



# Non-acute appendicitis: Clinicoradiopathologic findings and management

Sornsupha Limchareon MD<sup>1\*</sup>

Suntichai Dinchuthai MD, FRCST<sup>2</sup>

<sup>1</sup> Division of Radiology, Faculty of Medicine, Burapha University, Chonburi, Thailand

<sup>2</sup> Division of Surgery, Faculty of Medicine, Burapha University, Chonburi, Thailand

\* Corresponding author, e-mail address: sornsupha@hotmail.com

## Abstract

Acute appendicitis is a common abdominal condition that required surgical intervention. However, there are number of cases that have mild symptoms and signs and their onsets may be insidious. These conditions have been named in various styles including; recurrent appendicitis, relapsing appendicitis, chronic appendicitis, acute relapsing appendicitis, chronic relapsing appendicitis, and spontaneous resolving appendicitis. The objectives of this article are to review clinical manifestations, imaging tools, and management of non-acute appendicitis.

**Keywords:** chronic appendicitis, recurrent appendicitis, relapsing appendicitis, spontaneous resolving appendicitis



# ไส้ติ่งอักเสบไม่เฉียบพลัน: การสืบค้นทางคลินิก รังสีวิทยา พยาธิวิทยาและการรักษา

ศรสุภา ลิ้มเจริญ พ.บ., ว.ว. (รังสีวิทยาทั่วไป)<sup>1\*</sup>

สันติชัย ดินชูไท พ.บ., ว.ว. (ศัลยศาสตร์ทั่วไป)<sup>2</sup>

<sup>1</sup> สาขารังสีวิทยาและเวชศาสตร์นิวเคลียร์ คณะแพทยศาสตร์ มหาวิทยาลัยบูรพา ชลบุรี

<sup>2</sup> สาขาศัลยศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยบูรพา ชลบุรี

\* ผู้ติดต่อ, อีเมล: sornsupha@hotmail.com

## บทคัดย่อ

ไส้ติ่งอักเสบเป็นภาวะฉุกเฉินของช่องท้องที่พบบ่อยที่ต้องรักษาด้วยการผ่าตัด อย่างไรก็ตามมีผู้ป่วยที่เป็นไส้ติ่งอักเสบจำนวนหนึ่งซึ่งมีอาการทางคลินิกไม่รุนแรง การดำเนินโรคเป็นแบบค่อยเป็นค่อยไป และอาการทางหน้าท้องไม่ชัดเจน กลุ่มผู้ป่วยเหล่านี้ได้ถูกเรียกชื่อแตกต่างกันไป เช่น ไส้ติ่งอักเสบช้า ไส้ติ่งอักเสบกำเริบ ไส้ติ่งอักเสบเรื้อรัง ไส้ติ่งอักเสบกำเริบเฉียบพลัน ไส้ติ่งอักเสบกำเริบเรื้อรัง ไส้ติ่งอักเสบที่หายเอง บทความนี้มีวัตถุประสงค์เพื่อทบทวนวรรณกรรมที่เกี่ยวข้องกับภาวะไส้ติ่งอักเสบไม่เฉียบพลันดังกล่าว ในแง่ของการสืบค้นทางคลินิก รังสีวิทยา พยาธิวิทยา และการรักษา

**คำสำคัญ:** ไส้ติ่งอักเสบเรื้อรัง ไส้ติ่งอักเสบช้า ไส้ติ่งอักเสบกำเริบ ไส้ติ่งอักเสบที่หายเอง

## Introduction

The appendix is a worm-like structure, arising from posteromedial wall of the cecum. Its length is about 7-10 cm<sup>1</sup>. The positions of the appendix have been described as retrocecal, subcecal, retroileal, preileal and pelvic type<sup>2</sup>. Retrocecal type is the most common type in the majority of the literature<sup>3-5</sup>. Different positions result in variability of the clinical presentations<sup>4,6</sup>. In the 1,358 normal appendix from autopsies and 323 inflamed appendix by Clegg-Lampty et al proposed that retrocecal type is less susceptible to inflammation<sup>5</sup>.

Terminology used to describe the non-acute presenting appendicitis are variable and should be clarified, for example, recurrent appendicitis and relapsing appendicitis were used in the same condition.

