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Risk of appendicitis in patients with incidentally discovered appendicoliths

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ABSTRACT

Background: An appendicolith-related appendiceal obstruction leading to appendicitis is a commonly encountered surgical emergency that has clear evidence-based management plans. However, there is no consensus on management of asymptomatic patients when appendicoliths are found incidentally. The objective of this study was to determine the risk of appendicitis in patients with an incidental finding of the appendicolith.

Methods: A retrospective matched cohort study of patients with appendicolith discovered incidentally on computed tomographic scan from January 2008 to December 2014 at our institution was completed. The size and position of the appendicolith were ascertained. The study group was matched by age and gender to a control group. Both groups were contacted and interviewed regarding development of appendicitis.

Results: In total, 111 patients with appendicolith were successfully contacted and included in the study. Mean age was found to be 38 ± 15 y with 36 (32%) of the study population being females. Mean length of appendix was 66 ± 16 mm, and mean width was 5.8 ± 0.9 mm. Mean size of the appendicolith was 3.6 ± 1.1 mm (1.4-7.8 mm). Fifty-eight percent of appendicoliths was located at the proximal end or whole of appendix, 31% at mid area, and 11% at the distal end of appendix. All patients of the study and control groups were contacted, and at a mean follow-up of 4.0 ± 1.7 y, there was no occurrence of acute appendicitis in either group.

Conclusions: Patients with incidentally discovered appendicolith on radiological imaging did not develop appendicitis. Hence, the risk of developing acute appendicitis for these patients does not seem higher than the general population.

Introduction

Acute appendicitis is one of the most common general surgical emergencies reported worldwide, with up to 292,000 cases reported annually in the United States.[1] Since the description of the term "appendicitis" by Fitz in the 19th century,[2] appendicoliths also known as fecaliths are considered the most important etiological factor. Appendicoliths are

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hard, calcified fecal masses of variable sizes in the lumen of appendix. In 1939, Wangensteen and Dennis demonstrated obstruction of the appendix to be the most likely cause of appendicitis.[3] Since then, multiple studies have emphasized the role of appendicoliths in the pathogenesis of acute appendicitis.[4]

Although this association is well established, the management of incidentally found appendicoliths on radiological imaging is less clear. In 1966, Forbes and Lloyd-Davies recommended appendectomy for incidentally discovered appendicoliths, citing the reported incidence of appendicoliths in 0.8%-44% of patients with acute appendicitis.[4] However, more recently, Rabinowitz *et al*. studied 74 patients with incidental appendicoliths and concluded that although appendicoliths do increase the risk of appendicitis, it is not enough to warrant prophylactic appendectomy.[5] In another study, Rollins *et al*. reported that of 75 patients of pediatric age group having asymptomatic appendicoliths found incidentally, 5.8% developed acute appendicitis, making them conclude that prophylactic appendectomy is not indicated.[6]

Although acute appendicitis remains a clinical diagnosis, increased use of computed tomographic (CT) scans in the emergency departments across the world has increased incidental findings with no immediate clinically significant consequences.[7] Thus, from the prevailing concepts for etiology of acute appendicitis arises the question of the risk of appendicitis when appendicoliths are found incidentally. The objective of this study was to determine the risk of appendicitis in patients with appendicoliths found incidentally on CT scans performed for reasons other than acute appendicitis.

Materials and methods

This was a retrospective matched cohort study of patients in whom appendicoliths were found incidentally on abdominal CT scans performed from January 2008 to December 2014. All patients aged ≥16 y at the time of CT scan were included. Hospital radiology search software was used to identify CT scans that were performed for indications other than appendicitis but reported appendicoliths and no radiological evidence of appendicitis. The CT scans were reviewed by consultant radiologist and radiology resident who ascertained number, diameter, and position of the appendicoliths. Approval from institutional ethics review committee was obtained prior to the start of the study. As per the institutional policy, informed consent was taken on telephone in the presence of a witness. The consent was then documented and signed by both the interviewer and witness on the approved consent form.

Age- and gender-matched control group was identified from the radiology database and included those patients who had undergone an abdominal CT scan during the study period for indications other than appendicitis and had neither radiological evidence of appendicolith nor a clinical suspicion of appendicitis. Both groups were contacted by the authors for a standardized telephonic interview to determine the occurrence of appendicitis after being discharged from the hospital. The interview was conducted in Urdu language and included questions with regard to the occurrence of appendicitis at the time of CT scan or any time thereafter.

Statistical analysis

Data were collected and stored in Microsoft Excel (version 2010). Simple descriptive analysis was performed and reported as frequencies with percentages for categorical variables and means with standard deviations. Cases and controls were matched for age, gender, and dates of CT scan performed during the study period.

Results

Of the 200 patients identified as having incidental appendicoliths on radiological imaging, we could establish telephonic contact with 111 patients (55.5%), who were included in the study. A 1:1 matched control group of 111 patients was selected and also contacted for occurrence of appendicitis.

The mean age (± standard deviation) for the patients with appendicoliths was 38 ± 15 y with 36 (32%) being females (Table 1). Mean length of appendix was 66 ± 16 mm, and mean width was 5.8 ± 0.9 mm. Positions of the appendix were pelvic (21, 19%), postileal (13, 11.7%), preileal (17, 15.3%), promonteric (23, 20.7%), retrocecal (20, 18%), and subileal (17, 15.3%). Noncontrast-enhanced (neither intravenous nor oral) CT scan was performed in 98 patients (88%). The most common pathological finding in these CT scans was urolithiasis in 58 patients (52%), whereas 37 (33%) of the CT scans were within normal limits with no pathological findings.

Overall, single appendicolith was seen in 44 patients (40%), whereas 36 patients (32%) had two appendicoliths, nine (8%) patients had three appendicoliths, and three (3%) had more than 3 appendicoliths, whereas 19 (17%) had sludge (Table 2). Mean diameter of the appendicolith was 3.6 ± 1.1 mm (1.4-7.8 mm). Overall, 65 (58%) of appendicoliths were either at the proximal end or filled the entire appendiceal lumen, 34 (31%) at mid area, and 12 (11%) at the distal end of appendix.

At a mean follow-up of 4.0 ± 1.7 y (1.8-8.85), no patient in either the study group or control group developed acute appendicitis.

Table 1 – Patient demographics, type of CT scan, and the most common findings.

Variables	*n* (%)
Mean age	38 ± 15
Male	75 (67.5)
Type of CT scan	
Contrast enhanced	13 (11.7)
Noncontrast enhanced	98 (88.2)
Findings of CT scan	
Urolithiasis	57 (51.3)
Within normal limits	36 (32.4)
Others	17 (15.3)