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Caecal Gurgling - A new sign in the diagnosis of acute appendicitis and its correlation with intra operative findings

Susavan Das[1], Shib Shankar Kuiri[2], Sayak Roy[3], Kanchan Kundu[4]

[1,3,4]Senior Resident, [2]Associate Professor, Department of General Surgery, Bankura Sammilani Medical College, Bankura, West Bengal, India

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ABSTRACT

Background: Acute appendicitis is one of the most common surgical emergencies, with a lifetime prevalence rate of approximately one in seven. The incidence is 1.5–1.9/1,000 in the male and female population and is approximately 1.4 times greater in men than in women. The diagnosis of acute appendicitis is based purely on clinical history and examination combined with laboratory investigations such as elevated white cell count. **Aims and Objectives:** To examine clinical and laboratory findings of patients with right iliac fossa pain attending general surgery outdoor, indoor, and emergency of BSMCH and the relation between caecal gurgling with acute appendicitis andits correlation with intraoperative findings.**Materials and Methods:** This study was a hospital-based cross-sectional analytical study. It was conducted in rural-based tertiary care hospital and medical college with a time frame of about 1 ½ years from acceptance of synopsis. The period of study was from January 2019 to May 2020, in the Department of general surgery, Bankura Sammilani Medical College and Hospital, Bankura. **Results:** In Acute Appendicitis, 188(68.1%) patients were APL, and 88(31.9%) patients were BPL. In Normal Appendix, 85(68.5%) patients were APL and 39(31.5%) patient were BPL. Association of SES versusThe final diagnosis was not statistically significant (P=0.9315).**Conclusion:** Diagnosis of acute appendicitis is mainly clinical. Keeping in view the results of the present study, we conclude that caecal gurgling is an important positive clinical finding in the diagnosis of acute appendicitis. Incorporating caecal gurgling into Modified Alvarado Scoring System,especially in the patients with a MAS of 5–6 where there is a dilemma whether to operate the patient or not, it aids in our decision-making and thus helps to reduce the rate of negative appendectomies.

Key words: Acute appendicitis; Caecal gurgling; Intra operative findings

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INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies, with a lifetime prevalence rate of approximately one in seven.[1] The incidence is 1.5–1.9/1,000 in the male and female population and is approximately 1.4 times greater in men than in women.[2]

The diagnosis of acute appendicitis is based purely on clinical history and examination combined with laboratory investigations such as elevated white cell count. Despite being a common problem, acute appendicitis remains a difficult diagnosis to establish, particularly among the young, the elderly, and females of reproductive age, where a host of other genitourinary and gynecological inflammatory conditions can present with signs and symptoms that are similar to those of acute appendicitis.[3]

A delay in performing an appendicectomy in order to improve its diagnostic accuracy increases the risk of appendicular perforation and sepsis, which in turn increases morbidity and mortality.The opposite is also true, where with reduced diagnostic accuracy, the negative or

Address for Correspondence:
Dr. Kanchan Kundu, Paschim Pranabananda Pally, Senior Resident, Department of General Surgery, Bankura Sammilani Medical College, Bankura – 722 102, West Bengal, India. **Mobile:** 9153832572. **E-mail:** kanchankundubsmc@gmail.com

unnecessary appendicectomy rate is increased, and this is generally reported to be approximately 20–40%.

Diagnostic accuracy can be further improved through the use of ultrasonography or computed tomography imaging.[4] However, these modalities are costly and may not be easily available all the time. Making arrangements for these diagnostic modalities may lead to further delays in diagnosis and surgery.

Symptoms of ileus caused by the direct invasion of the intestinal walls by the infective microbes or their toxic products, or there may be true obstruction may be due to kinks or strangulation produced by the inflammatory exudates. The characteristic picture of ileus then develops and clinically a palpable gurgling is present.[3]

Cecal gurgling, a relatively new sign, which can aid Modified ALVARADO scoring system in individuals with a score of 5–6,that is., in the observational group, in predicting acute appendicitis and whether to operate it or not. The purpose of this study is to validate the sign and its correlation with intraoperative findings in our set up.

Aims and objectives

General objective

To find out predictive validity of caecal gurgling in patients with Modified Alvarado score of 5–6 for diagnosis of acute appendicitis.

Specific objective

To examine clinical and laboratory findings of patients with right iliac fossa pain attending general surgery outdoor, indoor, and emergency of BSMCH and the relation between caecal gurgling with acute appendicitis andits correlation with intraoperativefindings.

