ALVARADO SCORE IN THE DIAGNOSTIC OF PAIN IN THE RIGHT LOWER QUADRANT

SCORE ALVARADO EN EL DOLOR DE LA FOSA ILIACA DERECHA

Lada PE[1], Badra Roberto[2], Janikow Christian[2], Massa Martín[2], Taborda Bruno[2], Moretti Gastón[3], Menso Nicolás[3], Aimar Carolina[3], Martinez Peluaga Julián[3]

Abstract:

Background: Acute appendicitis neither suspected nor diagnosed could develop a perforation or otherwise it would take to removing of a normal appendix.
Objectives: Utilization of a clinical score system for aided diagnosis of this pathology and can reduce a negative appendicitis.
Setting: National Clinicas Hospital. Córdoba. Argentina.
Design: Prospective and protocolized study.
Methods: 594 patients were studied between October 2002 and December 2013. 312 males and 282 females their age average was 26.2 years. Alvarado score was realized in all patients when they entered. According clinic and second valoration with the score surgical exploration was decided in 574 patients. The remaining 20 were excluded due to other pathology. The diagnosis in acute appendicitis was confirmed by surgical finding and histopathologic studies.
Results: In surgical finding we showed 594 patients (91,28 %) had acute appendicitis. There was no operative mortality. Respects morbidity there was 1,74 % of medical and 13,93 % of surgical complications. The anatomo-pathologic report showed a normal cecal appendix in 50. The incidence of negative appendicectomy was about 8.71 %.
Conclusions: The utilization of score related to the surgical and anatomo-pathologic finding confirmed it was appreciable from 6 points to acute appendicitis diagnosis.
Keywords: *acute appendicitis; score system for diagnosis acute appendicitis; Alvarado score*

Resumen:

Antecedentes: La apendicitis aguda no sospechada y diagnosticada puede evolucionar hacia la perforación, ó por el contrario conduce a la remoción de un apéndice normal.
Objetivo: La utilización de un sistema de Score, desde un punto de vista clínico, para el diagnóstico de esta patología y lograr disminuir las apendicetomías negativas.
Lugar de Aplicación: Hospital Nacional de Clínicas. Córdoba. (Argentina)
Diseño: Estudio prospectivo y protocolizado.
Material y Métodos: Comprende a 594 pacientes estudiados entre octubre de 2002 y diciembre del 2013. De ellos, 312 eran del sexo masculino y 282 del femenino, con una edad promedio de 26,2 años de edad. A todos los pacientes se les realizo al ingreso el Score de Alvarado. En base a la clínica y a una segunda valoración con el Score se decidió la exploración quirúrgica en 574 pacientes. De los 20 restantes, fueron excluidos por otra patología. El diagnóstico de apendicitis aguda fue confirmado por los hallazgos quirúrgicos y la anatomía patológica.
Resultados: En los hallazgos operatorios se encontró en 524 pacientes (91,28%) que tenían una apendicitis aguda. No hubo mortalidad postoperatoria. En relación a la morbilidad hubo un 1,74 % de complicaciones médicas y un 13,93 % de las quirúrgicas. El informe anatomopatológico mostró en 50 pacientes un apéndice cecal normal. Por lo tanto la incidencia de las apendicetomías negativas fue del 8,71%.
Conclusiones: La utilización del Score en relación a los hallazgos quirúrgicos y anatomopatológicos confirma que fue sensible a partir de 6 puntos para el diagnóstico de apendicitis aguda.
Palabras claves: *apendicitis aguda; score clínico para el diagnóstico de apendicitis aguda; score de alvarado*

1. Chief of the Department of the Emergency Room. Hospital Nacional de Clínicas. University of Córdoba. Córdoba. Argentina. E-mail: pauleduardolada@yahoo.es
2. Surgeon of Emergency Room. Hospital Nacional de Clinicas. University of Córdoba. Córdoba. Argentina.
3. Resident of Surgery of Emergency Room. Hospital Nacional de Clinicas. University of Córdoba. Córdoba. Argentina

Score de alvarado y apendicitis aguda

INTRODUCTION

One of the most ordinary surgical emergencies in the emergency room for a clinical evaluation, diagnostic and treatment is the acute pain in the right lower quadrant with suspect of acute appendicitis. The not diagnostic of this disease can evolutionate to the perforation of the cecal appendix in 15 to 37% of the cases (1) (2). An early decision of surgery can conduce to the resection of a normal apendix.

To reduce the number of normal appendectomies and at the same time to not increase the appendix perforations, it was ideated different kinde of Scores for the diagnostic of acute appendicitis (3), the results were difficult to implement to this pathology.

In 1986, Alvarado A (4) describes a simple Score whit a clinical vision to be aplicate by generalists physiatrics and surgical residents for patients with suspect of acute appendicitis to arrive to the correct diagnostic in most of the cases.

MATERIALS AND METHOD

Betwen October 2002 and December 2013 in the Emergency room of the Clinical National Hospital it was done a prospective and protocolized study witch objetives was evaluate by a Score sistem all patients with pain in the right lower quadrant of the abdomen and suspect fo acute appendicitis. 594 patients were interned in the guard, 312 was masculine and 282 female **(Table I)**, average age of 26, 2 years (range between 15 to 91 years). All patients was categorized by Alvarado Score that included three clinical symptoms, three physical signs and two laborities finds just as shows **Table II**.

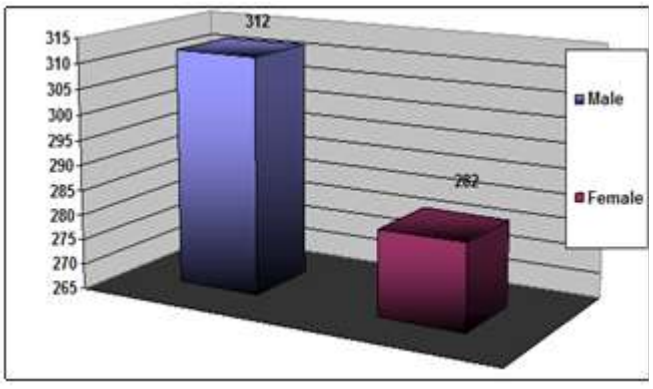

TABLE I: *Sex*

The timing betwen the first clinical symptoms and the consult in the guard were 1 to 9 days, but mostly was 48 hours (71, 4%). At that with 3 points, 10 with 4 points, 12 with 5 points, 109 with 6 points, 110 with 7 points, 144 with 8 points, 124 with 9 points and 83 with 10 points (Table III). All patients were hospitalized, 372 recived an abdominal ecography (64, 6%), 93 female received transvaginal echography (25%).

ALVARADO SCORE	POINTS
SYMPTOM	
Migratory pain to RLQ	**(1)**
Nausea and vomit.	**(1)**
Anorexia.	**(1)**
SIGN	
Tenderness in RLQ.	**(2)**
Fever > 37º C.	**(1)**
Rebound sign.	**(1)**
LABORATORY	
Leukocytes (> 10 x 10.9 L)	**(2)**
A shift to the left	**(1)**
TOTAL	**10**

TABLE II: *ALVARADO SCORE*

ALVARADO SCORE	NUMBER OF PATIENTS
3 points	**2**
4 points	**14**
5 points	**12**
6 points	**109**
7 points	**110**
8 points	**144**
9 points	**124**
10 points	**83**
TOTAL	**594 PATIENTS**

TABLE III: *Alvarado Score (Admission)*

With clinical symptoms, physical examination, laboratory and a second look of the Alvarado Score, does which had 6 or more points

received surgical exploration (574 patients, 98,28%), 503 had pre operatory suspect of acute appendicitis (84,68%), 60 localized peritonitis (10,1%) and 11 generalized peritonitis (1,85%). The last 20 patients was 10 cases of gynecological disease (1, 68%), and the other 10 was renal disease (1, 68%). These patients had ASA valuation, 329 with ASA IE, 213 with ASA IIE, 30 with ASA IIE, and 2 with ASA IVE **(Table IV).** Finally the diagnostic of acute appendicitis was confirmed by the surgical findings and anatomy pathology informs.

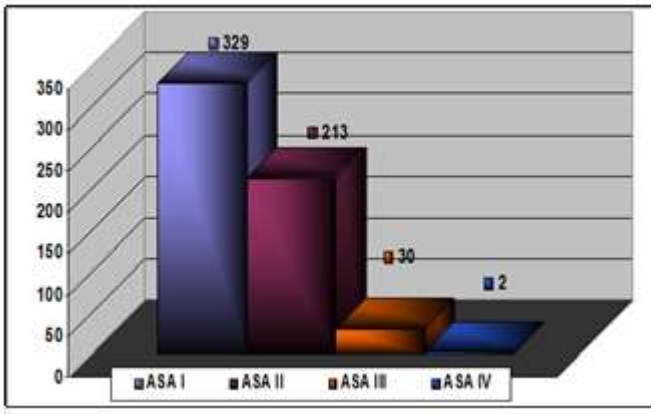

TABLE IV: *ASA*

RESULTS

From 574 patients that received surgery, 524 had an inflammatory appendix (91, 28%), 433 had acute appendicitis (75, 43%), 80 had localized peritonitis (13, 93%) and 11 had generalized peritonitis (1, 91%). From the last 50 patients, 19 had normal appendix with none other abdominal pathology (3, 31%), 27 female had gynecological disease (4, 70%), 3 had cecal acute diverticulitis and received right hemicolectomy (0, 52%), and 1 had Meckel diverticulitis and also received appendectomy (0, 17%), **(Table V).**

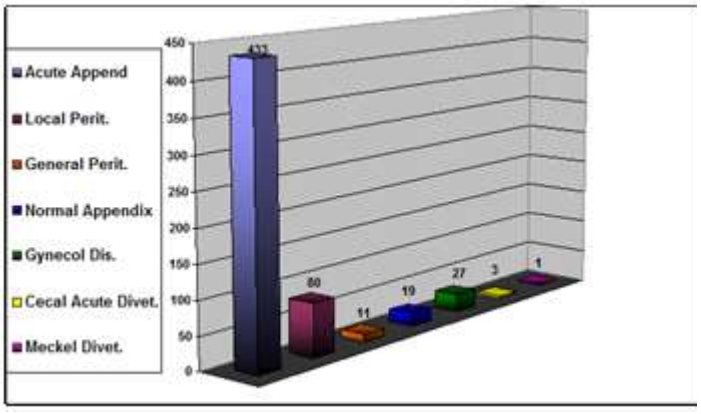

TABLE V: *Per operatory Diagnostic*

There was not surgical mortality. Medical complications were 5 cases of pneumonia, 1 stroke, 2 hypertensive crises, and 2 bronchial spasms. