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Evaluation of the Effectiveness and Safety of Non-Operative Treatment for Uncomplicated Acute Appendicitis in Adults at the mixed hospital in Laghouat over a period of six months : A Prospective Cohort Study.

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Dedication

*Thank you **Allah** for granting me success, and for giving me the strength necessary to accomplish this journey."El hamduliAllah"*

*To the source of tenderness and sacrifice, **my dear mother** you have been the support behind each of my successes.,your constant presence and care have eased my doubts and illuminated my darkest and most difficult moments.,your silent prayers have been my refuge. No words can adequately express the depth of my love for you .*

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*To **all those who have supported**, encouraged, and accompanied me closely or from afar, and who have placed their trust in my success and happiness.*

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Dedication

*Praise be to **Allah** who guided us to this. Praise be to **Allah** for His ease and success, **Alhamdou-li-Allah**.*

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AA: acute appendicitis

NOT: non operative treatment

UAA: uncomplicated acute appendicitis

APPAC:" antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis" trial

KNOMA: "the kouba non operative management of acute appendicitis" trial

GALT: gut-associated lymphoid tissue

DCs: dendritic cells

CMV: cytomegalovirus

RIF: right iliac fossa

RLQ: right lower quadrant

AIDS: acquired immunodeficiency syndrome

CRP: C-reactive protein

WBC: wight blood cells

AIRSS: appendicitis inflammatory response scoring system

US: ultrasound

CT: computed tomography

MR: magnetic resonance

SD: standard deviation

C3G: cephalosporin 3rd generation

CODA: “comparison of outcomes of antibiotic drugs and appendectomy “trial

NOTA: “non operative treatment for acute appendicitis” study

WSES: world society of emergency surgery

I Introduction :

Acute appendicitis is one of the most common cause of acute abdominal pain and remains the most frequent surgical emergency worldwide in adults with an estimated incidence of 100/ 100000 person-years(1). The lifetime risk of acute appendicitis in males is 8.6 and 6.7% in females.

Appendectomy either by laparoscopy or laparotomy, represents the gold standard treatment for acute appendicitis. However, recently, growing evidence from randomized controlled trials have suggested that non-operative treatment based on antibiotic therapy seems to be a reasonable and an interesting alternative for uncomplicated acute appendicitis. This approach could reduce surgical morbidity, length of hospital stay, and healthcare costs.(2)

But there is as the main limitation of exclusively medical treatment of uncomplicated acute appendicitis , the risk of recurrent appendicitis which may require delayed appendectomy .

As reported in a renowned Finnish study : Antibiotic Therapy vs Appendectomy for Treatment of Uncomplicated Acute Appendicitis (The APPAC Randomized Clinical Trial) " Most patients randomized to antibiotic treatment for uncomplicated appendicitis did not require appendectomy during the 1-year follow-up period, and those who required appendectomy did not experience significant complications "(3)

And in Algeria ,the KNOMA (the Kouba non operative management of acute appendicitis) trial, which is the first African clinical trial in the field, has demonstrated the non inferiority in terms of overall failure of the antibiotic therapy compared to appendectomy in the treatment of acute uncomplicated appendicitis in adults .(2)

In this context , the evaluation of the effectiveness and safety of non operative management has become a subject of current research .

1) Objectives:

1.1) Main objective:

-To evaluate the success rate and safety of non-operative treatment for uncomplicated acute appendicitis in adults at the Colonel Lotfi Mixted hospital in Laghouat from august 2025 to February 2026

1.2)Secondary objectives:

-To determine the failure rate of the treatment requiring a secondary appendectomy.

-To evaluate complications following medical therapy.

-To assess the proportion of patients treated using this protocol in our hospital.

II Literature review

1) Epidemiology :

_ Acute appendicitis can affect people of any age but is most common between the ages of **10 and 20 years**.(4), and it has a male-to female ratio of 1.4/1.(5)
_ the lifetime risk is **8,6%** for males and **6,7%** for females .(5)

_Searching for the first case of non operative treatment of AA, it could be suggested that it is as old as man itself. **the first report** of a suspected spontaneous resolution of AA was published in 1910 by Smith and Wood Jones. they described the case of a young Nu-bian woman where the appendix was found attached with a thick adhesive band to the left pelvic wall suggesting that she had survived appendiceal rupture with abscess formation Is . the bizarre aspect of the report that at the time of diagnosis, she was an uneviscer-ated mummy from the Byzantine era.

_In 1930 Bailey proposed his non-operative treatment algorithm and in 1959 Coldrey described for the first time a large series of **471 patients** treated non-operatively with intravenous antibiotics . the recurrence rate was 48/470 **(10,2%)** with **1 death**, **9** patients requiring abscess drainage, and **48** cases requiring a subsequent appendectomy .

_. Another series from China reported **500 patients** with the clinical diagnosis of AA Of these, **425** had conservative treatment with Chinese traditional medicine and antibiotics were given to some. 7 recurrences have been reported Conservative treatment has also been reported from doctors in service aboard of the U.S. Navy and the Soviet fishing fleet ships . the Russian one is a review of conservative treatment in **252 patients** with AA on vessels of the Kalingrad fishing industry from 1975 to 1987. In this series Gurin et al. reported a recovery rate of **84,1%** with only the use of antibiotics. the authors found no difference in outcomes based on presenting symptoms or age, but they suggested that conservative treatment was as more effective as earlier it starts . (6)

Historically, appendectomy was deemed necessary after surgeons recognized appendicitis as a potential cause of pelvic sepsis with a high mortality rate. However, in 1956, Coldrey challenged this conventional wisdom by reporting on **137 patients** who had acute appendicitis for more than **24 hours** and were treated with antibiotics instead of surgery .In 1977, researchers from China reported successful treatment of **92,9** percent of **425 patients** with acute appendicitis by traditional Chinese medicine alone

Since the success of non-operative treatment in the management of appendicular plastrons, we have considered introducing it as the first treatment option for uncomplicated acute appendicitis.(7) ; and with advances in medical imaging and

antibiotic therapy a non operative alternative has gradually developed .Several randomized studies and meta-analyses have shown that antibiotic treatment can be a valid option in selected patients .It is thus estimated that up to **71%** of patients with uncomplicated acute appendicitis can be effectively treated with antibiotics alone this evolution represents a significant shift in therapeutic epidemiology with a gradual increase in the proportion of patients managed without surgery .

2) Anatomical review :

2.1) Definition:

The vermiform appendix is an intraperitoneal structure that appears as a caudal continuation of the cecum, the first part of the ascending colon. The appendix is located towards the dead end of the cecum, in the right iliac fossa, approximately 2-3 cm under the ileocecal valve. (8)

The length of the appendix varies from 2 to 20 cm (with an average of 9 cm). The typical width is all about 5 mm. With age, there are changes in the diameter of lumen. It's more in children than adult and often obliterated after mid-adult life. The length also changes with age. It's longer in kids than in adults. a normal appendix typically has an outer diameter not exceeding 6 mm. (9)

The word "appendicitis" stems from Latin, combining appendix and -itis, and it means the inflammation of the appendix . (5)

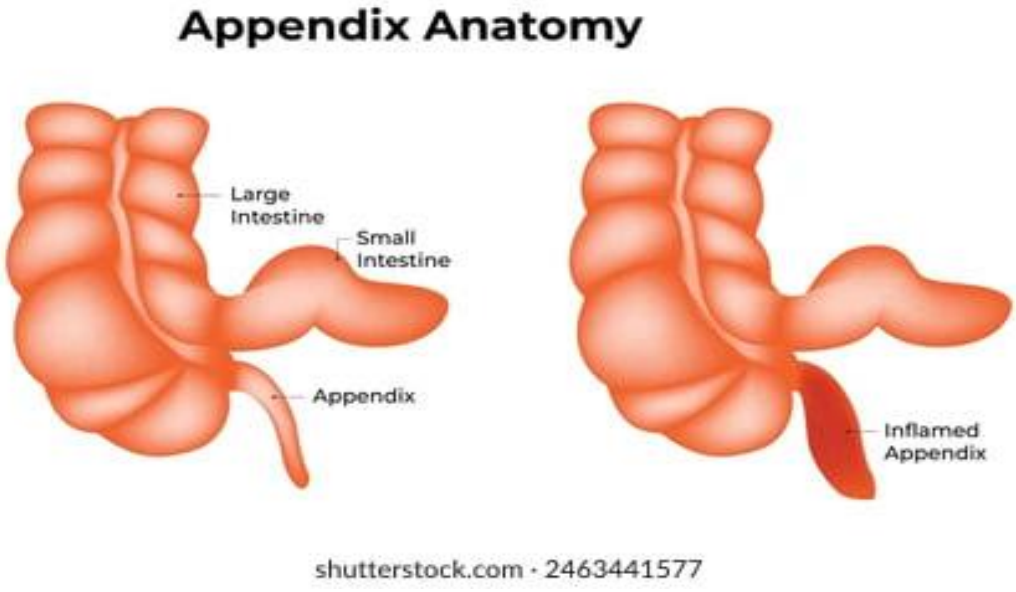


Figure 1 Appendix anatomy and appendicitis

Figure (1) : Appendix anatomy & appendicitis (10)

2.2) Variations in Position:

The appendix presents several variations in terms of its location, of which the following are frequent in the general population: the retrocecal, the prececal, the paracecal and the subcecal appendix. The retrocecal position of the appendix is the most common anatomical variant, as it is estimated to occur in about 25.471% of the general population .

⇨ **Positions According the needle of clock :**

- **Pre-ileal** : anterior to the terminal ileum – 1 or 2 o'clock.
- **Post-ileal** : posterior to the terminal ileum – 1 or 2 o'clock.
- **Sub-ileal** : parallel with the terminal ileum – 3 o'clock.
- **Pelvic** : descending over the pelvic brim – 5 o'clock.
- **Subcecal** : below the cecum – 6 o'clock.
- **Paracecal** : alongside the lateral border of the cecum – 10 o'clock.
- **Retrocecal** : behind the cecum (the most common position) – 11 o'clock.
- **Sushepatic** : It's an abnormal position of the appendix where it is located underneath the liver in the right hypochondrium. It's a development anomaly, which takes place because of failure in the descent of caecal bud. The caecum and appendix grow from caecal bud that originates from postarterial section of midgut loop (near its apex)

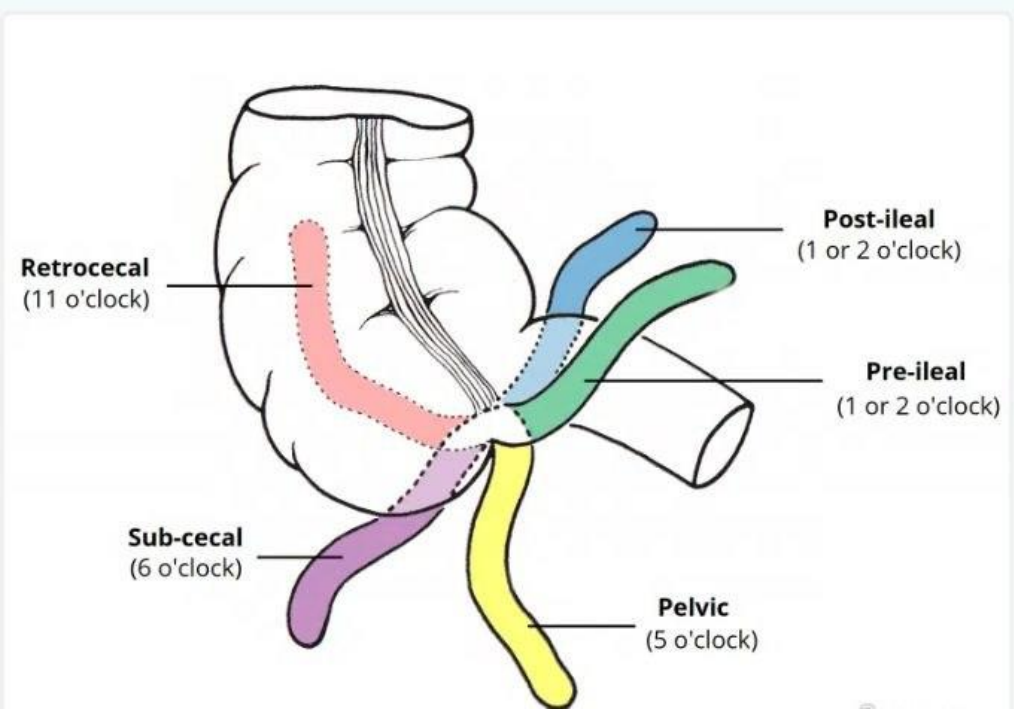


Figure 2 Anatomical variations of the appendix

Figure (2) : Anatomical variations of the appendix.(11)

2.3) Neuro-vascular Supply and lymphatic drainage :

The appendix is derived from the embryologic "midgut". Therefore, the vascular supply is via branches of the superior mesenteric vessels.

- ⇨ **Arterial supply** is from the appendicular artery (derived from the ileocolic artery, a branch of the superior mesenteric artery) . (11)
- ⇨ **venous drainage** occurs via the corresponding appendicular vein, which drains into the superior mesenteric vein which in turn drains into the portal vein.. Both vessels are contained within the mesoappendix.
- ⇨ **Innervation** : Sympathetic and parasympathetic branches of the autonomic nervous system innervate the appendix. This is achieved by the ileocolic branch of the superior mesenteric plexus. It accompanies the ileocolic artery to reach the appendix.

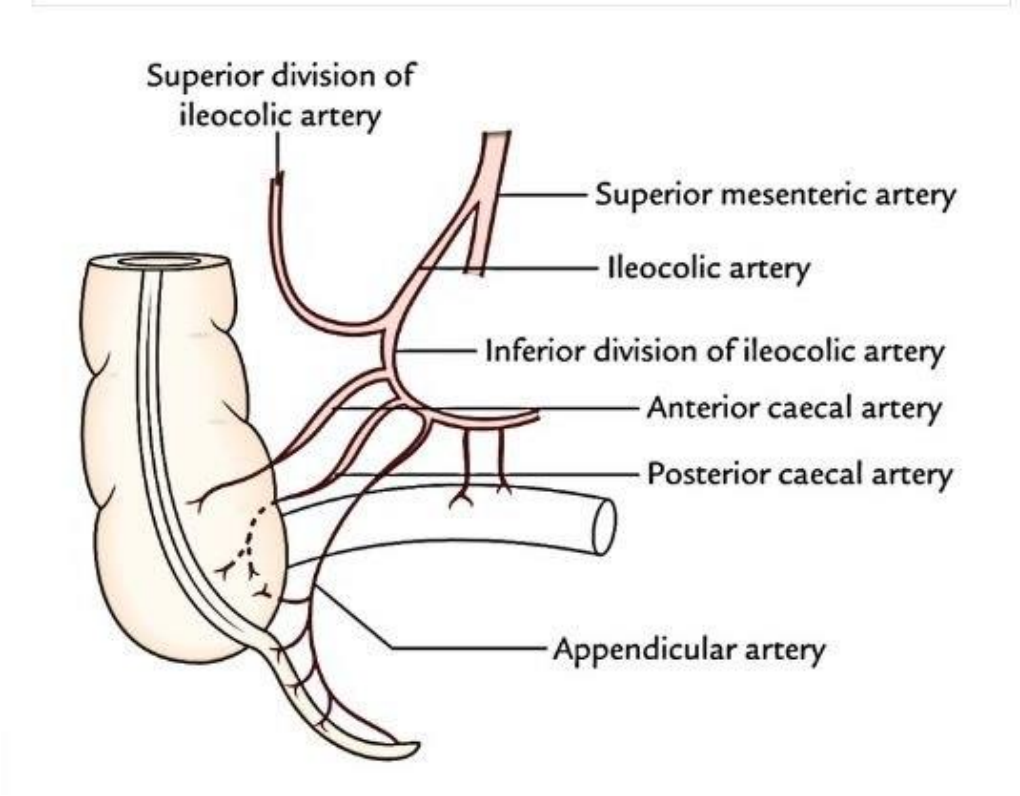


Figure 3 Arterial-blood-supply of the appendix vermiformis

Figure (3) : Arterial-blood-supply-of-the-appendix-vermiformis.(9)

- ⇨ **Lymphatic drainage** : The lymph vessels of the appendix drain into ileocolic lymph nodes directly or via appendicular nodes in the mesoappendix.

2.4) Microscopic structure :

The appendix has comparatively small angulated circular lumen as compared to its thick wall. The wall of the appendix includes 4 layers from inside outwards, these are: mucosa, submucosa, muscular layer, and serosa .

- **Mucosa:** The face of the mucous membrane is lined by the simple columnar cells and numerous goblet cells. It's devoid of villi. The intestinal glands (crypts of Lieberkuhn) are few and short.

- **Submucosa:** It includes a ring of large lymphoid follicles with germinal centers. Thus, the appendix is usually regarded as an abdominal tonsil.
- **Muscle layer:** It includes outer longitudinal and inner circular layers of smooth muscle.
- **Serosa:** It's created from visceral peritoneum. (9)

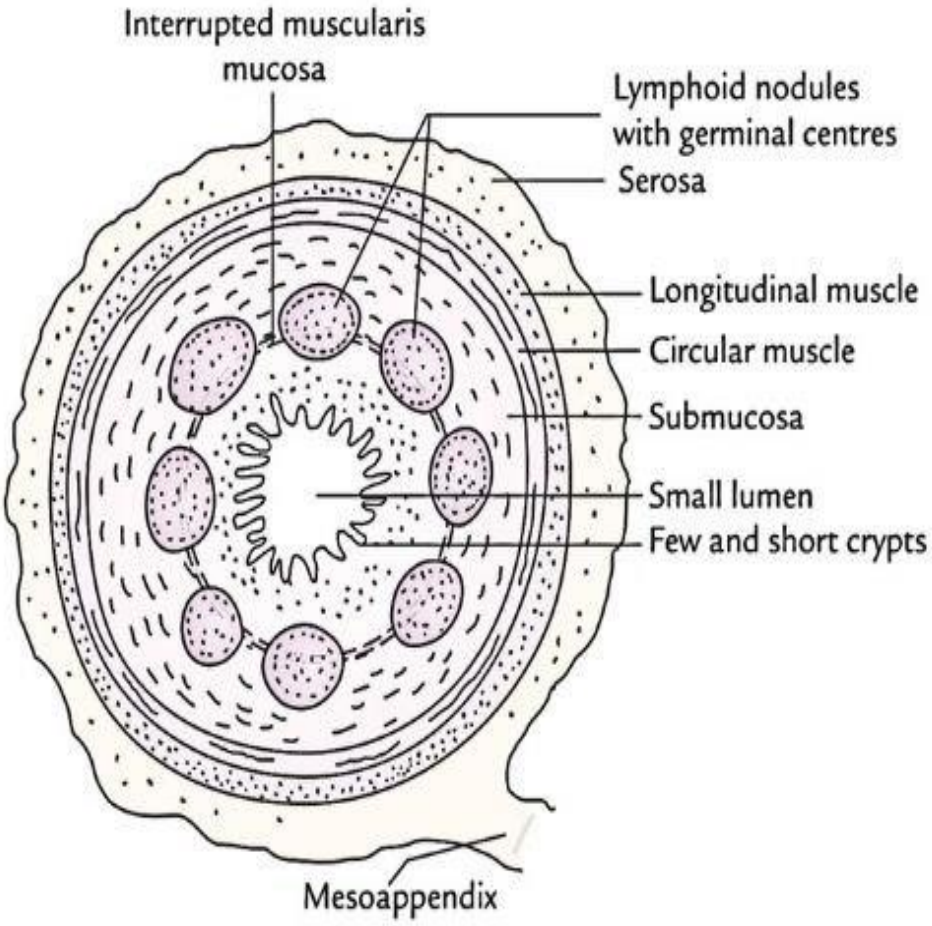


Figure 4 Transverse section of the appendix (microscopic structure)

Figure (4) : Transverse section of the appendix (microscopic structure) (9)

2.5) The immune role of the appendix :

An essential part of its immunological function is the interaction with the intestinal bacteria, a trait shown to be preserved during its evolution. The existence of the appendiceal biofilm in particular has proved to have a beneficial effect for the entire gut. In assessing the influence of acute appendicitis and the importance of a normally functioning gut flora, however, multiple immunological aspects point towards the appendix as a priming site

for ulcerative colitis. Describing the immunological and microbiotical changes in the appendix during acute and chronic inflammation of the appendix . (12)

The appendix, on the other hand, interacts with the host's immune system mainly by gut-associated lymphoid tissue (GALT), a network of immune cells concentrated in the appendix and other intestinal tissues which comprise different immune cells like dendritic cells (DCs), macrophages, and innate lymphocytes that serves as the first line defense ; it hane a role in the development of B and T lymphocytes and the production of IgA antibodies. These functions are particularly active during the first few years of life, indicating that the appendix may play a role in the development of the immune system in young individuals . (13)

3)Pathophysiology:

Acute appendicitis is primarily triggered by **obstruction** of the appendiceal lumen, which is considered the key pathogenic event in the majority of cases. The pathophysiology is multifactorial. This obstruction may be due to fecaliths (the most common cause, in the form of stercoliths), lymphoid hyperplasia (especially in adolescents and young adults), foreign bodies, intestinal parasites such as pinworms (oxyures), or neoplasms (including carcinoid tumors, adenocarcinoma, lymphoma, and metastatic lesions).

The most frequent cause is therefore obstruction of the appendiceal lumen (stercolith, foreign body, pinworms).

After luminal obstruction, continuous secretion of mucus and fluids by the appendiceal mucosa occurs, associated with impaired drainage, leading to progressive intraluminal distension. This causes an increase in both intraluminal and intramural pressure. As pressure rises, lymphatic drainage becomes compromised, resulting in lymphatic stasis, followed by venous outflow obstruction. When intraluminal pressure exceeds venous pressure, vascular congestion develops, ultimately leading to ischemia of the

the disease, aerobic bacteria predominate, but as ischemia progresses, a mixed aerobic and anaerobic flora develops. Common pathogens include Escherichia coli, Bacteroides, Peptostreptococcus, and Pseudomonas. This bacterial proliferation triggers an inflammatory response characterized by neutrophil infiltration and pus formation, further increasing intraluminal pressure.

As ischemia worsens, the integrity of the epithelial lining is lost, allowing bacterial invasion of the appendiceal wall. Ongoing vascular compromise, including thrombosis of small vessels as well as the appendiceal artery and veins, leads to transmural necrosis and gangrene.

If untreated, this process progresses to perforation of the appendix, which may result in a localized periappendiceal abscess or diffuse peritonitis. Inflammation may also extend to surrounding structures, including the pericecal fat and peritoneum.

An hematogenous cause is exceptional and is considered only when no luminal obstruction is identified.

Clinically, acute appendicitis is classified into:

_**Uncomplicated appendicitis**: inflammation without gangrene, perforation, or abscess

_**Complicated appendicitis**: presence of gangrene, perforation, or periappendiceal abscess .(14,15)

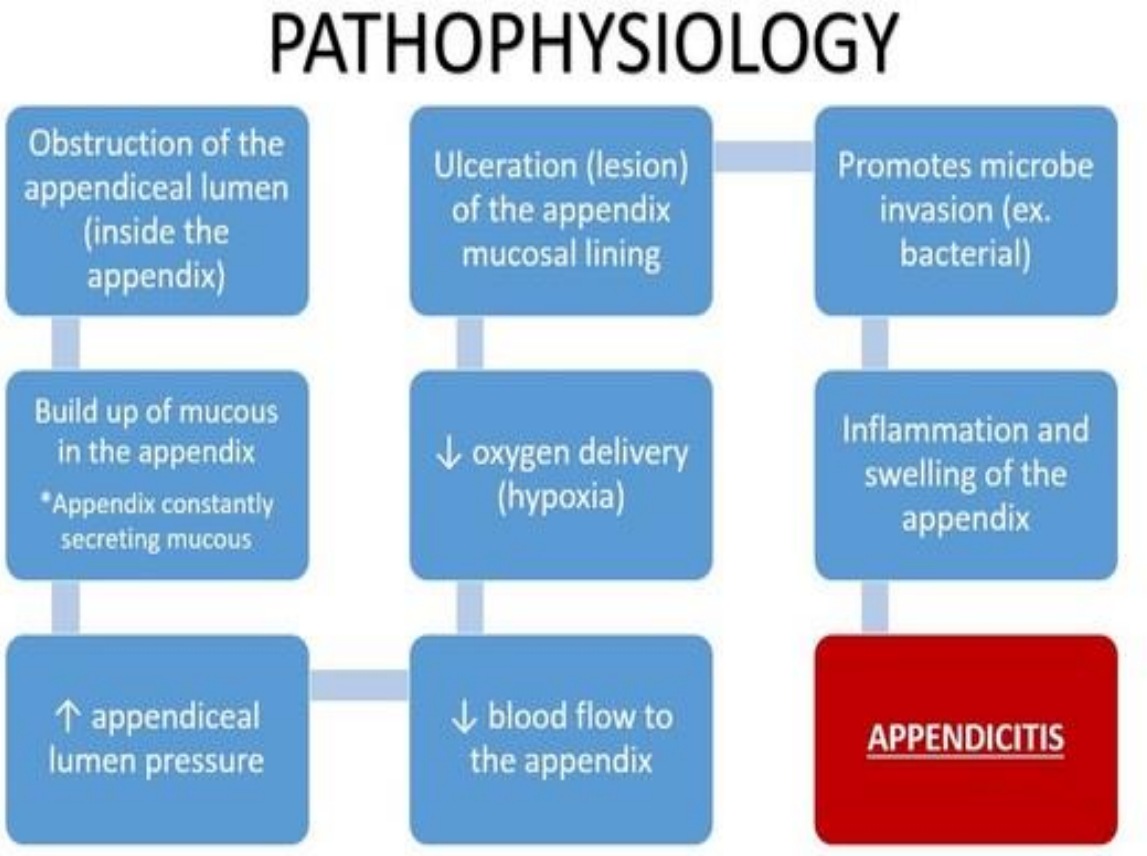


Figure 5 Pathophysiology of acute appendicitis

Figure (5) : Pathophysiology of acute appendicitis **.** (16)

4)Anatomopathology:

4.1) Acute appendicitis of non-specific bacterial origin:

In order of increasing severity, the following forms are distinguished:

⇨ **Catarrhal appendicitis (endoappendicitis)**

_ Macroscopic findings: The appendix appears edematous and hypervascular.

_ Microscopic findings: There is localized involvement of the mucosa, sometimes extending to the submucosa, with limited inflammation. A polymorphonuclear infiltrate and scattered necrotic foci are observed, presenting as small ulcerations or crypt microabscesses in certain sections, corresponding to so-called “focal”(17)

⇨ **Ulcerative and suppurative appendicitis**

_ Macroscopic findings: The lumen contains pus; the serosa is covered with fibrinous exudate (false membranes), and the peritoneal cavity contains an odorless seropurulent exudate, which at this stage is sterile on culture.

_ Microscopic findings: There are extensive tissue losses with necrotic debris infected at their base and an inflammatory infiltrate predominantly composed of polymorphonuclear leukocytes involving the entire wall. A fibrinoleukocytic exudate may be present on the serosal surface. (17)

_s characterized by neutrophils infiltrating the appendiceal mucosa, submucosa, and muscularis propria. The inflammatory process extends throughout the entire appendiceal wall and can cause extensive ulceration. In addition, intramural abscesses accompanied by vascular thrombosis may be observed. Suppurative appendicitis has a varied gross appearance but commonly observed findings include poorly-demarcated serosa, dilation of the appendix, congestion of surface blood vessels, and fibrinopurulent serosal exudate. However, an increased appendiceal diameter alone is not a conclusive finding and should be interpreted in conjunction with other clinical and histopathological features. (14)

⇨ **Phlegmonous appendicitis**

_ Macroscopic findings: This represents progression of the suppurative form, involving the entire appendix. The lumen contains pus, the serosa is covered with false membranes, and a sterile seropurulent exudate is present in the abdominal cavity.

_ Microscopic findings: Diffuse tissue destruction with widespread suppurative transmural necrosis. A fibrinoleukocytic coating on the serosa is almost constant.

⇨ **Abscessed appendicitis**

_ Macroscopic findings: The appendix may show a “clapper-like” appearance when suppuration is localized at the tip. When large, the abscess may mimic an inflammatory pseudotumor.

_ Microscopic findings: Corresponds to ulcerative and suppurative appendicitis with intense periappendiceal inflammation and a wall infiltrated by microabscesses.

⇨ **Gangrenous appendicitis**

_ Macroscopic findings: The appendix appears greenish with necrotic areas leading to perforation. In rapidly evolving cases, perforation occurs into the free peritoneal cavity, which contains foul-smelling pus and sometimes gas escaping under pressure upon opening the abdomen.

_ Microscopic findings: Extensive hemorrhagic and necrotizing ischemic damage of the wall, with relatively minimal inflammatory reaction and associated vascular thrombosis. (17)

_ is characterized by the necrosis of the appendix wall. If left untreated, perforation will eventually occur. In cases where perforation has taken place, transmural inflammation with areas of necrosis and extensive mucosal ulceration can be observed. Therefore, perforation is considered a complication of untreated gangrenous appendicitis. Grossly, the appendix wall appears friable and may display shades of purple, green, or black.(14)

- **Perforated appendicitis**

In cases of complicated perforated appendicitis, the histopathological evaluation may exhibit features indicative of abscess formation, characterized by marked transmural inflammation and neutrophils infiltrating the affected tissue. The inflammation frequently extends beyond the appendix to involve the surrounding mesoappendix. Complicated perforated appendicitis is a severe inflammatory process involving the appendix and the surrounding tissues, manifesting as evidence of perforation, abscess formation, and high-grade inflammation .(14)

4.2) Acute appendicitis associated with inflammatory and specific bacterial diseases:

More specific histopathological features may be observed in certain chronic inflammatory bowel diseases and infectious conditions (bacterial, parasitic, or viral). Epithelioid and multinucleated giant cell granulomas, with or without necrosis, have
been described in tuberculosis, Crohn's disease, yersiniosis, and sarcoidosis. Lesions of ulcerative colitis have been identified in appendices from colectomy specimens. Actinomyces may be present in the appendiceal lumen (normal or pathological) and should be investigated in cases of ileocecal abscesses suggestive of metastatic abscess formation. In typhoid fever, ulcerations centered on lymphoid follicles have been described.

4.3) Parasitic acute appendicitis:

Appendiceal parasitic infections include: Amebiasis Ascaris (9%) Trichuris trichiura (13%) Enterobius vermicularis (55%, most frequent) Amebiasis causes appendiceal ulcerations. Although mucosal ulcerations associated with pinworms have been reported, their pathogenic role remains controversial, as they are often considered incidental findings in non-specific inflammatory appendiceal lesions.

4.4) Viral acute appendicitis:

Certain viral infections may show characteristic findings in appendectomy specimens: Measles: Presence of multinucleated giant cells (Warthin–Finkeldey type) within hyperplastic lymphoid follicles. Cytomegalovirus (CMV): Enlarged cells with characteristic intranuclear eosinophilic inclusions surrounded by a clear halo ("owl's eye" appearance). Infectious mononucleosis: Lymphoid follicular hyperplasia with proliferation of small lymphocytes and immunoblasts resembling Reed–Sternberg cells.(17)

Figure 6 Catarrhal appendicitis

Figure (6) : Catarrhal appendicitis.(18)

Figure 7 Ulcerative and suppurative appendicitis

Figure (7) : Ulcerative and suppurative appendicitis.(17)

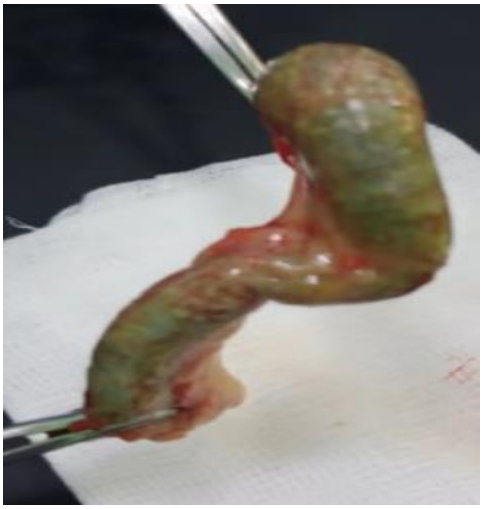


Figure 8 Phlegmonous appendicitis

Figure (8) : phlegmonous appendicitis .(19)

Figure 9 Appendicular abscess

Figure (9) : Appendicular abscess.(20)

Figure 10 Gangrenous appendicitis

Figure (10) : Gangrenous appendicitis .(21)

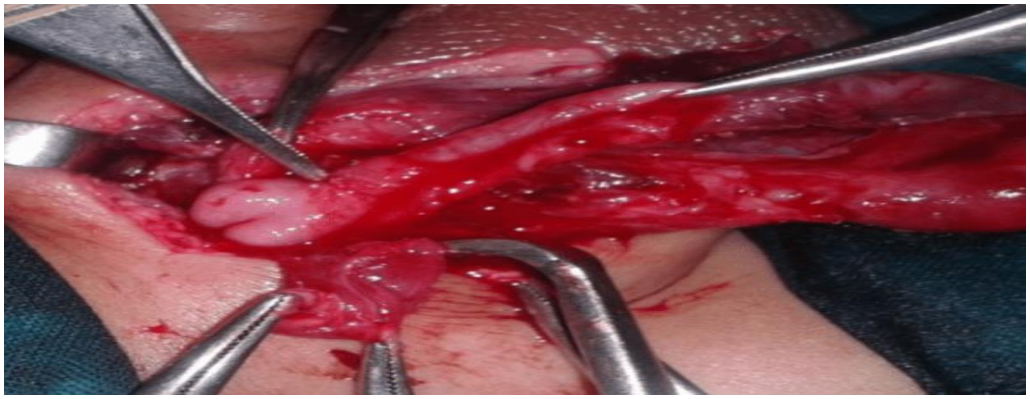


Figure 11 Perforated appendicitis

Figure (11): perforated appendicitis .(22)

5)Clinical diagnosis :

The diagnosis of appendicitis can be challenging even in the most experienced hands, and is predominantly a clinical one. Accurate anamnesis and physical exam are important to prevent unnecessary surgery and avoid complications. The probability of appendicitis depends on patient age, clinical setting, and symptoms.(23)

**it is characterezied by clinical polymorphism with a discrepancy between clinical presentation and histopathological findings .

5.1) Anamnesis:

For the majority of patients who present to the emergency department with acute appendicitis, abdominal pain will be their chief complaint. Typically, the patient describes a periumbilical pain which intensifies during the first 24 h, becoming constant and sharp, and migrates to the right iliac fossa ; Nausea, vomiting, and anorexia occur in varying degrees, though are usually present in more than 50% of cases in all studies. With disease progressing as previously outlined, pain becomes well defined and localises in the right lower quadrant near McBurney's point .

**Other clinical presentations :

Patients with a retrocaecal appendix or those presenting in the later months of pregnancy may have pain limited to the right flank or costovertebral angle. Male patients with a retrocaecal appendix may complain of right testicular pain. Pelvic or retroileal locations of an inflamed appendix will refer to the pelvis, rectum, adnexa, or rarely, the left lower quadrant. Subcaecal and pelvic suprapubic pain and urinary frequency may predominate.(23)

5.2) Physical examination:

By far, the most likely physical finding is abdominal tenderness, which occurs in over 95% of patients with acute appendicitis. Patients often find the right lateral decubitus position with slight hip flexion as the position of maximal comfort .

- The patient is often flushed, with a dry tongue and an associated faetor oris.
- A lower grade fever (37,9 – 38°C) ; a fever higher than 38- 38,5 °C is consistently associated with complicated acute appendicitis (gangrenous and perforated forms) , reflecting progression of local ischemia , bacterial translocation , and systemic inflammatory response .

Abdominal examination reveals painful tenderness and muscular rigidity in the right iliac fossa. Rebound tenderness is present; Pain is often exacerbated by movement; coughing may reproduce localized pain in the right lower quadrant (dunphy's sign).

Percussion tenderness, guarding, and rebound tenderness are the most reliable clinical findings indicating a diagnosis of acute appendicitis. Voluntary muscle guarding in the right lower quadrant is common and usually precedes the tenderness. The follow signs of acute appendicitis are the mostly described, but all of them occur in less than 40% of patients with acute appendicitis, and even their absence should not prevent the examiner from establishing an accurate diagnosis.

- **Mcburney's sign:** localized tenderness at mcburney's point (RIF) on abdominal palpation.

- **Blumberg's rebound pain:** (pain upon the sudden release of pressure at the level of the right iliac fossa).

- **Rovsing's sign:** pain in the right lower quadrant elicited by palpation or pressure of the left lower quadrant.

- **Psoas sign:** right lower quadrant pain with extension of the right hip or right thigh flexion against resistance.

- **obturator :** right lower quadrant pain with flexion and internal rotation of the right hip , sign depends on the location of the appendix in relation to these muscles and the degree of appendiceal inflammation. (23)

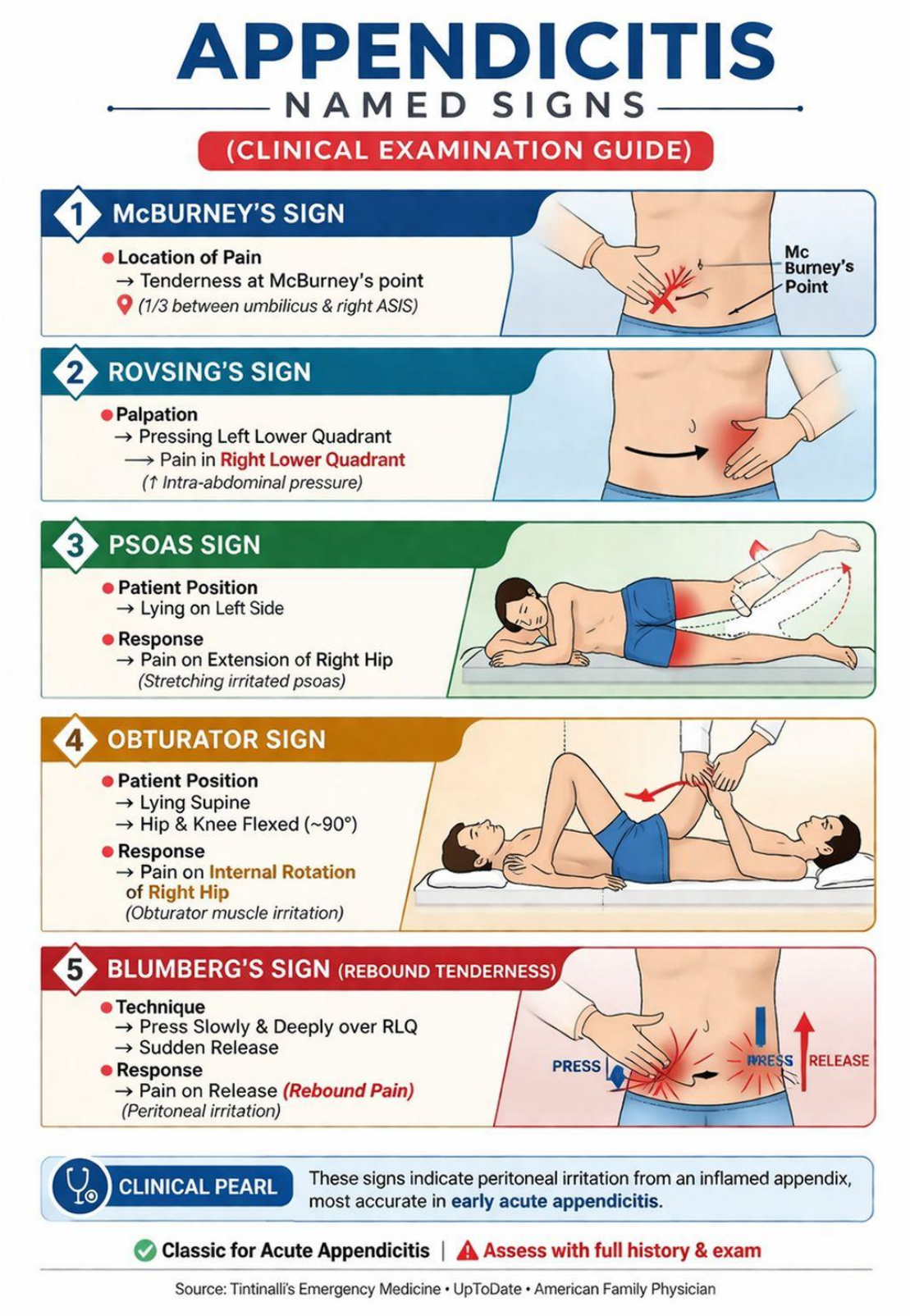


Figure 12 Clinical signs in acute appendicitis

Figure (12): clinical signs found in acute appendicitis.(24)

6) Laboratorial findings :

Laboratory data upon presentation usually reveal an elevated leukocytosis with a left shift, Neutrophilia greater than 75% will occur in the majority of cases. This inflammatory response may be absent in elderly or immunocompromised patients, with conditions such as malignancy or AIDS; leukocytosis is observed in less than 15% of such patients.

Measurement of C-reactive protein (CRP) is most likely to be elevated in appendicitis if symptoms are present for more than 12 h, reflecting disease progression.

The diagnostic performance improves significantly when combining inflammatory markers , the association of an elevated CRP, elevated WBC, or neutrophilia greater than 75% improves the sensitivity to 97%e100% for the diagnosis of acute appendicitis ; While no laboratory value can confirm or exclude acute appendicitis, most patients with acute appendicitis will have a WBC count of >10,000 cells/mm3. Accordingly, a WBC count ≥17,000 cells/mm3 is associated with complicated forms of acute appendicitis.(23)

Table 1 Alvarado scoring system (25)

Table 1: Alvarado scoring system

Alvarado score	
Symptoms	
Abdominal pain that migrates to the right iliac fossa	1
Anorexia (loss of appetite) or ketones in the urine	1
Nausea or vomiting	1
Tenderness in the right iliac fossa	2
Signs	
Rebound tenderness (Blumberg)	1
Fever of 37.3 °C or more	1
Laboratory	
Leukocytosis > 10,000	2
Neutrophilia > 70%	1
TOTAL	**10**

Patients with a score of > 7 points have a high risk of appendicitis. Patients with a score of <5 points have a very low risk of appendicitis.

The Alvarado scoring system is one of the most frequently used scoring systems to determine the need for surgical intervention for appendicitis.

A scores of 1-4 indicate discharged home, scores of 5-6 signify being "observed" and scores of 7-10 indicate the need of surgery.(5) *Table 2 Appendicitis inflammatory response scoring system*

TABLE 2 : Appendicitis Inflammatory Response scoring system .(5)

Feature		Score
Vomiting		1
Pain in right inferior fossa		1
Rebound tenderness	light	1
	medium	2
	strong	3
Body temperature	>38,5 °C	1
Polymorphonuclear leukocytes	70-84%	1
	>85%	2
WBC count	10-14.9×10*9/l	1
	≥ 15×10*9/l	2
CRP concentration	10-49g/l	1
	>50g/l	2

Scores of 0-4 suggest "discharged home", scores of 5-8 mean being "observed", and scores of 9-12 indicate the need to "undergo surgery". In a study comparing the Appendicitis Inflammatory Response scoring system to the Alvarado scoring system, the sensitivity of the Appendicitis Inflammatory Response scoring system was found to be 93% compared to 90% with the Alvarado scoring system, with specificity reported to be 85% compared to 55%, respectively. (5)

7)_Imaginological findings :

7.1) Radiography (X-ray): has a limited role in the diagnosis of AA and is not routinely recommended; it may show an appendicolith: calcified opacity in the

right lower quadrant, air-fluid levels or distension of the terminal ileum , localized ileus ... (23)

Figure 13 Appendicolith on abdominal x-ray

Figure (13) : appendicolith on abdominal x-ray.(26)

7.2) Abdominal Ultra sound (US): US is rapid, non-invasive, inexpensive, a widely-available imaging modality frequently employed as the primary imaging tool in evaluating patients with acute abdominal pain. In addition, it is the preferred primary imaging modality in evaluating children and pregnant patients with suspected acute appendicitis.