MATERIALS AND METHODS

The current study was a hospital-based cross-sectional analytical study, conducted in rural-based tertiary care hospital and medical college with a time frame of about 1½years from acceptance of synopsis.

Study population

All patients attending surgery OPD and emergency with pain in right iliac fossa with a Modified Alvarado score of <7 and operated of Bankura Sammilani Medical College and Hospital, with inclusion criteria and exclusion criteria applied properly. According to previous census, the number of patients should be around 400.

Sample size

All patients presenting with complaints of right iliac fossa pain and other symptoms and signs suggestive of acute appendicitis have been picked up for 5 days a week. The 5 days of each week have been chosen randomly.

Study design: Census method

Case, control - required or not:-

Case: Patients with Modified Alvarado score of<7 with cecal gurgling and operated

Control: Patients with Modified Alvarado score of <7 without cecal gurgling but operated

Inclusion criteria

1. All patients presenting with right iliac fossa pain in the age group of 13–60 years.

Exclusion criteria

1. History of RIF pain for >48 h.
2. Patients with a palpable lump at RIF.
3. Patients with features of appendicular abscess andperforation
4. Those who have been admitted by other specialties for other complaints but subsequently developed RIF pain.
5. Patients presenting withproven malignancy.
6. Patients with a history of trauma over the abdomen.
7. Patients with pregnancy and other comorbid conditions.

RESULTS

In our study among 400 patients, 306(76.5%) patients had Cecal gurgling and94 patients were without cecal gurgling.

347(86.8%) patients had Intraoperative findings of Inflamed Appendix and 53(13.3%) patients were with Normal Appendix.

325(81.3%) patients had Inflammed Appendix in HPE reportand 75(18.8%) patients had Normal Appendix in their HPE report.

332(83.0%) patients had Acute Appendicitis as final diagnosisand 68(17.0%) patients were with Normal Appendix as the final diagnosis.

Our study showed that in Acute Appendicitis, 282(84.9%) patients were with Elevated TLC and 50(15.1%) patients were with Normal TLC. In the Normal Appendix, 45(66.2%) patients were with Elevated TLC and 23(33.8%) patients had Normal TLC. The result has been shown in Table 1.

In Acute Appendicitis, 233(84.4%) patients had Caecal gurgling. In the Normal Appendix, 73(58.9%) patients had Cecal gurgling. The result has been shown in Table 2.

In our study, 347(86.8%) patients had Intraoperative Inflamed Appendix and 53(13.3%) patients were with Normal Appendix as shown in Table 3.

In our study, we have found that 325(81.3%) patients had Inflamed Appendix in HPE reportand 75(18.8%) patients have Normal Appendix in their HPE report and the final result has been shown in Table 4.

DISCUSSION

In our study, we found among 332 patients (who were diagnosed with acute appendicitis in HPE report) 282 patients were with elevated TLC and 50 patients were with normal TLC. The result was statistically significant(P=0.0002) as in Table 1.

Table 1: Association between TLC: Final diagnosis

	Final diagnosis		
TLC	**Acute appendicitis**	**Normal appendix**	**Total**
Elevated	282	45	327
Normal	50	23	73
Total	332	68	400

Chi-square: 13.3185; P: 0.0002. Odds Ratio: 2.8827 (1.6051, 5.1771)

Table 2: Association between cecal gurgling: Final diagnosis

	Final diagnosis		
Cecal gurgling	**Acute appendicitis**	**Normal appendix**	**Total**
Absent	43	51	94
Present	233	73	306
Total	276	124	400

Chi-square: 31.0671; P: <0.0001, Odds Ratio: 0.2642 (0.1629, 0.4284)

Table 3: Association between intra-op finding: Final diagnosis

	Final diagnosis		
Intra-op finding	**Acute appendicitis**	**Normal appendix**	**Total**
Inflamed appendix	318	29	347
Normal appendix	14	39	53
Total	332	68	400

Chi-square: 138.6375; P: <0.0001, Odds Ratio: 30.5468 (14.8785, 62.7150)

Table 4: Association between HPE FINDINGS: Final diagnosis

	Final diagnosis		
HPE findings	**Acute appendicitis**	**Normal appendix**	**Total**
Inflamed Appendix	325	0	325
Normal Appendix	7	68	75
Total	332	68	400

Chi-square: 355.0201; P: <0.0001

Kamran et al.,[8] showed in their study that the sensitivity and specificity of TLC as calculated in their study was 76.5% and 73.7%, respectively, while positive predictive value is 92.5%. TLC although not a diagnostic criteria for acute appendicitis but still was helpful investigation in decision making.

