

Concordance of the diagnosis of the surgeon with histopathological diagnosis in adult patients surgical intervention by acute appendicitis

Concordancia del diagnóstico del cirujano con el diagnóstico histopatológico en pacientes adultos intervenidos quirúrgicamente por apendicitis aguda

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Abstract

Objective: To identify the concordance of the macroscopic diagnosis with the histopathological diagnosis in patients surgically treated for Acute Appendicitis (AA) in the Naval General Hospital of High Specialty (HOSGENAES). **Methods:** All the patients with probable AA operated on appendectomy, in the general surgery service of the HOSGENAES, the histopathological report was recovered with support of the HIS-2 electronic file system of the hospital, the agreement was made by Cohen's kappa index. **Results:** In this study of 200 cases of AA, when categorized by groups in relation to the AA phase in the postoperative period, 5 (2.5%) cases were diagnosed by the surgeon as appendages apparently healthy or without inflammatory signs, 73 (36.5%) as congestive AA or catarrhal, 97 (48.5%) as phlegmonous or suppurative, 20 (10%) as gangrenous or necrotic and 5 (2.5%) as perforated. Histopathological diagnosis yielded the following figures: 10 (5%) cases of appendices without inflammatory signs, 61 (30.5%) cases of congestive or catarrhal AA, 107 (53.5%) phlegmonous or suppurative, 11 (5.5%) as gangrenous or necrotic and 11 (5.5%) as perforated. **Conclusions:** We obtained a low concordance (kappa: 0.18) in the diagnosis of AA among surgeons and pathologists when classifying it by phases.

Key words: Appendicitis. Appendectomy. Concordance.

Resumen

Objetivo: Identificar la concordancia del diagnóstico macroscópico con el diagnóstico histopatológico en pacientes intervenidos quirúrgicamente por apendicitis aguda (AA) en el Hospital General Naval de Alta Especialidad (HOSGENAES). **Método:** De los pacientes con probable AA operados de apendicetomía en el servicio de cirugía general del HOSGENAES se recuperó el reporte histopatológico con apoyo del archivo electrónico HIS-2 del hospital. La concordancia se realizó por el índice kappa de Cohen. **Resultados:** En este estudio de 200 casos de AA, al categorizar por grupos en relación a la fase de AA fueron diagnosticados por el cirujano 5 (2.5 %) casos como apéndices aparentemente sanos o sin signos inflamatorios, 73 (36.5%) como AA congestiva-catarral, 97 (48.5 %) como flemonosa-supurada, 20 (10 %) como gangrenosa-necrosada y

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5 (2.5%) como perforada. El diagnóstico histopatológico arrojó las siguientes cifras: 10 (5%) casos de apéndices sin signos inflamatorios, 61 (30.5%) casos de AA congestiva o catarral, 107 (53.5 %) flemonosa o supurada, 11 (5.5 %) como gangrenosa o necrosada, y 11 (5.5 %) como perforada. **Conclusiones:** Se obtuvo una baja concordancia (κ : 0.18) en el diagnóstico de AA entre cirujanos y patólogos al clasificarla por fases.

Palabras clave: Apendicitis. Apendicectomía. Concordancia.

Introduction

Appendectomy is currently the most common emergency surgical procedure in the world; the estimated risk for suffering from appendicitis sometime in life is 8.6% for men and 6.7% for women. It has an incidence of 1.5 a 1.9 cases per 1000 population, and the most affected population is between 15 and 35 years of age. One in 15-20 Mexicans will experience acute appendicitis (AA) sometime in life, and in our hospital nearly 800 appendectomies have been performed in the last 5 years, which makes for it to be one of the most common surgical procedures, just as in the reported literature¹.

AA is the most common emergency surgical pathology in our setting; however, it continues to be a diagnostic challenge for health professionals even with all the highly sensitive and specific complementary diagnostic studies¹.

Various diagnostic scales have been proposed and created for AA, with the Alvarado scale being the best known and most widely used, given that its use has been validated in numerous studies. To date, a specific and reliable marker has not yet been identified for AA. Despite advances in technology and research modalities, the percentage of negative appendectomies remains between 15 and 50%. The studies show that there is a certain benefit when performing a tomography in patients who have abdominal pain with few clinical data suggestive of AA, since the criteria used in the Alvarado scale most of the time appear at late stages of appendicitis¹.

It is widely known that appendicitis suspicion is clinical; it is integrated by history taking, physical examination, laboratory tests and imaging studies; and is corroborated by histopathological examination, once the surgical procedure is performed, it is staged by the surgeon according to macroscopic phases (phase 0-IV), but this classification sometimes differs from histopathological reports.

The appendicitis phase is not confirmed until post-operative findings are available. In a standardized way, the phase determines the number of days of

pharmacological treatment, the number days of hospital stay and possible complications; final histopathological diagnosis can modify this evolution. We consider prudent the search for agreement in the diagnoses, since it is related to appropriate treatment, days of hospital stay, days of recovery and possible complications. Failure to establish an early diagnosis increases disease mortality and morbidity as well as the risk of complications. A delayed diagnosis increases emergency department and hospital costs^{2,3}.

Severity of appendicitis can be determined by the macroscopic appearance and by histopathological examination. Through macroscopic observation of surgical findings, it can be classified as follows: phase 0, no appendicitis; phase I, congestive or catarrhal appendicitis, where hyperemia is appreciated; phase II, phlegmonous or suppurative appendicitis, i.e., with erosions of the mucosa, suppuration and fibrinopurulent exudates; phase III, necrotized appendicitis or with gangrenous wall; and phase IV, perforated appendicitis. Although to date there is no unique model with regard to clinical classification, in some hospitals it is valid for histopathological classification⁴⁻⁷.

Pharmacological management is related to AA stage, and there are various treatments and regimens. Cases of uncomplicated AA at phases I and II (congestive and phlegmonous) require short hospital stay and antibiotic treatment, in some cases for 24 hours or less; regarding the treatment of complicated acute appendicitis at phases III and IV (gangrened and perforated), they require a 72-hour hospital stay and double antibiotic treatment, for 7 to 10 days, which starts with the subject as inpatient and with management by oral route for follow-up on an outpatient basis⁸⁻¹².

Knowing the percentage of cases in which AA histopathological diagnosis is confirmed and its correlation with macroscopic diagnosis in our institution will help the application of the ideal antibiotic treatment regimen, since it is dependent on the AA phase¹³⁻¹⁷.

In the Naval Secretariat of Mexico, it is priority keeping military personnel in top health conditions for their performance in different activities, and in the case of experiencing pathologies of surgical resolution, the goals we pursue are to reduce hospital stay, complications and comorbidity, both for active and retired Navy members and their families, hence the importance of adequate macroscopic classification when the surgical procedure is carried out and concordance of final diagnosis, which undoubtedly is the histopathological report.

Method

A quantitative cross-sectional, non-experimental study was carried out, in the period comprised from September 2015 to August 2017, with all surgically intervened patients with AA diagnosis who attended for medical assessment and received surgical treatment at the Naval High Specialty General Hospital (HOSGENAES – *Hospital General Naval de Alta Especialidad*), which include people aged 16 to 65 years, who were active or retired military, affiliates and non-affiliates.

The study variables were gender, age, macroscopic appendicitis phases and histopathological classification. The classification used was the following: no appendicitis, congestive or catarrhal, phlegmonous or suppurated, gangrenous or necrotic, and perforated.

Calculated sample size was 193 patients¹⁸⁻²⁰. The 95% level of confidence was established with a kappa margin of error ± 0.15 .

Once the research protocol was approved, patients were recruited with support of the HOSGENAES general surgery department medical staff. Information on the diagnosis issued by the surgeon in the postoperative note and on histopathological diagnosis in the pathology department reports was collected, with support of the HIS-2 electronic records system of the hospital.

The analysis of macroscopic and histopathological diagnoses agreement was carried out using Cohen's kappa index.

Results

This study of 200 AA cases had a higher proportion of female patients, with 114 versus 86 male patients.

The highest incidence of appendicular clinical presentation occurred in patients between the third and fourth decades of life, with the majority being of the

Table 1. Acute appendicitis phases according to macroscopic and histopathological diagnoses in patients undergoing appendectomy

	Histopathological diagnosis					
	0	1	2	3	4	Total
Macroscopic diagnosis	0	2	3	0	0	5
	1	7	26	39	1	73
	2	1	32	60	3	97
	3	0	0	8	6	20
	4	0	0	0	1	5
	Total	10	61	107	11	200

Source: Own creation

third decade, with a total of 87 cases, and an age range of 45 years between the youngest (15 years) and the oldest patient (60 years).

When categorizing by groups in relation to the AA phase in the postoperative period, 5 (2.5%) were diagnosed by the surgeon as apparently healthy appendices or without inflammatory signs, 73 (36.5%) as congestive or catarrhal AA, 97 (48.5%) as phlegmonous or suppurated, 20 (10%) as gangrenous or necrotic, and 5 (2.5%) as perforated AA (Table 1). Histopathological diagnosis yielded the following resulting figures: 10 (5%) appendices without inflammatory signs, 61 (30.5%) congestive or catarrhal AA, 107 (53.5%) phlegmonous or suppurated, 11 (5.5%) gangrenous or necrotic, and 11 (5.5%) perforated AA (Table 1).

Discussion

AA diagnosis improves over the years of the surgeon's practice, due to his/her experience and to the advances in medicine in auxiliary studies, mainly imaging. Despite all this, it is not uncommon finding an apparently healthy appendix during surgical intervention in a patient with presumptive AA diagnosis. Neither is it uncommon not to find a cause that justifies the right iliac fossa pain on abdominal examination in these patients³.

The percentage of negative appendectomies considering the surgeon's point of view was 5%, similar to that referred by Kulikoff et al.²¹ in their study of 782 pediatric cases, which increased to 10% when it was compared with the pathological anatomy result. Both studies differ from observations reported by Ávila and

García²² in Colombia, who refer 18.1% of negative appendectomies. It is important highlighting that the value reported in our study is below 12-15% of laparotomies referred to as blank or negative, which is considered tolerable from the surgical point of view as indicated by the committee for development of clinical practice guidelines of the Mexican Association of General Surgery¹. Nevertheless, it is necessary bearing in mind that obtaining less than 12% of negative appendectomies should also be of concern, since it could mean that patients with atypical AA should be left under observation and be operated when they already have any complication.

By categorizing AA by phases, a low inter-observer agreement was obtained (kappa: 0.181085), similar to that reported by Segovia and Figueredo³ (kappa: 0.3466); however, it differs from the agreement reports of Flores-Nava et al.¹⁷ in pediatric patients, who report a similarity of 72.2% between the surgeon and the pathologist reports, which contrasts with the similarity of 49% in our study.

In general, surgeons and pathologists diagnose more phlegmonous AA (48.5 and 53.5%, respectively). There was also little difference between macroscopic and histopathological diagnoses in complicated phases (12.5 and 11%, respectively), with 100% effectiveness when classifying AA as complicated, similar to the 96.7% reported by Pourhabibi et al.²³ in 342 patients.

Failure in complicated AA diagnosis has importance due to involvement in therapeutics, number of hospitalization days and antibiotic treatment duration. False negatives (53 cases, 26.5%) that were underdiagnosed, i.e., macroscopically classified in a lower phase in relation to histopathology report, received suboptimal antibiotic therapy, which leads to assume that a higher rate of surgical morbidity could occur (more surgical site infections, abscesses or other complications) in many cases, although a deeper evaluation should be carried out to assess this situation, which was not part of this work. The false positives (49 cases, 24.5%) that were overdiagnosed had excessive hospital stay and antibiotic treatment, which is probably due to excessive caution in order to prevent subsequent complications.

At the time, with few diagnostic means, McBurney²⁴ proposed that rapid surgical intervention to ensure AA non-progression is much safer than delaying surgical treatment, a legacy which persists to date under the phrase "when in doubt, do the obvious", i.e., laparotomy; a phrase that has been adopted both in our

general surgery department and quite surely in many other hospitals, which guarantees us to somehow avoid procedures that imply greater morbidity and mortality for the patient, which is and always will be the priority for us^{24,25}.

Conclusion

A low agreement (kappa: 0.18) was obtained in AA diagnosis between surgeons and pathologists when it was classified by phases. Taking this into account, ideally, there should be a good (kappa: > 0.7) or excellent (kappa:> 0.8) agreement between postoperative macroscopic diagnosis made by the surgeon and histopathological diagnosis made by the pathologist of AA cases and their phases or stages, since postoperative therapy depends on an adequate diagnosis issued by the surgeon when performing the surgical procedure.

Recommendations

- The surgeon should be more careful with macroscopic findings, in order to refine postoperative diagnosis
- Histopathological report should be issued promptly in order to adjust inpatient drug treatment and on an outpatient basis if necessary.
- There should be greater communication between general surgery and pathology departments, and in case of any doubt, joint sessions should be held.

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Conflict of interests

The authors declare that they have no conflicts of interest.

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