### Chronic appendicitis:

The criteria for diagnosis of chronic appendicitis include 1) a history of right lower quadrant pain of at least 2-3 weeks duration 2) no alternative diagnosis 3) histopathologic evidence of chronic active inflammation and 4) complete relief of symptoms after appendectomy. Chronic appendicitis is rare. The incidence varies from 1-14% in the literature<sup>7-9</sup>. One previous study proposed that the presence of appendicolith (figure 1) could assist in distinguishing between chronic appendicitis and spontaneous resolving appendicitis<sup>10</sup>.

### Spontaneous resolving appendicitis:

The criteria for spontaneous resolving appendicitis are a clinical manifestation compatible with acute appendicitis, an enlarged non-compressible appendix with a diameter of more than 6 mm from ultrasonography, and rapidly subsiding symptoms usually within 24-48 hours<sup>11</sup>. The frequency of this type is approximately 8%<sup>11</sup>.

### Recurrent/Relapsing appendicitis:

Recurrent appendicitis is characterized by a history of similar episodic attacks of right lower

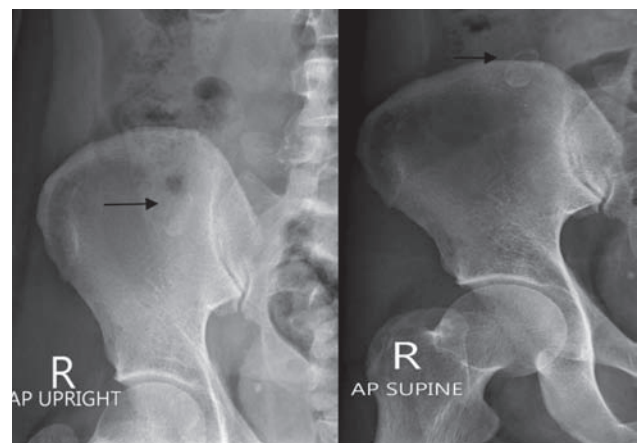
quadrant pain that lead to appendectomy, with a histopathology of acute inflammation<sup>7</sup>. The incidence of recurrent appendicitis is approximately 11%<sup>12</sup>. In the two recent studies found that presence of an appendicolith was a predictive factor of recurrent appendicitis<sup>13-14</sup>.

## Clinical presentations

Acute appendicitis is common in older children and young adults<sup>15</sup>. It is relatively rare at the extremes of ages<sup>15-16</sup>. The causes of acute appendicitis is believed to be luminal obstruction including fecaliths, lymphoid hyperplasia, foreign bodies, parasites, and both primary and metastatic tumors<sup>1</sup>. Recurrent appendicitis is thought to be resulted from intermittent obstruction while cause of chronic appendicitis is thought to be partial obstruction. Sgonralies et al<sup>17</sup> concluded that coprostasis but not coprolith was the contributing factor to acute exacerbation of chronic appendicitis. The morphologic findings of chronic appendicitis show increased fibrous tissue within the appendiceal wall<sup>18</sup>.

## Pathology

On microscopic examination of acute appendicitis, the early lesion shows mucosal ulceration and scattered crypt abscesses. Later, the inflammation extends into lamina propria<sup>1</sup>. In chronic appendicitis, there is chronic inflammatory



**Figure 1:** Plain films of the abdomen show an appendicolith (arrow) at right lower abdomen.

cell infiltration including lymphocytes (mostly T-lymphocyte), eosinophils and neural cell proliferations<sup>18</sup>.

## Imaging

Ultrasound has been widely used for diagnosis of appendicitis because it is easy to perform without radiation hazard. Graded compression technique is generally accepted. With the new ultrasound technology, the efficacy of ultrasound is very high with accuracy of 78-89%, sensitivity of 78-93%, specificity of 78-94%, positive predictive value of 86-87% and negative predictive value of 65-98%<sup>19-21</sup>.

Ultrasound, however, is operator-dependent. The ultrasonographic criteria for diagnosis of acute appendicitis (figure 2) are the appendiceal diameter of greater than 6 mm, presence of periappendiceal fat infiltration or periappendiceal fluid and paraappendiceal node of more than 3 nodes and more than 5 mm in short axis<sup>22</sup>.

Computed tomography (CT) is highly accurate and effective imaging technique for diagnosis of appendicitis. The sensitivity, specificity, accuracy, PPV and NPV have been reported up to 100%, 97%, 95%, and 100% respectively<sup>23</sup>. Different CT protocols have been used as the optimal technique remains controversial<sup>23-25</sup>. Nevertheless it is generally accepted that thin-section (< 5 mm) scanning improves

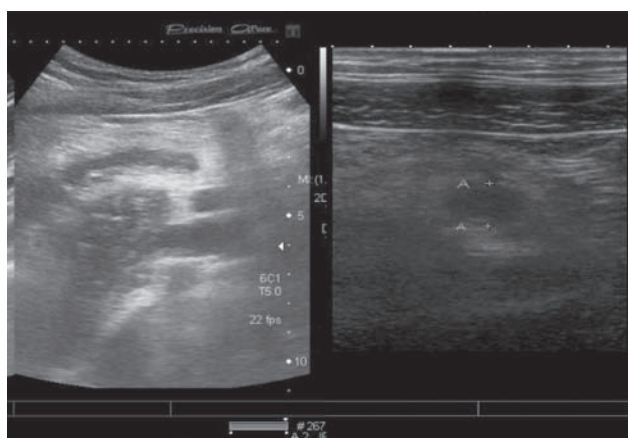
identification of the appendix<sup>23-24</sup>. The need for contrast study has been debated<sup>23</sup>. In our practice, we use unenhanced CT with selective use of contrast material. No further imaging is necessary unless unenhanced CT images are inconclusive, in which case an enhanced CT is performed. The type of contrast material and routes of administration are decided by radiologist. CT findings of non-acute appendicitis are similar to those of acute appendicitis including appendiceal enlargement, appendiceal wall thickening, periappendiceal fat stranding and appendiceal wall enhancement.<sup>26-27</sup> Figures 3 and 4 respectively shows CT images of normal appendix and acute appendicitis with an appendicolith.

## Management

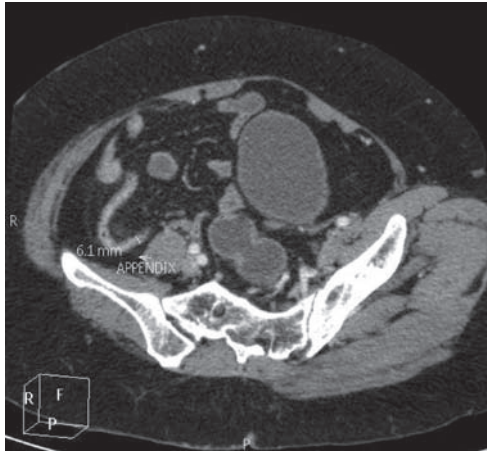
Treatment of non-acute appendicitis remains controversial. Some surgeons favor initial non-operative treatment using antibiotic followed by interval appendectomy due to more favorable outcome.<sup>28-29</sup> Others favor immediate surgery<sup>30</sup>, though recurrent rate is low<sup>31</sup>. One recent article in 2011 reported a case of subacute appendicitis successfully treated by a medically supervised water-only fast followed by a plant-based, low-fat, low-sodium diet<sup>32</sup>. The reason supporting interval appendectomy is to rule out malignancy. Lai HW et al.<sup>33</sup> studied 1,873 patients diagnosed with appendicitis. They found that the incidence of appendicitis associated with colon cancer was 0.85%<sup>33</sup>. However, in most literature, early surgical intervention is recommended due to high recurrent rate especially in the presence of appendicolith<sup>13-14,17</sup>.

## Conclusion

The non-acute appendicitis is difficult to diagnose if clinician is not aware of this entity. It is often misdiagnosed as another more common abdominal conditions such as urinary tract infection or pelvic inflammatory disease. Recognition of this condition especially in patients who have recurrent or prolonged symptoms leads to early diagnosis and proper management.



**Figure 2:** Longitudinal and axial sonograms show increased diameter of appendix (8.4 mm) with periappendiceal fat infiltration



**Figure 3:** Oblique transverse CT image with IV contrast material of a normal appendix.



**Figure 4:** Coronal CT image without contrast material shows swelling of appendix and an appendicolith. There is prominent fat stranding.

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