The appendix appears on ultrasound as a lamellated, elongated, blind-ending structure. Unlike normal bowel, the inflamed appendix is fixed, non-compressible, and appears round on transverse images. Measurements of appendix are performed with full compression. Traditionally, the diagnosis of appendicitis is made when the diameter of the compressed appendix exceeds 6 mm. In contrast, the thick-walled and non-compressible appendix, maintained in a fixed position by the compressing transducer, will show circumferential color when inflamed.

Irregular periappendiceal fluid collection, suggests perforated appendicitis or abscess formation in complicated cases. (23)

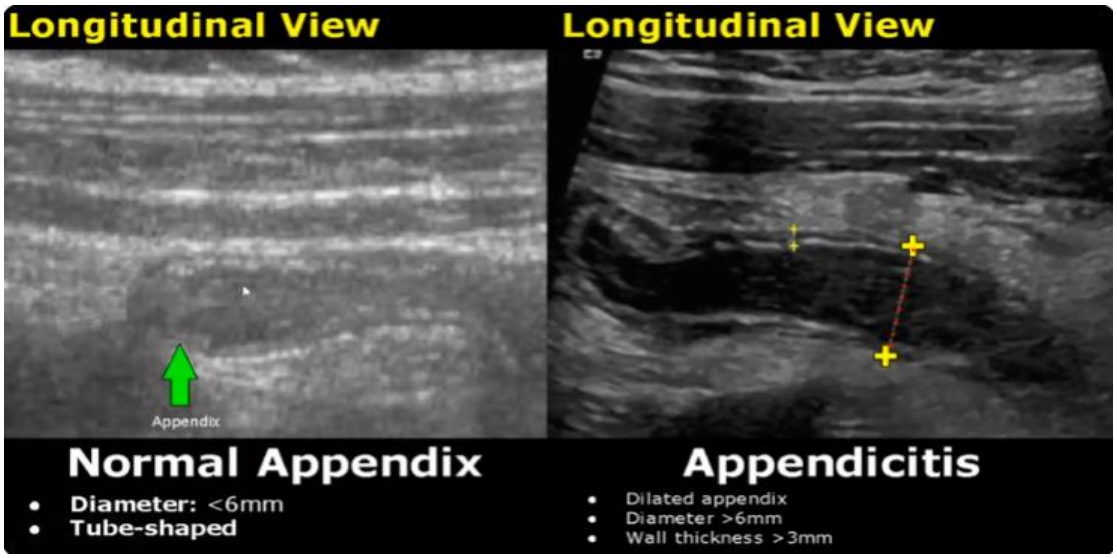


Figure 14 Sonographic findings normal appendix VS acute appendicitis

Figure (14) : Sonographic findings" **normal appendix** vs **acute appendicitis**".(27)

7.3) Computed tomography: represents an excellent diagnostic alternative for all other patients ; An abdominopelvic CT scan with intravenous contrast demonstrates >95% accuracy in diagnosing acute appendicitis in adults .IT is complementary to US and is recommended whenever US results are suboptimal, indeterminate, or normal in patients with acute abdominal pain.

The inflamed appendix appears as an enlarged appendix with an outer diameter of >6 mm , thickening of the appendiceal wall measuring >2 mm to 3 mm, periappendiceal fat stranding, enhancement of the appendiceal wall, the presence of inflamed soft tissue at the appendiceal base separating the appendix from the cecum, and the existence of an appendicolith. In most cases of appendicitis, observing intraluminal contrast media or air due to luminal distention is uncommon.(23)

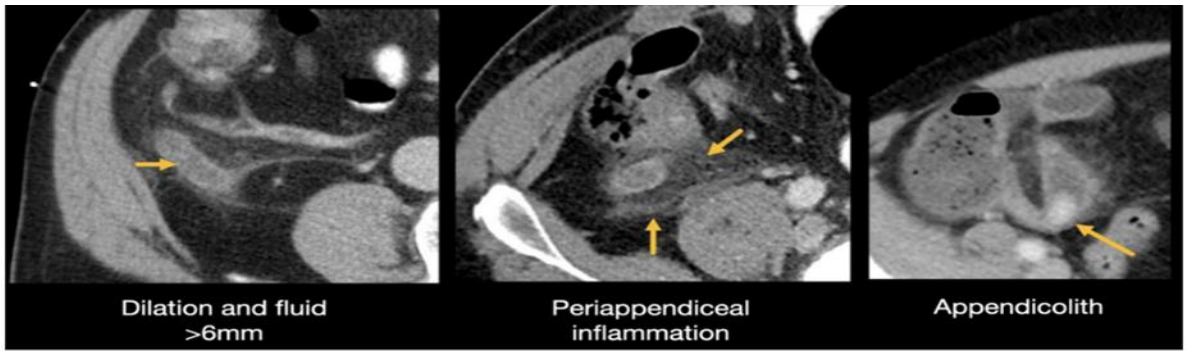


Figure 15 CT images of acute appendicitis (transversal sections)

Figure (15) : CT images of acute appendicitis (transversal sections).(28)

7.4) Magnetic resonance (MR):

MR imaging is emerging as an alternative to CT in pregnant patients and in patients who have an allergy to iodinated contrast material. MR imaging has a limited role in the work-up of suspected appendicitis. Although the use of MR imaging avoids ionizing radiation, it has several disadvantages, including high cost, long duration of studies, and limited availability on an emergent basis. According some authors, the use of MR imaging is limited to pregnant patients in whom ultrasound is inconclusive. On MR imaging, the appendix is identified as a tubular structure with intraluminal T1 and T2 prolongation. Appendicitis is diagnosed using thresholds of the size used for CT. Inflammatory changes are visualized as T2 hyperintensity in the periappendiceal fat. There are no known adverse effects of MR imaging in human pregnancy, but the safety of MR imaging has not been proven unequivocally. Although tissue heating from radiofrequency pulses, acoustic stimulation potentially harm the fetus. It remains there for an indefinite amount of time, excreted by the fetal kidneys and subsequently swallowed by the foetus with amniotic fluid. Although there is no evidence of mutagenic or teratogenic effects of gadolinium in humans, mutagenic effects were seen in animal studies. Therefore a conservative approach avoids using gadolinium when possible in the first trimester.(23)

8)_Evolution and complication:

8.1) Localized peritonitis:

- **Appendiceal Phlegmon (Appendiceal Mass)**

Around the appendiceal focus, small bowel loops and the omentum cluster together, forming an appendiceal phlegmon (appendiceal mass). Clinically, this is characterized by:

_Persistent pain, which may be somewhat attenuated;

_Persistent fever and leukocytosis;

_On examination, a diffuse, firm inflammatory mass (“phlegmon”) plastered against the abdominal wall, tender to pressure, dull to percussion, extending laterally to the iliac crest and inferiorly to the inguinal ligament, without crossing the midline;

_On abdominopelvic CT scan, there is often a localized peritoneal reaction in the right iliac fossa (contrast enhancement and thickening of the parietal peritoneum adjacent to the infectious focus, with a small dependent fluid collection in the pouch of Douglas).

The course of this phlegmon is variable:

_Slow regression is possible; however, the main risk is the development of an appendiceal abscess, suggested by worsening, throbbing pain, a rise in temperature with a swinging (spiking) pattern, and increased focal tenderness within the mass. Leukocytosis worsens, with marked neutrophilia. Ultrasound and CT scan confirm the diagnosis, showing a hypodense collection with an enhancing wall, often containing gas bubbles; the perforated appendix is usually difficult to identify. Oral administration of diluted iodinated contrast (10%) may help delineate the abscess.

_Although an appendiceal phlegmon is generally a contraindication to immediate surgery, it is essential to detect a localized abscess in order to drain it before spontaneous rupture into a hollow organ or the general peritoneal cavity occurs (leading to severe "three-stage" peritonitis), or before complications such as distant abscesses develop (subphrenic abscess, hepatic abscess via septic emboli in the portal system).

- ⇨ **Appendiceal abscess:**

An appendiceal abscess is a localized collection of pus that develops as a complication of acute appendicitis, usually when the inflammatory process becomes walled off by surrounding structures such as the omentum, small bowel loops, and mesentery.

8.2) Generalized Peritonitis:

Peritonitis may present in two forms:

_Progressively spreading peritonitis (**one-stage peritonitis**):

The initial episode does not resolve, and by the 3rd or 4th day, pain persists; cessation of stool and gas passage becomes evident; pulse rate increases, temperature rises, and on palpation, the painful area extends beyond the right iliac fossa, with guarding spreading past the midline. Digital rectal examination elicits marked pain.

_**Two-stage peritonitis**: After an initial rapid improvement of symptoms, there is a sudden onset of severe abdominal pain accompanied by abdominal rigidity.(17)

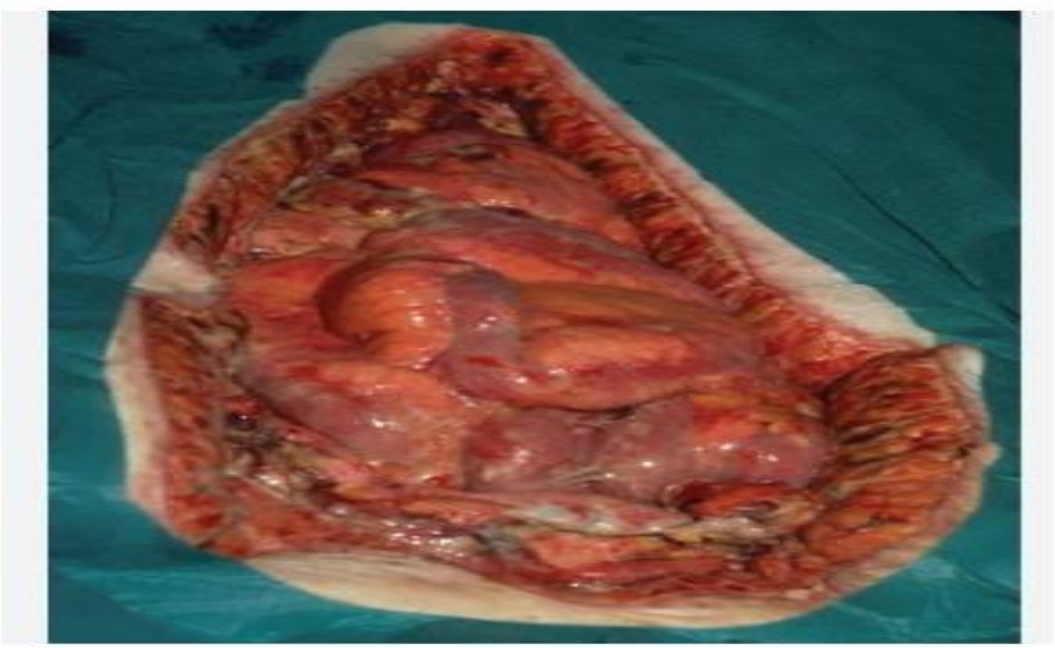


Figure 16 Appendiceal peritonitis

Figure (16) : Appendiceal peritonitis.(29)

9)_Differential diagnoses:

The differential diagnosis of acute appendicitis includes but is not limited to

_ Crohn ileitis _ Mesenteric adenitis _ Complicated cecal diverticulum _ Mittelschmer

_ Salpingitis _ Ruptured ovarian cyst

_ Ectopic pregnancy _ Tubo-ovarian abscess

_ Musculoskeletal disorders _ Endometriosis

_ Pelvic inflammatory disease _ Gastroenteritis

_ Right-sided colitis _ Renal colic

_ Kidney stones _ Irritable bowel disease

_ Testicular torsion _ Ovarian torsion

_ Round ligament syndrome, and epididymitis.

A comprehensive medical history and a problem-oriented physical examination are necessary to narrow the differential diagnosis. Recent viral infection is suggestive of acute mesenteric adenitis. Acute bacterial ileitis may be due to infections with Yersinia or Campylobacter species. Severe cervical motion tenderness during the bimanual pelvic examination may indicate pelvic inflammatory disease.

One of the most challenging differential diagnoses of acute appendicitis is the acute presentation of Crohn disease. While a past medical history significant for Crohn.

disease can prevent unnecessary surgical procedures in the setting of acute abdominal pain, Crohn disease can initially present acutely, mimicking acute appendicitis.(14)

In women, acute cholecystitis may be mistaken for appendicitis and vice versa. In cases of an abnormally low-lying gallbladder or a subhepatic appendix, palpation finding may be misleading. one must then rely on a history of possible biliary colic , suggestive dietary intolerances or biological indicators among these ;the presence of bile salts in the first urine sample collected a slight increase in bilirubin levels and elevated alkaline phosphatase are highly suggestive of a biliary disorder .(17)

So the differential diagnoses of acute appendicitis are numerous and are summarized in**.** (17)

10)_Treatement and management :

10.1) Adjuvant treatment:

1) Pain control (analgesics) + antipyretics: paracetamol in first line.

2) Antiemetics (e.g : metoclopramide).

3) Intravenous hydration.

4) Antibiotics (cephalosporins or amoxicillin-clavulante +metronidazole)

5) Gradual reintroduction of oral feedings as the patient improves (in case of NOT).

10.2) Non-operative treatment:

A non-surgical approach using an antibiotic therapy in AA may reduce the complication rate; the lower efficacy may prevent antibiotic therapy from being a first-hand alternative to surgery. (3)

The antibiotic coverage for acute appendicitis typically involves targeting aerobic and anaerobic bacteria pending culture results; a combination of antibiotics is used. A third-generation cephalosporin, such as ceftriaxone or cefotaxime, or a beta-lactam/beta-lactamase inhibitor, provides coverage against

aerobic gram-negative bacteria. Either metronidazole or clindamycin is administered to provide coverage against anaerobic bacteria. This combination of antibiotics is chosen to cover a broad range of potential pathogens that may be involved in appendicitis. However, the choice of antibiotics may vary depending on local antimicrobial resistance patterns and individual patient factors, such as allergies or previous antibiotic exposure.(14)

Most patients randomized to antibiotic treatment for uncomplicated appendicitis did not require appendectomy during the 1-year follow-up period, and those who required appendectomy did not experience significant complications. (30)

Conservative treatment with antibiotics was found to be 18% less effective than surgical treatment . Given substantial crossover in studies, it is recommended to continue to pursue surgical intervention as the first line therapy . Future studies employing different antibiotic regimens, both oral and intravenous, need to be conducted to examine the efficacy of antibiotics and explore the possibility of forgoing surgery for patients suffering from uncomplicated appendicitis. NOT has been found to have a high success rate of 86.1%. (5)

10.3) Surgery:

Appendectomy, via open laparotomy by standard technique using a McBurney right lower quadrant muscle splitting incision or via laparoscopy, remains the standard treatment for acute appendicitis .

