

Clinical-surgical correlation of acute appendicitis at the General Hospital of Luque from June 2022 to June 2023 based on the Jerusalem WSES Guide 2020

Correlación clínico – quirúrgico de la apendicitis aguda en el Hospital General de Luque desde junio de 2022 a junio de 2023 basado en Guía WSES de Jerusalén 2020

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ABSTRACT

Introduction: Acute appendicitis is one of the most common surgical emergencies, with appendectomy being the standard treatment. However, its diagnosis remains complex. In 2015, the World Society of Emergency Surgery (WSES) published evidence-based guidelines to improve its management, which were updated in 2020. This study aims to correlate the clinical and surgical findings of acute appendicitis in patients at the General Hospital of Luque between June 2022 and June 2023, with the recommendations of the WSES 2020 guidelines. **Methods:** Observational, retrospective, descriptive cross-sectional study. **Results:** Of the 291 patients, 93.8 % (273) underwent appendectomy. Most appendectomies were conventional (76.9 %). Surgical findings showed a higher prevalence of phlegmonous appendicitis (52 %) and gangrenous appendicitis (23 %). Sixty-six percent of patients with uncomplicated appendicitis received a single dose of antibiotics, while 34 % with more severe forms received postoperative antibiotics. No drainage was used in any of the patients. **Conclusion:** The Alvarado, AIR, and RIPASA scales demonstrated a high predictive value for diagnosing acute appendicitis. The WSES 2020 guidelines are applicable and useful in managing this condition in our population.

Keywords: Acute Appendicitis, WSES Guidelines, Jerusalem Guidelines 2020.

RESUMEN

Introducción: La Apendicitis Aguda es una de las urgencias quirúrgicas más comunes, cuyo tratamiento estándar es la apendicectomía. Sin embargo, su diagnóstico sigue siendo complejo. En 2015, la Sociedad Mundial de Cirugía de Emergencia (WSES) publicó guías basadas en evidencia para mejorar su manejo, que fueron actualizadas en 2020. Este estudio busca correlacionar los hallazgos clínicos y quirúrgicos de la apendicitis aguda en pacientes del Hospital General de Luque entre junio de 2022 y junio de 2023, con las recomendaciones de las guías WSES 2020. **Métodos:** Estudio observacional, retrospectivo, descriptivo de corte transversal. **Resultados:** De los 291 pacientes, el 93.8 % (273) fueron sometidos a apendicectomía. La mayoría de las apendicectomías fueron convencionales (76.9 %). Los hallazgos operatorios mostraron mayor prevalencia de apendicitis flemmonosa (52

%) y gangrenosa (23%). El 66% de los pacientes con apendicitis no complicada recibieron una dosis única de antibióticos, mientras que el 34 % con apendicitis más grave recibieron antibióticos postoperatorios. No se utilizó drenaje en ningún paciente. **Conclusión:** Las escalas de Alvarado, AIR y RIPASA demostraron un alto valor predictivo en el diagnóstico de apendicitis aguda. Las guías WSES 2020 son aplicables y útiles en el manejo de esta patología en nuestra población.

Palabras Claves: Apendicitis Aguda, Guía WSES, Guía de Jerusalén 2020.

INTRODUCTION

Acute appendicitis is the acute inflammatory process of the cecal appendix which represents one of the most common urgencies a surgeon faces and whose treatment consists in the cecal appendix's resection or appendectomy. The appendectomy is one of the most frequent procedures in all surgical services worldwide. In the General Hospital of Luque, there are 400 to 500 appendectomies yearly. However, acute appendicitis diagnosis is still a challenge and there are some controversies regarding its handling.

In June 2015, the World Society of Emergency Surgery (WSES) organized in Jerusalem the first conference for consensus over diagnosis and treatment of acute appendicitis in adult patients with the intention of creating guides based on evidence and hence reaching a timely and efficient handling of said pathology. Afterwards, a new consensus conference took place in Nijmegen in June 2019, during which the previous guidelines (**Jerusalem Guidelines**)² were updated to provide declarations and recommendations based on evidence according to variable clinical practice in order to reach the **World Society of Emergency Surgery (WSES) Jerusalem 2020 Guidelines** regarding acute appendicitis.

In this work, a correlation of clinical findings will be

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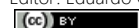
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performed based on the WSES Jerusalem 2020 Guidelines, with the surgical findings in patients admitted with an acute appendicitis diagnosis in the General Hospital of Luque from June 2020 to June 2023.