Ainippully et al.,[9] had shown in their study that TLC proved more useful if it was performed within 24 h of the onset of symptoms and was relevant only if antibiotics have not been administered.

In our study, we found that in Acute Appendicitis, 233(84.4%) patients had Cecal gurgling. In the Normal Appendix, 73(58.9%) patients had Cecal gurgling. Association of Cecal gurgling versus Final Diagnosis was statistically significant (P<0.0001) as in Table 2.

MH Abbas et al.,[11] found in their studies that altered Alvarado scoring system in which an additional point of caecal gurgling was introduced, was slightly better in the diagnosis of acute appendicitis especially in equivocal patients (score 5-6). The rate of negative appendectomy in their study was 10.8%.

In this study, in Acute Appendicitis, 318(95.8%) patients had Inflamed Appendix and 14(4.2%) patients had Normal Appendix as per intra-operative findings. In the Normal Appendix, 29(42.6%) patients had Inflamed Appendix and 39(57.4%) patients were Normal Appendix as per intra-operative findings. Association of Intra-Op Finding versusThe final diagnosis was statistically significant (P<0.0001) as in Table 3.

In Acute Appendicitis, 325(95.5%) patients had Inflamed Appendix and 7(2.1%) patients had Normal Appendix in HPE findings. In the Normal Appendix, 68(100.0%) patients had Normal Appendix. Association of HPE FINDINGS versusThe final diagnosis was statistically significant (P<0.0001) as in Table 4.

In Acute Appendicitis, the mean MASS (mean±SD) of patients was 5.6476±.5914. In the Normal Appendix, the mean MASS (mean± SD) of patients was 4.5441±.8364. Difference of mean MASS with both Final Diagnosis was statistically significant (P<0.0001). In Inflamed Appendix, 261(80.3%) patients had Cecal gurgling. In Normal Appendix, 45(60.0%) patients had Caecal gurgling. Association of Cecal gurgling versus HPE FINDINGS was statistically significant (P<0.0001). In Acute Appendicitis, 312(94.0%) patient were ≥5 and 20(6.0%) patient were <5. In Normal Appendix, 22(32.4%) patient were ≥5 and

46(67.6%) patient were <5. Association of MASS versus Final Diagnosis was statistically significant (P<0.0001).

Al Qahtani et al.,[12] found that the diagnosis of acute appendicitis remains mainly clinical, Alvarado score can be recommended as a helpful tool for the admission criteria and further management in order to reduce unnecessary admissions and to reduce the morbidity and mortality of acute appendicitis. The rate of negative appendectomy in their study was 12.5%.

In this study, we found that the modified Alvarado score was more in Acute Appendix compared to the Normal Appendix which was statistically significant. Cecal gurgling incorporating into Modified Alvarado score the Sensitivity was 94.0; Specificity was 67.6; Positive Predictive Value was 93.4; Negative Predictive Value was 69.7 and Accuracy was 95.0.

Sanjay et al.,[13] found in their study that for MAS the sensitivity was 98.44%,specificity 94.4%.

Limitations of the study

In spite of every sincere effort our study has lacunae.

The notable short comings of this study are:

1. The sample size was small. Only 400 cases are not sufficient for this kind of study.
2. The study has been done in a single center.
3. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out.

CONCLUSION

Keeping in view the results of the present study, we conclude that cecal gurgling is an important positive clinical finding in the diagnosis of acute appendicitis. Incorporating caecal gurgling into Modified Alvarado Scoring System,especially in the patients with a MAS of 5–6 where there is a dilemma whether to operate the patient or not, it aids in our decision making and thus helps to reduce the rate of negative appendectomies.

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Authors Contribution:
SD- Manuscript preparation, Data collection, Literature search; **SSK-** Conceptualized the study, literature search, data analysis and interpretation, revision of manuscript; **SR-** Literature search, prepared first draft; **KK-** Concept and design of the Study, Reviewed the literature and revision of manuscript, literature search

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Orcid ID:
Dr. Susavan Das - https://orcid.org/0000-0002-0001-677X
Dr. Sayak Roy - https://orcid.org/0000-0003-0498-8194
Dr. Shib Shankar Kuiri - https://orcid.org/0000-0003-2212-6571
Dr. Kanchan Kundu - https://orcid.org/0000-0002-6300-600X

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