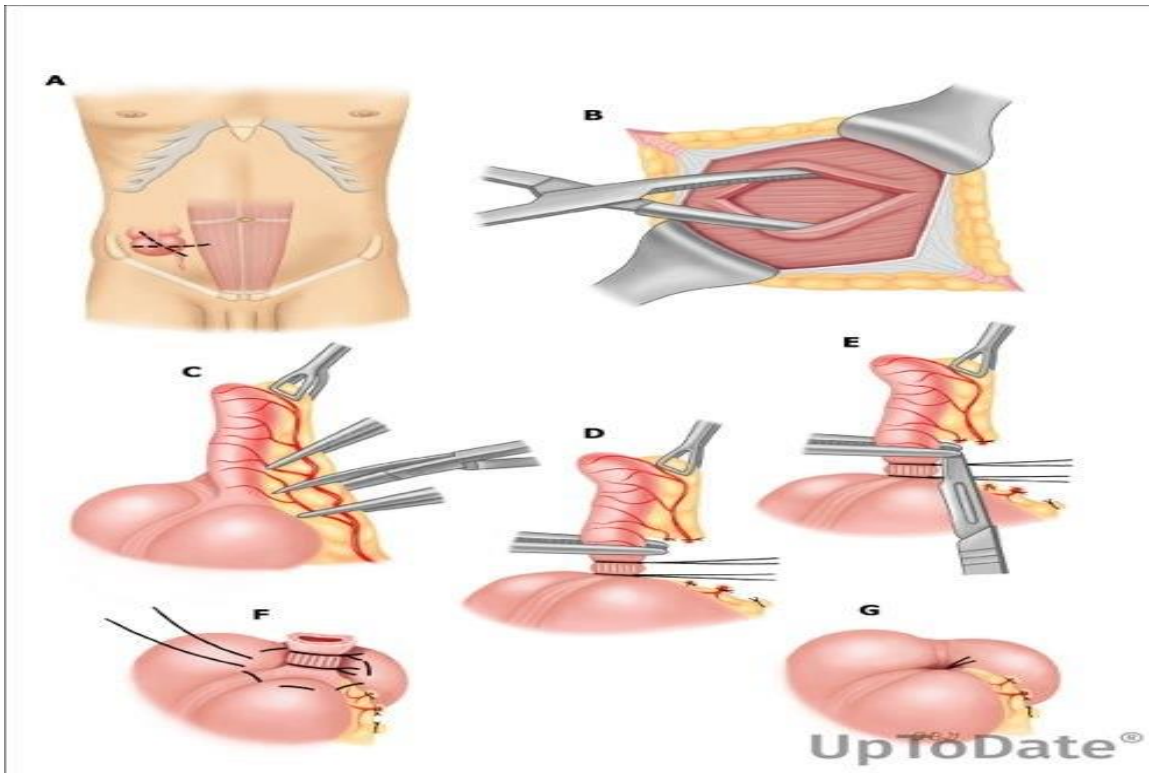


Figure 17 Appendectomy by laparotomy (Mc burney's incision)

Figure (17) : Appendectomy by laparotomy (Mc burney's incision).(31)

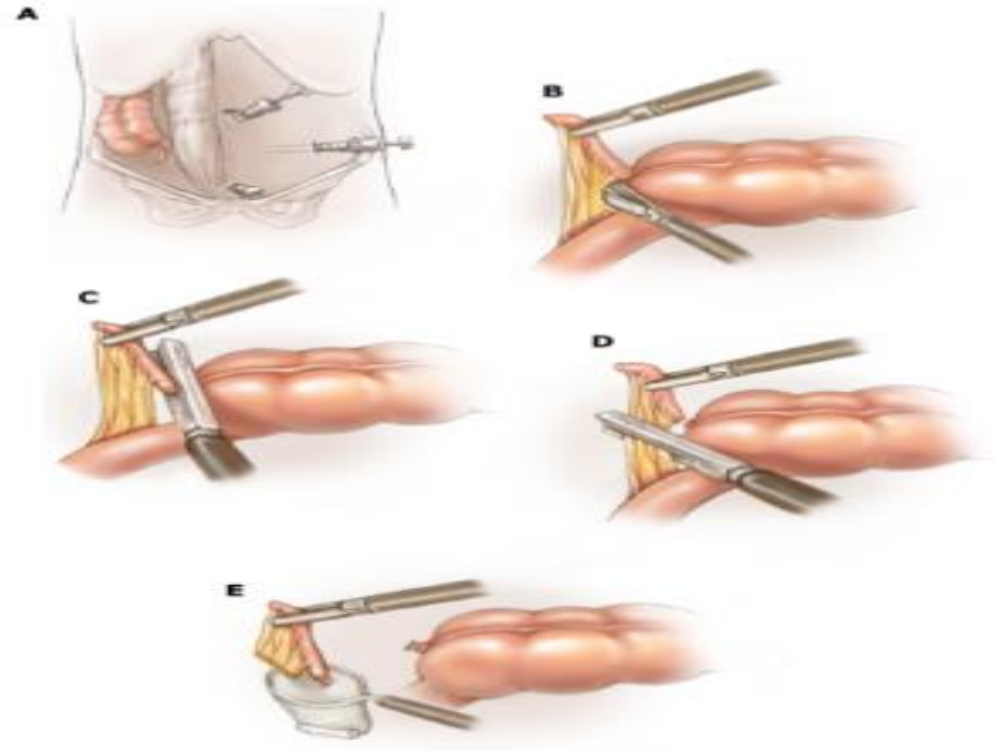


Figure 18 Appendectomy via laparoscopy

Figure (18) : Appendectomy via laparoscopy . (31)

III Pratical part

1) Materials and methods:

1.1) Type of study:

This is a **prospective cohort study** conducted among adult patients diagnosed with **uncomplicated acute appendicitis**. The study included patients who consulted at the emergency unit or were hospitalized in the General Surgery Department of the **240-bed Mixed Hospital of Laghouat**.

1.2) Study period :

The study was conducted over a period of 6 months, from **20TH August 2025** to **20TH February 2026**.

1.3) Study population:

1.3.1) Inclusion criteria:

✓ Patients aged from 15 years+3 months and older.

✓ diagnosis of uncomplicated acute appendicitis based on :

- Clinical criteria (tenderness or rebound pain at the level of the right iliac fossa, Alvarado score <7);

- Biological: hyperleukocytosis “but <15000”

- Radiological ultrasound (or computed tomography): caliber of the appendix >6mm and < 10mm ; with absence of appendicolith ; absence of other complications such as :perforation, abscess ,peritonitis …

✓ Obtain informed consent.

1.3.2) Non inclusion criteria :

-Alvarado score≥7; hyperleukocytosis >15000; ultrasound or CT scan: caliber of the appendix >10mm + the presence of appendicolith).

- Complicated acute appendicitis.

- Pregnancy.

- Antibiotic allergy.

1.3.3) Exclusion criteria :

-Refusal of the non-operative treatment by the patient.

-Discharge against medical advice.

-Loss of follow-up.

-Revised diagnosis.

1.4) Data collection

Data were collected prospectively from patients' medical records using a standardized data collection form.

The following variables were recorded :

1.4.1) Demographic Data:

- Age (years)
- Sex (male/female)

1.4.2) Clinical Data:

- Medical and surgical history
- Onset of symptoms
- Abdominal pain location (clinical examination)
- Fever
- Nausea/vomiting, Anorexia, Altered bowel habits

1.4.3) Paraclinical Data:

- Laboratory findings (white blood cell count, CRP)
- Imaging findings (ultrasound or CT scan)

1.4.4) Treatment Data and management:

Initial **intravenous antibiotic** therapy administered for 2 days, providing coverage against both **aerobic** and **anaerobic** bacteria.

***Protocol(1):** Cephalosporins "Cephotaxime"1g/6h and metronidazole "Flagyl" 500mg/8h.

***Protocol(2):** Augmentin "Amoxicillin+clavulanate" 1g/6h and metronidazole "Flagyl" 500mg/8h.

- ⇨ **Adjuvant treatment:** analgesic, antipyretic, antiemetic, hydration, Gradual reintroduction of oral feedings as the patient improves.
- ⇨ Close clinical **monitoring** of patients, including assessment of pain, fever; and inflammatory markers (WBC,CRP) the 3rd day of treatment.

- ⇨ In cases of clinical improvement, patients were switched to **oral antibiotic therapy**.
- ⇨ The total duration of antibiotic treatment was 10 days.
- ⇨ A clinical follow-up was carried out at 1 month and 6 months after completion of treatment.

1.4.5) Outcomes Data:

- Treatment success
- treatment failure
- safety
- recurrence
- complications.

1.5) Statistical analysis:

All statistical analysis were performed using SPSS software version 27.0.1(IBM SPSS Statistics)

A **descriptive analysis** was conducted to summarize baseline characteristics and clinical data. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD).

The primary outcome was treatment success, defined as resolution of symptoms without the need for surgical intervention during the index hospitalization. Success and failure rates were calculated as proportions. Given the small sample size (n = 36), only exact statistical methods were applied for comparative analysis. Specifically, the student's t-test was employed to assess differences between success and failure rates, while Fisher's exact test was used for categorical variables (success and failure rates between the two treatment protocols).

No parametric tests or multivariate analyses were performed due to the limited sample size. All analyses were conducted in accordance with standard statistical approaches for prospective cohort studies.

1.6)_Description of the different stages of the work and their probable duration:

 Total planned duration and schedule: 07 months.

 Literature review: 20 days.

- ➢ The bibliographic sources mainly consist of books, original articles, internet sites, as well as theses and recommendations from learned societies.
- ➢ Documentary synthesis and critical report on the subject (01months).

 Study initiation: (20 days)

 Data collection.

 Analysis and discussion of results: (01 month)

 Writing: (01month).

1.7) Tasks performed by the intern:

- Conduct a comprehensive literature review of clinical trials and guidelines regarding non-operative management (antibiotic therapy) versus appendectomy to establish the study framework.
- Design standardized data collection forms and clinical questionnaires to track patient demographics, inflammatory markers (CRP, WBC),radiological findings(appendicular diameter, absence of appendicolith), and clinical outcomes.
- Develop a detailed research outline to structure the theoretical basis of the cohort study, focusing on inclusion criteria for "uncomplicated" cases.
- Prospective follow-up and analysis of medical records for adult patients enrolled in the non-operative treatment protocol to evaluate success rates and recurrence.

1.8) Expected results: In this prospective cohort study, NOT of UAA in adults is anticipated to demonstrate a high initial treatment success rate, estimated at 70–90% during the index hospitalization. Early treatment failure, necessitating surgical intervention, is expected in approximately 10–30% of cases. Among patients with initial successful conservative management, a recurrence rate of 10–20% is projected within three months of follow-up. Clinical improvement is expected to occur within 48–72 hours of antibiotic therapy initiation, with a low overall complication rate (<10%). Collectively, these findings are expected to support NOT as a safe and effective alternative to appendectomy in carefully selected patients, with favorable short-term outcomes and acceptable risk of recurrence.

2) RESULTS:

2.1) Study Population:

During the study period, 36 adult patients were admitted to the emergency unit or to the general surgical unit for UAA were enrolled in the prospective cohort and treated with NOT. All patients fulfilled the diagnostic criteria.

The study population presented a mean age of 29,94 ± 13,41 years(range: 16–63), with 58,3%(21) males and 41,7% (15)females.
Hypertension was present in 5,6% of patients; diabetes in 2,8%, and 8,3% had a prior surgical history.
The mean symptom duration was 1,69 ± 0,75 days: 47,2% presented within 24 hours, 36,1% between 24–48 hours, and 16,7% after 48 hours.

The mean temperature was 37,27 ± 0,66 °C. The mean white blood cell count was 11605,56 ± 4,221.37/mm³, and mean CRP was 19,5 ± 18,68 mg/L. The mean appendiceal diameter was 8,23 ± 0,87 mm. Right iliac fossa pain was reported in 97,2% of cases. Other symptoms included epigastric pain (16,7%), pelvic pain (11,1%), right flank pain (8,3%), and lumbar pain (11,1%). Nausea and vomiting were present in 36,1% and 19,4%, respectively.
No appendicolith was detected. All patients (100%) had an Alvarado score < 7.

The results are mentioned in the **Table (3)** below:

Table 3 Baseline clinical and biological characteristics of the study population

Table 3 : *Baseline clinical and biological characteristics of the study population.*

Variable	categories /measures	Frequencies (n)	mean±sd or percentage%
Age (years)	mean ± sd	—	29,94 ± 13,41
	Min – Max	—	16 – 63
Gender	male	21	58.30%
	female	15	41.70%
HBP	Yes	2	5.60%
	Non	34	94.40%
Diabetes	Yes	1	2.80%
	Non	35	97.20%
Surgical history	Yes	3	8.30%
	Non	33	91.70%
Onset of symptoms	mean ± sd	—	1,69 ± 0,75
	< 24 h	17	47.20%

	24–48 h	13		36.10%
	> 48 h	6		16.70%
Temperature (°C)	mean ± sd	—	37,27 ± 0,66	
	Min – Max	—	35,6 – 38,4	
WBC (/mm³)	mean ± sd	—	11605,56 ± 4221,37	
	Min – Max	—	3200 – 19800	
CRP (mg/L)	mean ± sd	—	19,5 ± 18,68	
	Min – Max	—	2 – 70	
Caliber of the appendix(mm)	mean ± sd	—	8,23 ± 0,87	
	Min – Max	—	6,3 – 10	
Pain of the RLQ	Yes	35		97.20%
	No	1		2.80%
Epigastric pain	Yes	6		16.70%
	No	30		83.30%
Pelvic pain	Yes	4		11.10%
	No	32		88.90%
Right flank pain	Yes	3		8.30%
	No	33		91.70%
Lumbar pain	Yes	4		11.10%

	No	32	88.90%
Nausea	Yes	13	36.10%
	No	23	63.90%
Vomitting	Yes	7	19.40%
	No	29	80.60%
Bowel transit disorders	Yes	0	0%
	No	36	100%
Anorexia	Yes	0	0%
	No	36	100%
Tenderness in the RIF	Yes	4	11.10%
	No	32	88.90%
Appendicolith	Yes	0	0%
	No	36	100%
Alvarado score	≥ 7	0	0%
	< 7	36	100%

HBP: high blood pressure; **WBC:** White blood cells; **CRP:** C-reactive protein; **RLQ**: right lower quadrant; **RIF:** right iliac fossa.

2.2) Outcomes of Non-Operative Treatment:

The primary outcome of this study was the success of NOT, defined as clinical resolution of appendicitis, confirmed by normalization of symptoms, inflammatory markers, and clinical examination without the need for appendectomy during the index hospitalization or the early follow-up period.

Secondary outcomes included the rate of treatment failure and the need for surgical intervention.

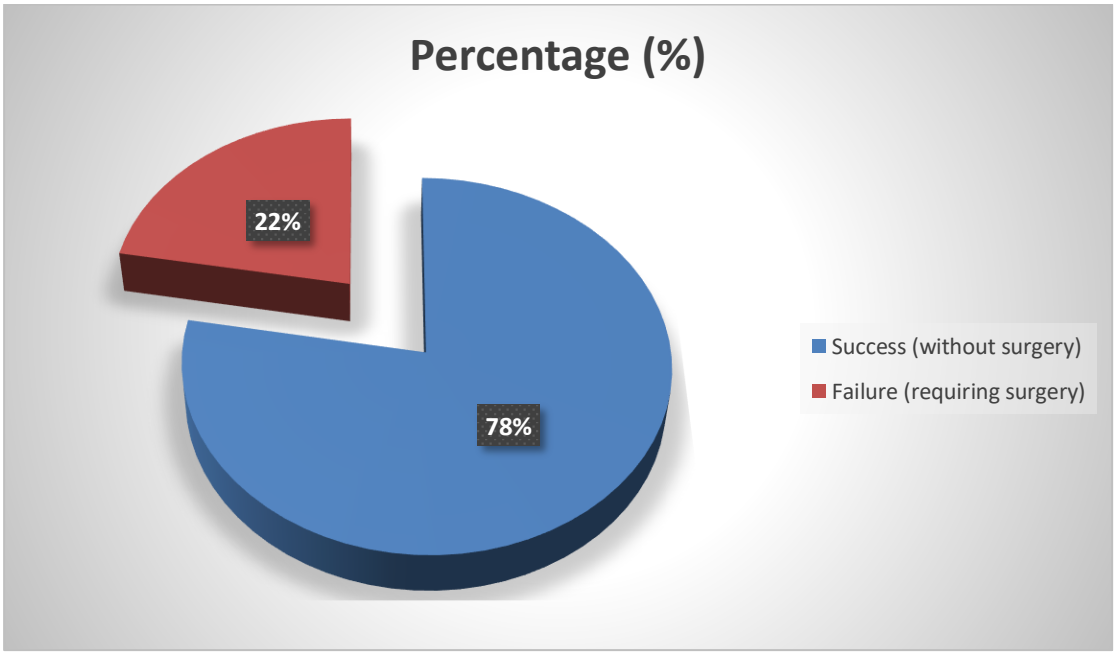
Out of 36 patients, 28 (77,8%) achieved successful treatment without surgery, while 8 patients (22,2%) required surgical intervention, indicating treatment failure.

Results are presented in **table 4** & **diagram1** below.

Table 4 Overall outcomes of non operative treatment (n=36)

Table 4 : Overall outcomes of non-operative treatment (n = 36).

Results of NOT	Frequencies (n)	Percentage (%)
Success (without surgery)	28	77.80%
Failure (requiring surgery)	8	22.20%
Total	36	100%



Diagram(1): overall success and failure rates of NOT (n=36).

Diagram 1 Overall success and failure rates of non operative treatment (n=36)

2.3) Outcomes by Antibiotic Protocol

All 36 patients were treated according to one of two antibiotic protocols. Protocol assignment was based on clinical judgment, allergy history, and local antibiotic stewardship guidelines. The two protocols differed in their antibiotic class.

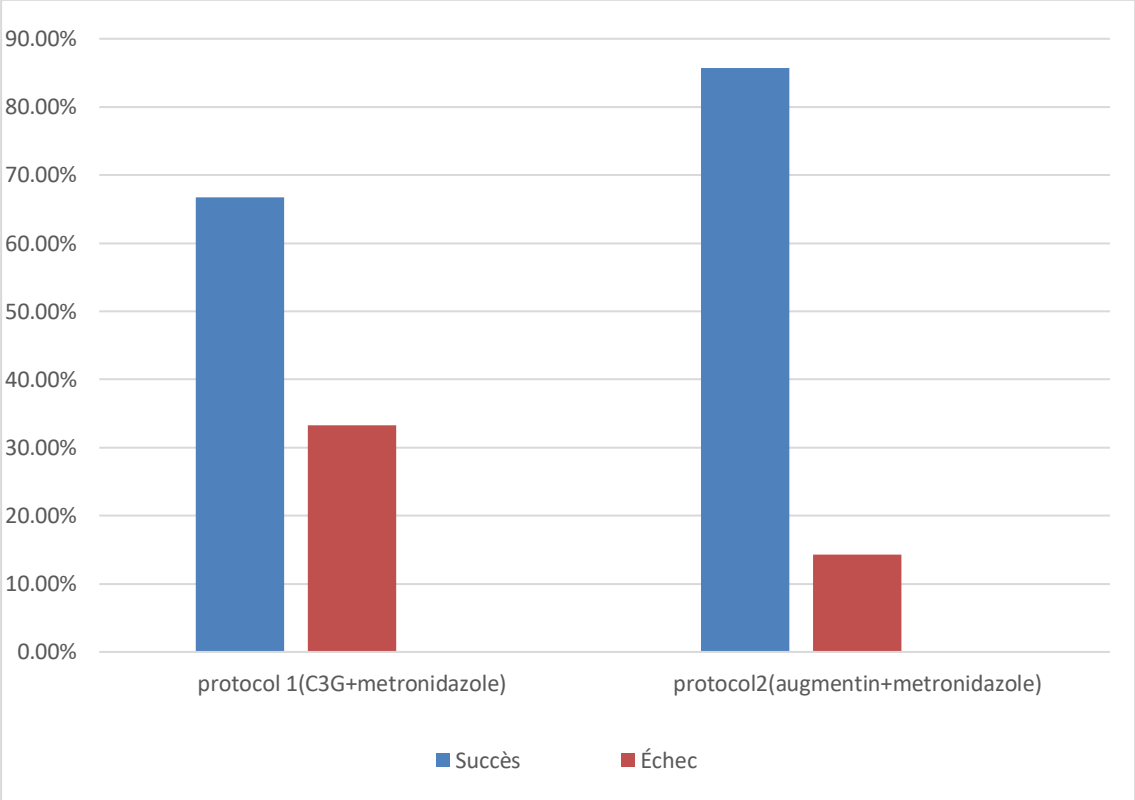
Treatment outcomes according to antibiotic protocol were as follows: in Protocol 1, 10/15 patients (66.70%) achieved treatment success, while five patient

(33.30%) required surgery. In Protocol 2, 18/21 patients (85.70%) achieved treatment success, whereas three patients (14.30%) required surgery.
The outcomes stratified by protocol are presented in **Table 5** & **diagram 2** below.

Table 5 Treatment outcomes stratified by antibiotic protocol

Table 5 : Treatment outcomes stratified by antibiotic protocol.

Protocol	Success	Failure
Protocol1(C3G+metronidazole)	66.70%	33.30%
Protocol2(Augmentin+metronidazole)	85.70%	14.30%



Diagram(2): comparison of success **&** failure rates of NOT**:** protocol1 **vs** protocol2;(n=36).

Diagram 2 Comparison of success and failure rates of non operative treatment :protocol 1 VS protocol 2 ,(n=36)

3) Discussion:

3.1) Clinical,Biological, and Radiological Characteristics

Age

The mean age of the study cohort was 29.94 ± 13.41 years, with a range of 16 to 63 years. This distribution reflects the well-established epidemiological pattern of acute appendicitis, which predominantly affects adolescents and young adults, with peak incidence occurring in the second and third decades of life. The relatively young age of our population is clinically relevant because it implies a lower baseline comorbidity burden and greater physiological reserve, both of which are favorable factors for the success of conservative management. Older patients (particularly those over 65 years) are generally considered at higher risk for complicated appendicitis and NOT failure, partly due to attenuated inflammatory responses that may mask clinical deterioration.

Sex

The cohort comprised 21 male patients (58.3%) and 15 female patients (41.7%), yielding a male-to-female ratio of approximately 1.4/1. This distribution is consistent with the slight male predominance widely reported in the incidence of acute appendicitis across most published series and epidemiological studies.(5)

Treatment failure was more frequent among female patients than male patients (33.3% vs 14.3%), although this association did not reach statistical significance ($p = 0.236$). In our study, this finding may be related to the small sample size rather than a true biological difference. Therefore, sex alone does not appear to be a reliable criterion for predicting response to antibiotic therapy in uncomplicated acute appendicitis.

Most published studies did not identify sex as an independent predictive factor for treatment failure. Similar findings were reported by Loftus et al. and Wakasa et al., where no significant differences were observed between males and females regarding the outcomes of conservative treatment.(32,33)

Comorbidities and Surgical History

The prevalence of significant comorbidities was low in this cohort. Arterial hypertension was present in 2 patients (5.6%), and diabetes mellitus in 1 patient (2.8%), rates that are considerably lower than in the general adult population of comparable age ranges.

This low comorbidity burden reflects both the inherent epidemiology of acute appendicitis (which disproportionately affects healthy young individuals) and the selection criteria applied, which appropriately excluded patients with significant systemic disease likely to confound outcomes or increase operative risk.

Three patients (8.3%) reported a history of prior abdominal surgery, none of which involved previous appendectomy.Prior abdominal surgery is not a contraindication to NOT, but it may theoretically alter the local anatomy or inflammatory response; none of these patients experienced a disproportionate rate of failure in this cohort.

Symptom Onset and Duration

The mean duration of symptoms before hospital presentation was 1.69 ± 0.75 days. More specifically, 17 patients (47.2%) presented within the first 24 hours of symptom onset, 13 patients (36.1%) between 24 and 48 hours, and 6 patients (16.7%) after more than 48 hours. This distribution indicates that the majority of patients presented at an early stage of the disease — a finding of considerable clinical importance, as early-stage appendicitis is associated with a lower degree of periappendiceal inflammation, lower risk of progression to perforation, and higher likelihood of response to antibiotic therapy. The mean symptom duration of less than 48 hours aligns with the inclusion criteria used in landmark NOT trials and is consistent with the recommendation to restrict NOT to cases presenting within 72 hours of symptom onset.

The 6 patients who presented after 48 hours were carefully evaluated to exclude any sign of complicated disease before being enrolled. Their inclusion was justified by the absence of complications (appendicolith, perforation, or free peritoneal air on imaging), and their Alvarado scores remained below the threshold of 7.

No significant difference was observed regarding duration of symptoms before admission between the success and failure groups ($p = 0.771$).

Interestingly, some studies reported that longer symptom duration before admission may actually predict successful conservative treatment. Loftus et al. found that patients with symptoms lasting more than 24 hours before admission were more likely to have successful NOT.(32)

Pain Characteristics and Symptom Profile

Right lower quadrant (RLQ) pain was the cardinal presenting symptom, reported by 35 of 36 patients (97.2%), consistent with its role as the primary diagnostic criterion for acute appendicitis. The one patient without RLQ pain presented with an atypical pain distribution (pelvic and lumbar) likely attributable to a retrocecal or pelvic appendix position, as confirmed on imaging.

Referred or atypical pain was reported in a minority of patients: epigastric pain in 6 (16.7%), pelvic pain in 4 (11.1%), right flank pain in 3 (8.3%), and lumbar pain in 4 (11.1%). The presence of atypical pain locations in these patients is consistent with the known variability in appendix position and innervation. These patients underwent thorough imaging evaluation to confirm the appendiceal origin of the symptoms.

Nausea was reported in 13 patients (36.1%) and vomiting in 7 (19.4%). These symptoms reflect visceral peritoneal irritation and are classic components of the appendicitis symptom triad the relatively moderate rates of nausea and vomiting in this cohort, compared to surgically managed series, may reflect the early and uncomplicated nature of the disease.

Previous studies similarly failed to identify digestive symptoms as strong predictors of NOT failure.Clinical symptoms may contribute to the diagnosis of appendicitis but are often insufficient for predicting disease severity or therapeutic response.(32)

Notably, no patient reported bowel transit disorders or anorexia, suggesting the absence of advanced ileus or sepsis, which would have been red flags for complicated appendicitis requiring immediate surgery.

Right iliac fossa (RIF) tenderness elicited by deep palpation was present in only 4 patients (11.1%), while diffuse or rebound tenderness was not documented in any patient. The low prevalence of peritoneal signs further corroborates the uncomplicated nature of the appendicitis in this cohort and supports the appropriateness of the conservative management approach.

Abdominal defense was the only variable significantly associated with treatment failure in our study ($p = 0.028$). Patients with abdominal defense had a markedly higher failure rate compared with those without defense (75% vs 15.6%).(34)

Alvarado Score

All 36 patients (100%) had an Alvarado score strictly below 7 at presentation. The Alvarado score is a clinical scoring system that integrates migration of pain to the RLQ, anorexia, nausea/vomiting, RLQ tenderness, elevated temperature, and leukocytosis. Scores range from 0 to 10, with scores of 7 or above indicating a high probability of appendicitis requiring surgery. The universal score below 7 in our cohort confirms the absence of severe clinical features and supports the suitability of all enrolled patients for NOT.

The Alvarado score was used as a gating criterion rather than as a stratification tool, and its systematic application ensures that patients with more severe presentations were appropriately triaged to surgery.

A study demonstrated that a low Alvarado score was associated with a higher success rate of non-operative treatment and that the Alvarado score could help identify patients who are suitable candidates for conservative management.(32)

__The mean body **temperature** at admission was 37.27 ± 0.66 °C (range: 35.6–38.4 °C). No patient presented with high-grade fever (≥ 38.5 °C), which would have been a clinical alert for complicated or perforated appendicitis. This finding is consistent with the uncomplicated and early nature of the disease in this cohort. Temperatures in the upper range of normal or mildly elevated are typical of uncomplicated appendicitis and do not themselves contraindicate conservative management.

Loftus et al. demonstrated that lower admission temperature (<37.3°C) was independently associated with successful NOT. Similarly, other studies identified elevated body temperature as a predictor of failure.

The absence of significance in our study may be explained by the small sample size.(32)

__The mean white blood cell count (**WBC**) was 11,605.56 ± 4,221.37 /mm³, with values ranging from 3,200 to 19,800 /mm³. While all patients had some degree of leukocytosis or marginal leukocytosis, the mean WBC remained well below the threshold of 18,000–20,000 /mm³ that is typically associated with complicated or perforated appendicitis. Leukocytosis in the range observed is consistent with an acute but contained inflammatory response. The wide range (3,200–19,800 /mm³) reflects the inherent biological variability of the host inflammatory response and is not unusual in uncomplicated appendicitis series.

The effect size was negligible, suggesting absence of clinically meaningful difference between groups.

Although elevated WBC is commonly associated with acute appendicitis, several studies reported inconsistent results regarding its predictive value for NOT failure our findings suggest that initial WBC count alone may not be sufficient for predicting treatment outcome.(32)

__The mean C-reactive protein (**CRP**) level was 19.5 ± 18.68 mg/L, with values ranging from 2 to 70 mg/L. CRP is a sensitive but non-specific acute-phase reactant that rises several hours after the onset of inflammation and peaks at 48–72 hours. The relatively low mean CRP — well below the threshold of 75–100 mg/L often cited as a marker of complicated appendicitis — is consistent with the early and uncomplicated stage of disease in this population. The substantial standard deviation (±18.68 mg/L) reflects the variability in time from symptom onset to blood sampling, as CRP kinetics are time-dependent. Patients who presented after 48 hours tended to have higher CRP values, although formal subgroup analysis of this association was not the primary objective of this study.

Several studies have identified elevated CRP as a predictor of NOM failure or complicated appendicitis. Wakasa et al. and Shindoh et al. reported that high CRP levels were significantly associated with increased risk of failure.(33)

__Ultrasonography was the first-line imaging modality used in all patients. The mean **appendiceal caliber** on imaging was 8.23 ± 0.87 mm, ranging from 6.3 to 10 mm. An appendiceal outer diameter exceeding 6 mm is universally accepted as the sonographic threshold for appendicitis.

All patients in our cohort met this criterion, confirming the imaging diagnosis. The upper limit of 10 mm in this series, with a mean of 8.23 mm, is consistent with uncomplicated, non-gangrenous appendicitis and supports the appropriateness of conservative management.

Several studies suggested that larger appendiceal diameter may predict failure of antibiotic therapy. Loftus et al. reported that appendiceal diameter <13 mm was associated with successful NOT.(32)

However, our results did not confirm this association. The relatively small appendiceal diameter observed in most of our patients may explain the absence of significant differences.

__Critically, no patient presented with an **appendicolith** (fecalith) on imaging. This is a deliberate consequence of the inclusion criteria applied, as the presence of appendicolith is strongly associated with a higher rate of NOT failure, early recurrence, and increased risk of complicated appendicitis including perforation and abscess formation.

Published data from the **APPAC trial** and others consistently demonstrate that patients with appendicolith have significantly worse outcomes with NOT.(35) , and most current guidelines, including those of the World Society of Emergency Surgery (WSES) and the American College of Surgeons (ACS), recommend against NOT in this subgroup. By systematically excluding patients with appendicolith.(36) this study population was optimally selected for conservative management, contributing to the favorable overall success rate.

No periappendiceal fluid collection, free peritoneal air, or imaging signs of perforation were identified in any patient, fulfilling the imaging inclusion criteria for uncomplicated appendicitis in all cases

3.2) Treatment Success

Non-operative treatment was successful in 28 patients (77.8%), defined as complete resolution of appendicitis symptoms, normalization or significant improvement of inflammatory markers, and discharge without surgical intervention. These 28 patients were managed with intravenous antibiotics during hospitalization, followed by oral antibiotic completion, with progressive clinical improvement documented by serial clinical examination and repeat laboratory testing. Clinical resolution was typically observed within 48 to 72 hours of antibiotic initiation, consistent with published data on the natural history of antibiotic-responsive uncomplicated appendicitis.

All successfully treated patients were monitored with daily clinical assessments, temperature measurements, and serial WBC and CRP measurements. Discharge was authorized only when all of the following criteria were met: absence of pain or pain well-controlled without parenteral analgesia, normalization of temperature (< 37.5 °C for at least 24 hours), clear clinical improvement on examination, and decrease of WBC and CRP toward normal ranges. These stringent discharge criteria ensured that no patient with residual or incompletely resolved inflammation was prematurely discharged.

3.3) Treatment Failure

Treatment failure occurred in eight patients (22.2%). Failure was defined as the need for surgical intervention during the index hospitalization due to one or more of the following: persistence or worsening of abdominal pain despite 48–72 hours of adequate antibiotic therapy; clinical deterioration with development of peritoneal signs; failure of inflammatory markers (WBC, CRP) to improve or a secondary rise after initial improvement; or development of localized complications such as abscess formation on repeat imaging. In all cases of failure, the decision to operate was made collectively by the surgical team following a standardized protocol, and surgery was performed on a controlled, non-emergency basis except in one case where rapid clinical deterioration necessitated urgent intervention.

The 22.2% failure rate observed in this study falls within the range reported in published literature (8–39% depending on follow-up duration and inclusion criteria). It is important to emphasize that treatment failure in NOT does not represent a management error or adverse event per se — rather, it reflects the inherent limitations of antibiotic therapy for a disease with a broad biological spectrum. The key safety guarantee of NOT lies precisely in the systematic monitoring combined with a predetermined, low threshold for surgical conversion, thereby preventing the progression to complicated appendicitis in the event of antibiotic non-response.

Table 6 Comparison of NOT success rates across major published studies

Table (6) : Comparison of NOT success rates across major published studies

Study	Design	n (NOT)	Success	Follow-up
APPAC (Salminen 2015)	RCT	257	72.7%	1 year
CODA (Flum 2020)	RCT	776	68%	30 days

Styrud et al. 2006	RCT	128	86%	1 year
NOTA study Di Saverio et al. 2014	Prospective	159	86.2%	2 years

.RCT = randomized controlled trial.

The **APPAC** (Antibiotic Therapy vs. Appendectomy for Treatment of Uncomplicated Acute Appendicitis) trial, published in JAMA in 2015 by Salminen et al.(30), is among the most frequently cited randomized controlled trials in this field. It enrolled 257 patients in the antibiotic arm and reported a one-year success rate of 72.7%, with a cumulative recurrence rate of approximately 27.3% over five years of follow-up. Our study's success rate of 77.8% exceeds the APPAC one-year success rate by approximately 5 percentage points, which may be partially attributed to the strict exclusion of patients with appendicolithiasis (a strategy associated with better outcomes in NOT) as well as the early presentation of the majority of patients in our cohort (83.3% presented within 48 hours of symptom onset).

-The **CODA** (Comparison of Outcomes of antibiotic Drugs and Appendectomy) trial, published in the New England Journal of Medicine in 2020 by Flum et al.(37), included 776 patients in the antibiotic arm and reported that 68% did not undergo appendectomy within 30 days. Importantly, the CODA trial did not exclude patients with appendicolithiasis, which likely contributed to its lower success rate compared to studies applying stricter inclusion criteria, including the present one.

-Appendectomy versus Antibiotic Treatment in Acute Appendicitis. A Prospective Multicenter Randomized Controlled Trial Styrud et al.(2006) reported an 86% success rate in their randomized trial.(38)

- The **NOTA** Study (Di Saverio et al.2014) observed a 86.2% success rate in a prospective cohort that, like ours, excluded patients with appendicolith.(39)

The slight difference between these higher rates and our 77.8% may reflect the limited sample size of our cohort, which introduces greater statistical variability, as well as potential differences in the antibiotic protocols and monitoring practices applied.

Overall, the success rate of 77.8% obtained in this study is both clinically meaningful and consistent with the existing evidence base, reinforcing the validity of NOT as a first-line strategy for carefully selected adult patients with uncomplicated acute appendicitis combined with close monitoring and follow up.

3.4) Comparison of treatment effectiveness: Protocol 1 vs Protocol 2

In our study, two antibiotic regimens were used for the non-operative management of uncomplicated acute appendicitis: Protocol 1 based on third-generation cephalosporin (C3G) combined with metronidazole, and Protocol 2 based on amoxicillin-clavulanic acid combined with metronidazole.

The failure rate appeared higher in patients treated with the C3G-based protocol compared with the second regimen (33.3% vs 14.3%). However, this difference did not reach statistical significance ($p = 0.236$). These findings suggest that both antibiotic protocols provided relatively comparable effectiveness in the management of uncomplicated acute appendicitis within our cohort.

The absence of a statistically significant difference may be explained by the limited sample size and the relatively small number of treatment failures observed. Consequently, the present study may not have had sufficient statistical power to detect moderate differences between antibiotic regimens. Nevertheless, the overall success observed with both protocols supports the feasibility of conservative treatment using broad-spectrum antibiotic coverage targeting enteric gram-negative bacteria and anaerobic organisms.

The choice of antibiotics in non-operative management of appendicitis remains an area of ongoing debate. Current evidence suggests that no single antibiotic regimen has demonstrated clear superiority over others, provided that adequate coverage against common digestive flora is achieved. Third-generation cephalosporins combined with metronidazole are widely used because they provide effective coverage against Gram-negative enteric bacteria and anaerobic pathogens. Similarly, amoxicillin-clavulanic acid is frequently used as a broad-spectrum alternative with additional anaerobic activity.(40)

Several studies, including prospective and randomized trials, have shown that the combination of amoxicillin–clavulanic acid achieves high clinical success rates in the non-operative management of uncomplicated acute appendicitis, supporting its use as a therapeutic alternative in carefully selected patients.(39,41)

Multiple studies and contemporary guidelines have validated the use of both regimens in uncomplicated appendicitis. The APPAC trial used broad-spectrum antibiotic therapy and demonstrated that antibiotic treatment could successfully avoid surgery in a large proportion of patients with uncomplicated appendicitis.(35) Likewise, the WSES Jerusalem Guidelines recommend several acceptable antibiotic regimens, including cephalosporin-based combinations and beta-lactam/beta-lactamase inhibitor regimens, without establishing definitive superiority of one protocol over another.(36)

A systematic review and network meta-analysis by Sippola et al. concluded that current evidence does not clearly identify an optimal antibiotic regimen for non-

operative treatment of acute appendicitis. The authors emphasized that treatment success depends more on appropriate patient selection and early identification of complicated appendicitis than on the specific antibiotic combination used.(42)

3.5) Risk Factors for Failure of Non-Operative Treatment

Identifying predictors of failure of non-operative treatment (NOT) in uncomplicated acute appendicitis remains a major clinical challenge. Early recognition of patients at increased risk of treatment failure is essential to optimize patient selection, reduce delayed surgery, and minimize the risk of progression to complicated appendicitis.

In our study, several demographic, clinical, biological, and radiological variables were analyzed as potential predictors of treatment failure, including age, sex, nausea, vomiting, abdominal defense, duration of symptoms, temperature, white blood cell count (WBC), C-reactive protein (CRP), appendiceal diameter, and antibiotic protocol.

Due to the relatively small sample size of our cohort and the limited number of treatment failures observed, multivariate logistic regression analysis could not be reliably performed. Logistic regression requires an adequate number of events per variable to generate statistically valid and stable estimates. Performing such analysis with a limited number of failure events would have exposed the study to a high risk of overfitting and unreliable conclusions. Consequently, only univariate analyses were conducted in this study.

Despite this limitation, our results identified abdominal defense as the only factor significantly associated with treatment failure ($p = 0.028$). Patients presenting abdominal defense had a markedly higher rate of surgical conversion, suggesting that localized peritoneal irritation may reflect a more advanced inflammatory process despite the absence of radiological signs of complicated appendicitis. This finding is clinically important because it emphasizes the value of careful physical examination in selecting patients for conservative treatment.

Temperature also appeared to be clinically relevant. Although the difference did not reach statistical significance, patients with treatment failure had higher mean body temperatures compared with successfully treated patients. The relatively large effect size observed suggests that fever may represent a marker of increased inflammatory severity and possible risk of failure. The absence of statistical significance is likely related to insufficient statistical power due to the small cohort size.

Other variables, including age, sex, nausea, vomiting, WBC count, CRP level, duration of symptoms, and appendiceal diameter, were not significantly associated with treatment failure in our study. However, the lack of significance should be interpreted cautiously because small sample sizes increase the risk of type II error and may mask clinically relevant associations.

The literature has identified several factors associated with increased risk of failure of non-operative management. Multiple studies reported that the presence of appendicolith is one of the strongest predictors of failure, recurrence, and complicated appendicitis. Elevated CRP levels, high fever, significant leukocytosis, larger appendiceal diameter, and signs of localized peritonitis have also been associated with poorer outcomes in several published series.

Loftus et al. demonstrated that lower temperature, lower modified Alvarado score, and smaller appendiceal diameter were associated with successful non-operative management.(32) Similarly,the APPAC trial emphasized the major negative prognostic role of appendicolith (35) Wakasa et al. additionally reported that elevated inflammatory markers may increase the likelihood of treatment failure and recurrence.(43)

Current international guidelines therefore emphasize the importance of strict patient selection before attempting conservative treatment. Patients presenting signs suggestive of complicated appendicitis, severe inflammatory response, or appendicolithiasis should generally be considered poor candidates for non-operative management.(36)

Overall, although logistic regression analysis could not be performed in our study, our findings remain broadly consistent with the existing literature and support the concept that careful clinical, biological, and radiological assessment is essential for predicting the success of non-operative treatment in uncomplicated acute appendicitis.

4) Strengths of the Study

- The prospective nature of the study allowed systematic and rigorous collection of clinical and therapeutic data.
- **First study conducted in Laghouat**; to our knowledge, this study is the first conducted in the Laghouat region regarding the non-operative management of uncomplicated acute appendicitis, giving it important local and regional value.
- **Relevant and contemporary topic**: NOT of UAA is a modern therapeutic approach that is increasingly discussed in international literature.
- **Pilot study opening the way for future research**: This study may serve as a pilot study and provide a basis for larger future studies with longer follow-up periods.
- **Strict and standardized methodology**: Inclusion, exclusion, and follow-up criteria were applied rigorously to improve the reliability of the results.
- **Evaluation of two antibiotic protocols**: The study compared two different antibiotic regimens, allowing assessment of their relative effectiveness.

- **Analysis of treatment failure predictors**; Identifying predictive factors for treatment failure represents an important contribution to clinical practice.
- **Practical clinical applicability**: The findings may contribute to improving the management of uncomplicated acute appendicitis in similar healthcare settings.
- **Assessment of treatment safety**: The study evaluated not only treatment success but also the safety and complications associated with non-operative management.

5) Limitations of the Study

- **Small sample size**; The limited number of included patients may reduce the statistical power and limit the generalizability of the findings.
- **Single-center study**: Conducting the study in a single hospital center may limit the applicability of the results to other populations and healthcare settings.
- The short follow-up period may underestimate the true long-term recurrence rate.
- **Lack of certain clinical and biological parameters;** some potentially important clinical and laboratory parameters were not included in the analysis, which may limit the comprehensive interpretation of the findings.
- **Difficulties in patient monitoring and follow-up;** Challenges related to regular patient monitoring and post-discharge follow-up may have influenced the assessment of outcomes and recurrence.
- **Unequal distribution between treatment protocols:** Differences in patient numbers between the two antibiotic protocols may affect the comparison of treatment effectiveness.

6) Perspectives:

- Larger multicenter studies with a greater sample size are needed to confirm the effectiveness and safety of non-operative management of uncomplicated acute appendicitis.
- Longer follow-up periods should be conducted to better evaluate long-term recurrence rates and late complications.
- Future randomized controlled trials are recommended to reduce selection bias and improve the strength of evidence.
- Additional studies comparing different antibiotic regimens may help identify the most effective therapeutic protocol.
- Further research should evaluate patients' quality of life and satisfaction after non-operative treatment.
- This study may serve as a pilot study and provide a foundation for future research in the region of Laghouat.
- Future studies should include additional clinical, biological, and radiological parameters to better identify predictors of treatment failure.

7) Recommendations:

- ❖ Non-operative management should be proposed only for carefully selected patients with uncomplicated acute appendicitis.
- ❖ Strict clinical, biological, and radiological assessment is necessary before initiating conservative treatment.
- ❖ Regular clinical follow-up should be ensured after hospital discharge to detect recurrence or treatment failure early.
- ❖ Standardized treatment protocols should be adopted to optimize patient management and improve outcomes.
- ❖ Patients should be informed about the possibility of recurrence and the importance of medical follow-up.
- ❖ Close collaboration between surgeons, emergency physicians, and radiologists is recommended to improve diagnostic accuracy and therapeutic decision-making.
- ❖ Larger prospective studies are encouraged to strengthen the available evidence regarding non-operative treatment of uncomplicated acute appendicitis.
- ❖ Healthcare professionals should receive continuous training regarding the indications, benefits, and limitations of conservative management of acute appendicitis.
- ❖ Non-operative treatment (NOT) can also be safely proposed as an alternative in cases where general anesthesia is contraindicated.

8) Conclusion:

UAA has traditionally been treated by appendectomy, which remains the standard therapeutic approach worldwide. However, in recent years, NOT based on antibiotic therapy has emerged as a promising alternative in carefully selected patients. The present prospective study aimed to evaluate the effectiveness and safety of NOT for UAA in adults, while also comparing two different antibiotic protocols and identifying factors associated with treatment failure.

The results of our study demonstrated that conservative treatment can achieve a satisfactory success rate in selected patients presenting with UAA. Most patients showed favorable clinical evolution under antibiotic therapy without the need for immediate surgical intervention. These findings support the growing evidence reported in international literature regarding the feasibility of non-operative management as a therapeutic option in specific clin ical situa tions.

An important aspect highlighted by our study is the safety of conservative treatment. The majority of patients tolerated antibiotic therapy well, with

a low incidence of severe complications during hospitalization and follow-up. Careful patient selection, strict clinical monitoring, and appropriate radiological assessment played a major role in ensuring safe management and reducing the risk of adverse outcomes. Furthermore, early identification of treatment failure allowed timely surgical intervention when necessary, thereby limiting the occurrence of complicated appendicitis.

The comparison between the two antibiotic protocols showed that both regimens may be effective in the management of uncomplicated acute appendicitis. However, additional large-scale studies are still required to determine the optimal antibiotic strategy and establish standardized treatment guidelines.

Despite its encouraging findings, this study has several limitations, including the relatively small sample size, the single-center design, and the short follow-up duration. Nevertheless, as the first study conducted in the region of Laghouat on this subject, it provides valuable local data and may serve as a pilot study for future multicenter research with larger populations and longer follow-up periods.

As a final result, NOT of UAA appears to be an effective and safe therapeutic alternative in carefully selected adult patients when supported by strict clinical, biological, and radiological evaluation as well as close follow-up. Although appendectomy remains an essential treatment option, conservative management may reduce unnecessary surgical interventions and their associated risks in selected cases. Further randomized and multicenter studies are needed to confirm these findings and better define the indications, long-term outcomes, and safety profile of non-operative treatment for uncomplicated acute appendicitis.

And This study contributed to change the long-held belief that acute appendicitis can only be treated surgically.

Appendix:

PATIENTS SELECTION CRITERIA FOR NOT OF UAA:

Date :

Civil Status :

***Fullname:** ***Adress:**

***Age:** ***Phone number**

***Sex:**

Medical History: **_ Medical:**

_ Surgical:

_ Family History:

Reported Symptoms:

_Onest of symptoms:

_Pain Localisation :(Right lower quadrant pain)

_ Duration of pain :

_ Associated Symptoms :

***Nausea:** yes / no

***Vomiting:** yes / no

***Digestive transit disorder:** diarrhea/ constipation

***others:…**

_ General symptoms:

***Fever:** yes / no ; temperature(c°):

***Anorexia:** yes / no

Clinical Examination:

___ Abdominal palpation:

** **Tenderness at the right iliac fossa:** yes /no

** **Rebound pain:** yes/no

Laboratory results: _ WBC (Hyperleukocytosis): /mm³

_ Neutrophils:

_CRP: mg/l

Radiological criteria:

****** Ultrasound:**

- The caliber of the appendix (>6 mm and <10mm): yes/no
- appendiceal wall Thithening (>2-3 mm): yes/no
- The absence of appendicolith: yes /no

****** TDM:**

Treatement already received : yes /no

_ If yes, witch type of treatement :

_ Duration:

_ Evolution:

Informed consent to be treated medically as a first line approach : yes / no

Prescribed medication :

- Type :1) C3G 1g +Metronidazole 500mg

Or 2) Augmentin 1g +Metronidazole 500mg

-The total duration of the treatment :

Does the condition require hospitalisation ?

Yes / No (Outpatient treatment)

The evolution with treatement :

-Improvement of symptoms after 48 h : yes / no

-Persistant fever: yes /no if yes , temperature:

-Complications !!: _Abscess:

_Peritonitis:

_Appendiceal phlegmon:

_None:

))) On the third day with medication:

**Clinical: symptomatic improvement: yes / no

**Biological: WBC= /l ; CRP= mg /l

))) One month follow up:

**Clinical check-up :

_recurrence / secondary recourse to surgery: Yes / No

)))) three months follow up:

Clinical check-up:

_recurrence / secondary recourse to surgery: Yes / No

Alvarado Score:

<7 : YES /NO

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Abstract

Title: Evaluation of the Effectiveness and Safety of Non-Operative Treatment for Uncomplicated Acute Appendicitis in Adults at the mixed hospital in Laghouat over a period of six months: A Prospective Cohort Study.

Background:

Appendectomy has long been the gold standard treatment for acute appendicitis. However, increasing evidence from randomized controlled trials suggests that non-operative treatment (NOT) based on antibiotic therapy may represent a safe and effective alternative for uncomplicated acute appendicitis (UAA) in carefully selected patients. This study aimed to evaluate the effectiveness and safety of NOT for UAA in adults at the Colonel Lotfi Mixed Hospital of Laghouat, Algeria.

Methods:

A prospective cohort study was conducted including 36 adult patients (≥15 years) diagnosed with UAA between August 20, 2025, and February 20, 2026. Diagnosis was based on clinical, biological, and radiological criteria (Alvarado score <7, leukocytosis <15,000/mm³, appendiceal diameter 6–10 mm, absence of appendicolith or complications). Patients received intravenous antibiotics for 48 hours followed by oral therapy to complete a 10-day course using one of two regimens: Protocol 1 (cefotaxime + metronidazole) or Protocol 2 (amoxicillin-clavulanate + metronidazole). Patients were monitored clinically and biologically during hospitalization, with follow-up at 1 and 6 months. Treatment failure was defined as the need for appendectomy during the initial hospitalization. Statistical analysis was performed using SPSS v27.0.

Results:

The mean age was 29.94 ± 13.41 years, with a male predominance (58.3%). The overall success rate of NOT was 77.8% (28/36), while 22.2% (8/36) required surgical intervention. Protocol 2 showed a higher success rate compared to Protocol 1 (85.7% vs. 66.7%), although the difference was not statistically significant ($p = 0.236$). Abdominal defense was the only factor significantly associated with treatment failure ($p = 0.028$). No severe complications were observed among successfully treated patients.

Conclusion:

Non-operative treatment appears to be a safe and effective first-line option for selected adults with UAA, with a success rate comparable to that reported in the literature. Careful patient selection, close monitoring, and prompt surgical intervention in case of failure are essential to ensure optimal outcomes. Larger multicenter studies with longer follow-up are required to validate these findings and establish standardized treatment protocols.

Keywords: Uncomplicated acute appendicitis, non-operative treatment, antibiotic therapy, appendectomy, success rate, treatment failure, prospective study.

Résumé:

Titre: Évaluation de l'Efficacité et de la Sécurité du Traitement Non Opératoire de l'Appendicite Aiguë Non Compliquée chez l'Adulte à l'Hôpital Mixte de Laghouat sur une Période de Six Mois : Étude de Cohorte Prospective

Contexte :

L'appendicectomie constitue depuis longtemps le traitement de référence de l'appendicite aiguë. Cependant, des données croissantes issues d'essais contrôlés randomisés suggèrent que le traitement non opératoire (TNO) basé sur l'antibiothérapie pourrait représenter une alternative sûre et efficace pour l'appendicite aiguë non compliquée (AANC) chez des patients soigneusement sélectionnés. Cette étude visait à évaluer l'efficacité et la sécurité du TNO chez des adultes atteints d'AANC à l'Hôpital Mixte Colonel Lotfi de Laghouat, Algérie.

Méthodes :

Une étude de cohorte prospective a été menée incluant 36 patients adultes (≥15 ans) diagnostiqués avec une AANC entre le 20 août 2025 et le 20 février 2026. Le diagnostic reposait sur des critères cliniques, biologiques et radiologiques (score d'Alvarado <7, leucocytose <15 000/mm³, diamètre appendiculaire de 6 à 10 mm, absence d'appendicolithe ou de complications à l'imagerie). Les patients ont reçu une antibiothérapie intraveineuse pendant 48 heures, suivie d'un relais oral afin de compléter une durée totale de 10 jours, selon deux protocoles : Protocole 1 (céfotaxime + métronidazole) ou Protocole 2 (amoxicilline-acide clavulanique + métronidazole). Une surveillance clinique et biologique a été assurée durant l'hospitalisation, avec un suivi à 1 et 6 mois. L'échec du traitement était défini par la nécessité d'une appendicectomie durant l'hospitalisation initiale. L'analyse statistique a été réalisée à l'aide du logiciel SPSS version 27.0.

Résultats :

L'âge moyen des patients était de 29,94 ± 13,41 ans, avec une prédominance masculine (58,3 %). Le taux global de succès du TNO était de 77,8 % (28/36), tandis que 22,2 % (8/36) ont nécessité une intervention chirurgicale. Le protocole 2 a montré un taux de succès supérieur à celui du protocole 1 (85,7 % contre 66,7 %), sans différence statistiquement significative (p = 0,236). La défense abdominale était le seul facteur significativement associé à l'échec du traitement (p = 0,028). Aucune complication sévère n'a été observée chez les patients traités avec succès.

Conclusion :

Le traitement non opératoire apparaît comme une option thérapeutique sûre et efficace en première intention chez des adultes sélectionnés atteints d'AANC, avec un taux de succès comparable à celui rapporté dans la littérature. Une sélection rigoureuse des patients, une surveillance étroite et une conversion

chirurgicale rapide en cas d'échec sont essentielles pour garantir des résultats optimaux. Des études multicentriques de plus grande envergure avec un suivi prolongé sont nécessaires pour confirmer ces résultats et définir des protocoles thérapeutiques standardisés.
Mots-clés : Appendicite aiguë non compliquée, traitement non opératoire, antibiothérapie, appendicectomie, taux de succès, échec thérapeutique, étude prospective.

الملخص

العنوان: تقييم فعالية وسلامة العلاج الطبي غير الجراحي لالتهاب الزائدة الدودية الحاد غير المعقد لدى البالغين بالمستشفى المختلط للأغواط خلال فترة ستة أشهر : دراسة كوهورت مستقبلية

الخلفية:

لطالما اعتُبرت عملية استئصال الزائدة الدودية العلاج المرجعي لالتهاب الزائدة الدودية الحاد .ومع ذلك، تشير الأدلة المتزايدة المستمدة من الدراسات العشوائية المحكمة إلى أن العلاج غير الجراحي القائم على المضادات الحيوية قد يمثل بديلاً آمناً وفعالاً في حالات التهاب الزائدة الدودية الحاد غير المعقد لدى مرضى مختارين بعناية .هدفت هذه الدراسة إلى تقييم فعالية وسلامة هذا النهج لدى البالغين في مستشفى الكولونيل لطفي المختلط بالأغواط، الجزائر.

المنهجية:

أُجريت دراسة أترابية مستقبلية شملت 36 مريضاً بالغاً عمره يفوق 15 سنة وثلاثة أشهر تم تشخيصهم بالتهاب الزائدة الدودية الحاد غير المعقد خلال الفترة الممتدة من 20 أغسطس 2025 إلى 20 فبراير 2026.استند التشخيص إلى معايير سريرية وبيولوجية واشعاعية) مقياس ألفارادو7> ، عدد الكريات البيضاء/15000> مم^3، قطر الزائدة بين 6 و 10مم، مع غياب الحصاة الزائدية أو المضاعفات في التصوير .(تلقى المرضى علاجاً بالمضادات الحيوية الوريدية لمدة 48 ساعة، تلاه علاج فموي لاستكمال مدة إجمالية قدرها 10 أيام، وفق بروتوكولين :البروتوكول الأول (سيفوتاكسيم + ميترونيدازول) والبروتوكول الثاني (أموكسيسيلين-حمض كلافولانيك + ميترونيدازول). تمت متابعة المرضى سريرياً وبيولوجياً أثناء الاستشفاء، مع متابعة لاحقة بعد شهر و 6أشهر .عُرّف فشل العلاج بالحاجة إلى تدخل جراحي خلال فترة الاستشفاء الأولى .تم التحليل الإحصائي باستخدام برنامج SPSS الإصدار.27.0 .

النتائج:

بلغ متوسط عمر المرضى 29.94±13.41 سنة، مع غالبية للذكور(58.3%) . بلغ معدل نجاح العلاج غير الجراحي(36/28) 77.8% ، في حين احتاج (36/8) 22.2% إلى تدخل جراحي .أظهر البروتوكول الثاني نسبة نجاح أعلى مقارنة بالبروتوكول الأول 85.7%) مقابل (66.7% دون دلالة إحصائية .(p = 0.236) كانت العلامة الوحيدة المرتبطة بشكل معنوي بفشل العلاج هي وجود دفاع بطني (p = 0.028).لم تُسجل أي مضاعفات خطيرة لدى المرضى الذين تم علاجهم بنجاح.

الخلاصة:

يُعد العلاج غير الجراحي خياراً علاجياً آمناً وفعالاً كخط أول لدى المرضى البالغين المختارين المصابين بالتهاب الزائدة الدودية الحاد غير المعقد، مع معدل نجاح مماثل لما ورد في الأدبيات العلمية .إن الاختيار الدقيق للمرضى، والمراقبة الدقيقة، والتدخل الجراحي السريع عند الحاجة، تعد عوامل أساسية لضمان نتائج مثلى .هناك حاجة إلى دراسات متعددة المراكز وبأعداد أكبر وفترة متابعة أطول لتأكيد هذه النتائج وتحديد البروتوكولات العلاجية المثلى.

الكلمات المفتاحية:

التهاب الزائدة الدودية الحاد غير المعقد، العلاج غير الجراحي، المضادات الحيوية، استئصال الزائدة، معدل النجاح، فشل العلاج، دراسة مستقبلية.