pointing sign was positive in 3.26% cases and Rovsing's sign was positive in 26.14% cases. Diffuse abdominal tenderness was present in 87.58% cases, rebound tenderness was present in 80.39% cases, abdominal distention was in 13.07% cases, rigidity over RIF was present in 84.96% case, obliteration of liver dullness in 2.6% cases, and absent of bowel sound was in 40.52% cases. In digital rectal examination, tenderness over right side was present in 9.80% cases and tenderness on recto-vesicle or recto-uterine pouch was present in 7.84% cases. Enamul Kabir⁷ showed that temperature was present in 52.22% cases, tenderness over RIF was present in 100% cases, rebound tenderness was present in 61.11% cases and rigidity over RIF was present in 50% cases. Shafiq⁸ showed that

temperature was present in 72% cases, tenderness over RIF was present in 100% cases, rebound tenderness was present in 65% cases and rigidity over RIF was present in 55% cases. Shoaib⁹ showed that temperature was present in 88% cases, tenderness over RIF was present in 100% cases, rebound tenderness was present in 88% cases and rigidity over RIF was present in 95% cases. Abraham D¹⁰ showed that digital rectal examination done in 127 (45.8%) of patient out of which 80 (63%) of patient had tenderness. Based on the wide variation found on other studies we can say tenderness on rectal examination can be supportive but its absence should not lead to exclusion of diagnosis. Besides it indicates that most surgeons might be reluctant to do digital rectal examination in patients with suspected burst appendix.

Table 4 shows that 38.56% of patients were suffered for patients for 3 days, 31.38% of patients for 4 days were suffered from symptoms and 20.91% of patients for 1-2 days and 2.61% patients for < 1 day were suffered from symptoms. Shafiq⁸ showed that 50% of patients were suffered for < 1 day and 29% of patients were suffered for 1-2 days. Enamul Kabir⁷ showed that 50% of patients were suffered for < 1 day and 36.6% of patients were suffered for 1-2 days. In Bickell N A¹¹, this study quantifies the changing risk of appendiceal rupture with time of untreated symptoms. Rupture risk was < 2% in patients with less than 36 hours of untreated symptoms. For patients with untreated symptoms beyond 36 hours, the risk of rupture rose to and remained steady at 5% for each ensuing 12 hour period.

Table 5 shows that leucocyte count $>11 \times 10^9/L$ was 58.17% and $<11 \times 10^9/L$ was 41.83%. Neutrophil count $>70\%$ was 68.63% and $< 70\%$ was 31.37%. Deneke A¹⁰ showed that analysis of the WBC in relation to diagnosis of burst appendix as in most studies end up with controversial result. It was found that 50% of patients had WBC count above $11,000/mm^3$, which is above normal. A high count is supportive to clinical diagnosis but a normal count ($4,000-11,000/mm^3$) cannot rule out appendicitis. In Shafiq⁸ leucocyte count $>11 \times 10^9/L$ 48% and $< 11 \times 10^9/L$ 52% and in Enamul Kabir³⁵ leucocyte count $>11 \times 10^9/L$ 47.77% and $< 11 \times 10^9/L$ 52.23%.

Table 6 shows plain x-ray abdomen in erect posture is normal in 62.75%, intestinal obstruction in 27.45%, peritonitis in 7.19% and free gas shadow under diaphragm in 2.61%. In USA¹² normal in 50% cases and abnormal in 50% cases but findings are non-specific. Pneumoperitoneum on an upright abdominal radiograph suggests a diagnosis other than appendicitis. Rarely does a perforated appendix present with pneumoperitoneum (1 to 2%).

Table 7 shows that USG done for 100% cases whereas in USA¹² done for 34.5% patients. Ultrasonogram shows normal findings in 55.56% and suggesting ruptured appendicitis in 44.44%. In USA¹² normal findings in 54%. Ultrasonography is often used as the initial diagnostic

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imaging study in the majority of patients in whom the clinical diagnosis of appendicitis is equivocal. Ultrasound is noninvasive and rapidly available and avoids radiation exposure. Most studies of graded compression ultrasound demonstrate a sensitivity of more than 85% and a specificity of more than 90%. However, the sonogram for appendicitis is a highly operator-dependent study. In addition, perforation significantly decreases the diagnostic accuracy of graded compression of the appendix. Thus, the ultrasonographic diagnosis of perforated appendicitis depends on the secondary findings on periappendiceal fluid, mass, and loss of the integrity of the submucosa layer. Gaseous distention of the right lower quadrant bowel loops or prolonged symptoms suggesting perforation should make CT the preferred imaging study for improved accuracy and potential utility in planning intervention for appendiceal abscess or phlegmon.

Table 8 shows that 33.33% cases presented with only burst appendix without local sequel and 35.29% cases present with generalized peritonitis. 13.73% cases present with localized peritonitis, 10.46% cases present with localized abscess, 5.23% cases present with periappendiceal fluid collection and extraluminal appendolith present in 1.96% cases. In Addis et al shows generalized peritonitis in 21.80% and Ehtasam¹³ shows generalized peritonitis in 31.78% cases.

Table 9 shows that appendix was perforated at the tip of appendix in 47.06% of patients, at the base of appendix in 30.72% of patients, at the body of appendix in 18.95% of patients and at the base with involvement of caecum in 3.27% of patients. Our result correlates with Marchildon MB¹⁴.

In table 10, Patients suspected burst appendix underwent emergency operation and operative findings revealed burst appendix in 153 patients out of 200 patients. So diagnostic accuracy was 76.5% and diagnostic error in 23.5%. Our results correlates to Williams RF et al study¹⁵. Their diagnostic accuracy were 92%.

Table 11 shows that the early post-operative complication. Patients discharged from hospital without any complication was 33.98%. Fever in 48.37% of patients, wound infection in 45.75% of patients, wound dehiscence in 18.95% of patients, burst abdomen in 7.18% of patients, pneumonia in 2.61% of patients, intra-abdominal abscess in 0.65% of patients and prolong paralytic ileus in 28.76% of patients. In Dandapat MC¹⁶ shows wound infection in 50% of patients, prolong paralytic ileus in 48% of patients, intra-abdominal abscess in 21.70% of patients and urinary symptoms in 15.20% of patients. In a study Shafiq⁸ shows wound infections in 33.33% cases.

Conclusion

Burst appendix present a challenge to the clinicians because it can delay in diagnosis, result in delay in operation and can develop fatal complications. So we emphasize on careful history taking and physical examination in such cases which will make the difference between life and death.

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