The present study had as a general objective to compare clinical findings based on the WSES Jerusalem 2020 Guidelines with the surgical findings of patients admitted with an appendicitis diagnosis in the General Hospital of Luque, from June 2022 to June 2023. To achieve this, surgical findings of the patients submitted to appendectomies in said hospital were analyzed. The percentage of patients submitted to appendectomies was also determined, taking the parameters established by the WSES Jerusalem 2020 Guidelines as reference. The percentage of patients submitted to conventional surgery as opposed to laparoscopic surgery was evaluated as well. Special attention was given to the use of antibiotics in acute appendicitis patients, according to the WSES Jerusalem 2020 Guidelines' recommendations, and the percentage of patients in which drainage was utilized was determined. Finally, the non-surgical handling of patients admitted with a likely acute appendicitis diagnosis was analyzed, following the model of said guide.

THEORETICAL/CONCEPTUAL FRAMEWORK

Acute appendicitis is one of the main causes of surgical acute abdomen and the most common indication for urgent surgery worldwide, affecting mainly young people from 20 to 30 years old, with an approximate risk of 16% in men as well as in women. Likewise, a correlation with overweightness (18.5%) and obesity (81.5%) was observed in affected patients.³ Its first pathogenic mechanism is obstruction of the appendicular lumen, which can be caused by appendicoliths, lymphoid hyperplasia, foreign bodies, parasites or tumors. This obstruction unchains an inflammation which can evolve towards perforation, abscesses or generalized peritonitis, being *Escherichia coli* and *Bacteroides* the most frequent infectious agents.⁴ Abdominal pain, initially on the epigastric or periumbilical region, shifts towards the right iliac fossa in 50-60% of cases.⁵ It's accompanied by symptoms like nausea, vomiting and fever, and symptoms like urinary urgency or tenesmus can be present.⁶ As the inflammation progresses, pain can be detected in the lower right quadrant which increases with movements or by cough reflexes.⁷ Clinical signs include the McBurney point, the Blumberg and Rovsing sign⁸⁻⁹. Laboratory exams show leukocytosis (more than 10.000 cells/mm³) and increase in reactive protein C. The sensibility and specificity needed for the diagnosis, around 57 to 87% for reactive protein C and 62 to 75% for leukocytosis.¹⁰⁻¹¹ The abdominal echography has a 86% sensibility and 81% specificity, and computed axial tomography has a 92.3% sensibility for diagnosis.¹²

The surgical treatment of choice is appendectomy, which can be performed conventionally or laparoscopically. Conventional appendectomy is still a common procedure, with low morbidity and mortality. However, the current tendency favors laparoscopy, especially for non-complicated appendicitis. Although some studies point out that open surgery is still preferred in complicated cases, laparoscopy is effective, safe and its early use can facilitate diagnosis and favorable treatment, depending on the experience of the surgical team.¹³⁻¹⁴⁻¹⁵

The WSES Jerusalem 2020 Guidelines provide updated rules regarding diagnosis, surgical treatment and antibiotics. The use of diverse diagnostic scales is highlighted, such as AIR, Alvarado, RIPASA and AAS, which optimize decision making, reduce unnecessary hospitalization and minimizes

imagery studies and explorative surgeries. AIR score is useful to identify low risk patients,¹⁶ while Alvarado's is highly sensitive to exclude appendicitis with low scoring.¹⁷ RIPASA has shown high sensibility and specificity, especially in western populations.¹⁸

The AAS score classifies patients in high, intermediate and low risk. A study has shown that 49% of patients were at high risk, with a 93.3% specificity.¹⁹ WSES 2020 Guidelines suggest using clinical scoring (AIR, Alvarado, AAS) to rule out appendicitis, especially in low risk patients, and avoid unnecessary studies and surgeries.

For imagery diagnosis, it's recommended to perform an echography along with clinical scoring to enhance precision and reduce the use of computerized tomography. If the echography is inconclusive, a diagnostic laparoscopy can be performed. In pregnant woman, transabdominal echography is the starting method, and if unclear, a magnetic resonance can be performed.

This focus reduces resource use, enhances diagnostic precision and clinical results.

Regarding the time of surgery, the Guidelines suggest performing the appendectomy within the first 24hours in non-complicated cases, without increasing the risk of complications due to delays.²⁰ However, puncturing appendicitis prioritizes intervention within 72 hours.²¹⁻²²ⁿ Laparoscopic appendectomy (LA) offers important advantages over open appendectomy (OA), such as less postsurgical pain, shorter in-patient stays, faster recovery and less complications, especially infections in the surgical site. Although LA has longer surgical time and higher costs, it enhances the scar's aesthetics and decreases hospital costs in the long term.²³⁻²⁴ A metanalysis shows that LA is also beneficial in complicated acute appendicitis, with a lower infection rate and faster recovery, without significative differences in intra-abdominal abscesses.²⁵

The WSES Jerusalem 2020 Guidelines also recommend LA for both appendicitis types, as long as there's resources and experience.²⁶⁻²⁷ It's particularly useful in obese, elderly or high-risk patients. In non-complicated appendicitis, it can be ambulatory, with less costs and faster recovery. The use of postoperative drainage is also not recommended due to the additional risks in entails.²⁸

Intra-operative classification allows to categorize cases according to severity, making for better management. Complicated acute appendicitis includes puncturing, abscesses or peritonitis, and these patients require postoperative antibiotics, whose duration varies.²⁹ Tools such as LAPP scoring and the classification system proposed by Gomes allows the stratification of cases and guides for treatment. Although intra-operative diagnosis is useful, histopathological biopsy is always recommended to confirm the diagnosis.³⁰⁻³¹

Lastly, the Jerusalem 2020 Guide recommends a singular pre-operative dose of ample-specter antibiotics (0 to 60 minutes before the surgery) to reduce postoperative infections, without needing additional antibiotics in non-complicated cases. In complicated appendicitis, it's suggested to continue ample-specter antibiotics for 3 to 5 days, as long as control is adequate.

MATERIALS AND METHODS

An observational, retrospective, descriptive, cross-cut design was used, performed in patients submitted to appendectomies by laparoscopic or conventional way in the General Hospital of Luque between June 2022 and June 2023. The focal population included patients admitted with an acute appendicitis diagnosis, while the accessible population encompassed those with suspicion of the same condition. Patients whose diagnosis was

confirmed by pathological anatomy were included and those without results, without valued diagnostic scales according to Jerusalem 2020 Guidelines, and those who presented alternative diagnosis, were all excluded.

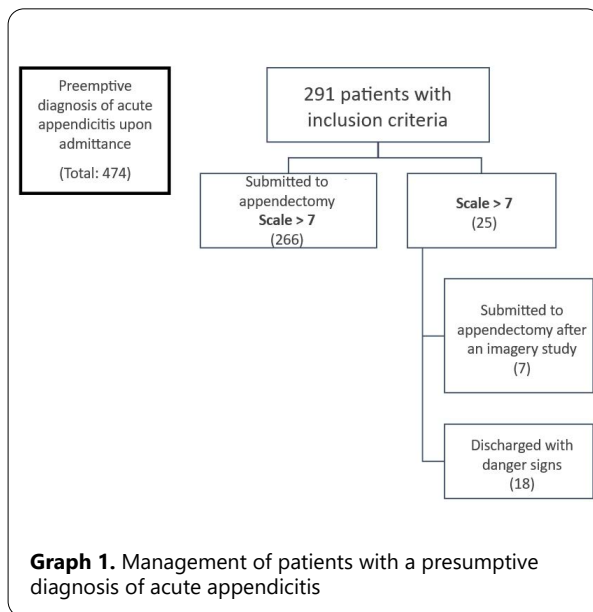
A simple, random, non-probabilistic sampling was used, and data recollection was performed by medical residents and medicine students, using tools such as Microsoft Excel, surveys, clinical files and pathological anatomy reports. The data was organized systematically and analyzed to correlate clinical and surgical findings with the WSES 2020 Guidelines' recommendations. Descriptive statistics were applied, and possible selection and information biases were evaluated, guaranteeing the reliability of the data obtained.

Ethical considerations: Authorization of the General Hospital of Luque's General Surgery Service authorities was obtained to carry out the study. This investigation didn't present complex ethical considerations, given that it's an observational, descriptive, retrospective study based exclusively on the revision of clinical files, guaranteeing the confidentiality of patients by only using the numbers in the files. Likewise, due to the nature of the study and the employment of medical registry data, no risk for patients was caused, thus fulfilling the non-malice principle.

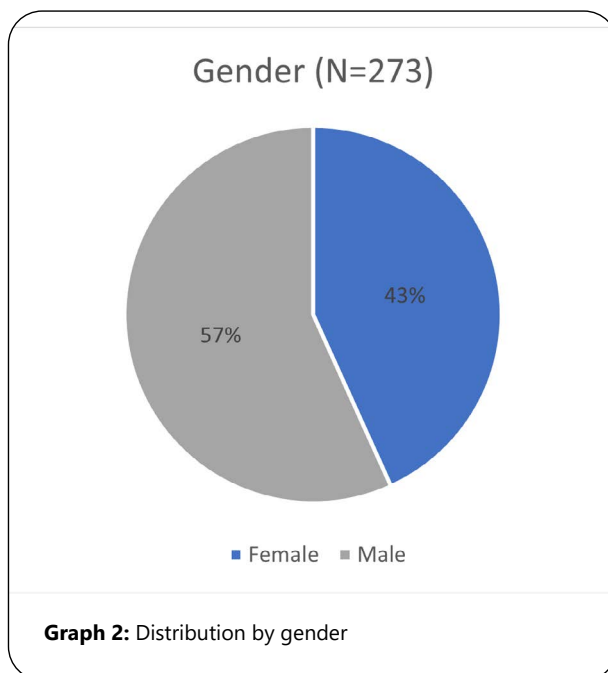
RESULTS

In the General Hospital of Luque, from June 2022 to June 2023, a total of 2,214 patients reported to urgency services due to pain in the lower hemiabdomen, of which 21.7% (474 patients) were admitted with suspicion of acute appendicitis. Of these 474 patients, 291 cases that fulfilled the inclusion criteria for this study were analyzed.

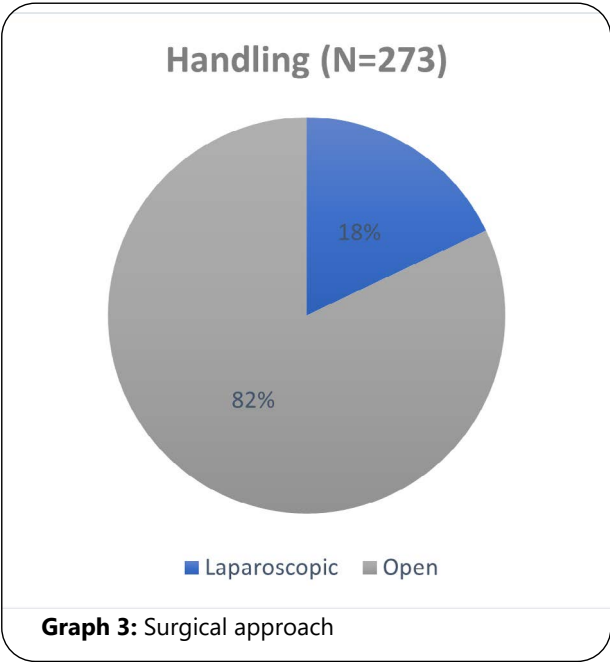
Of the 291 patients evaluated, 93.8% (273) were submitted to an appendectomy, while in 18 cases (3.8%) surgical intervention was not necessary, being observed and subsequently diagnosed with other pathologies. Of the 273 intervened patients, 266 (91.4%) were operated on without needing complementary studies, given that they fulfilled Alvarado and AIR scorings over 7, and RIPASA over 7.5. In 25 cases (8.5%) with scores lower than the former, complementary studies were performed, and in 7 of these cases (2.4%) the acute appendicitis diagnosis was confirmed through images, which allowed the appendectomies to be performed. The remaining 18 patients (6.1%) were discharged after ruling out acute appendicitis.



Regarding gender distribution, the male population represented the 57% (155 patients), while the female population was the 43% (118 patients).

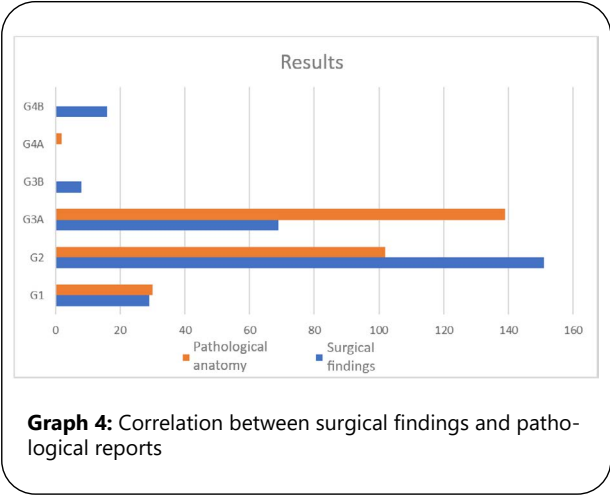


Of the 273 patients submitted to an appendectomy, 224 (76.9%) were operated on through the conventional method, while 49 (17.9%) were submitted to a laparoscopic appendectomy.



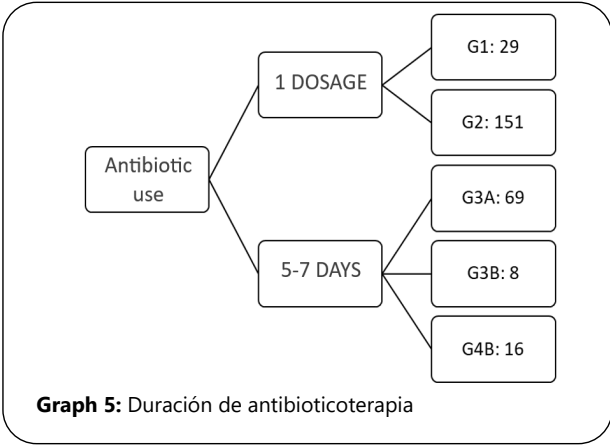
Regarding surgical findings, most cases corresponded to grade 2 (phlegmonous) with 151 cases (52%), followed by grade 3A (gangrenous) with 69 cases (23%), grade 1 (congestive) with 29 cases (10%), grade 4B (localized peritonitis) with 16 cases (5.5%) and grade 3B (gangrenous with base affliction) with 8 cases (3%). As for pathological anatomy, the most frequent findings were grade 3A (gangrenous) with 139 cases (47.7%), followed by grade 2 (phlegmonous) with 102 cases (35%), grade 1 (congestive) with 30 cases (10%) and grade 4A (localized peritonitis) with 2 cases (0.7%).

Among the 273 patients submitted to appendectomies, there were some differences between surgical findings and the results of pathological anatomy.



In relation to the use of antibiotics, following the WSES Jerusalem 2020 Guidelines, of the patients submitted to an appendectomy, 180 patients (66%) with a non-complicated acute appendicitis (phlegmonous and congestive) received a single dosage of perioperative antibiotics (Amoxicillin-sulbactam 1.5 gr), while 93 patients (34%) with gangrenous and

localized peritonitis appendicitis received antibiotics during postoperative up until completing the plan.



No drainage of any type was used on any patients submitted to an appendectomy in the General Hospital of Luque.

In the General Hospital of Luque there were no cases of appendectomies with intra-operative drainage placement. However, there was 1 case of a patient who had a deep surgical site infection with intra-abdominal collection, reason why a tubular drainage was placed in 1 moth after surgery.

DISCUSSION

Within the existing literature, there were no studies found to be similar to the present one, although diverse studies compared the Alvarado and AIR scales or Alvarado and RIPASA. By comparing the results obtained to the ones of other studies, a similarity regarding sensibility and specificity of the utilized scales can be observed. In general, evaluated systems showed high sensibility and elevated positively predictive value, which facilitated the acute appendicitis diagnosis and allowed to reduce performing unnecessary procedures.

The WSES Jerusalem 2020 Guidelines recommend the use of the AIR scale due to its predictive capacity and greater discrimination power in adults with acute appendicitis suspicion. However, in the studied population, anatomopathological results indicate that the Alvarado scale presents greater specificity and sensibility.

In general terms, the scales used in this study offer a high recommendation rate, but it's fundamental to consider the particular conditions of each patient and clinical environment before taking surgical decisions. This aspect highlights the importance of individual clinical evaluation and clinical judgment in the handling of acute appendicitis.

Despite the promising results, the study presents some limitations. Firstly, by being a retrospective study, there's the chance of bias within data recollection, given that it depends on the quality of medical records. Likewise, the non-probabilistic sampling limits the generalization of the findings towards other populations out of the context of the General Hospital of Luque.

Regarding the implications for future investigations, it would be valuable to perform multicentric prospective studies that allow a greater generalization of results, as well as exploring the combination of diagnostic scales with image tools to further optimize the acute appendicitis diagnosis. Likewise, evaluation of new scales or diagnostic methods could contribute

to the betterment in diagnostic precision and the reduction of unnecessary surgical interventions.

CONCLUSION

It's concluded that said study of the Alvarado, AIR and RIPASA scales has a high predictive value to diagnose acute infectious cases in the right iliac fossa, like acute appendicitis.

Furthermore, for the patient's diagnosis with acute appendicitis suspicion who yield Alvarado, AIR and RIPASA intermediate scores, from 4-7, image studies were of great help to reach the diagnosis and being able to be submitted to urgent surgery.

The clinical-surgical correlation of acute appendicitis in the General Hospital of Luque based on the WSES Jerusalem 2020 Guidelines, can be applied to our population as a method that backs up the decision making in the management of patients

with a suspicion of acute appendicitis.

ETHICAL CONSIDERATIONS

There were no ethical problems identified in the study's work management.

FUNDING

The present study had no external sources of funding.

AUTHOR'S CONTRIBUTION

All authors participated in patient attention and creation of the manuscript.

CONFLICT OF INTERESTS

Authors declare no conflict of interests related to the present work.

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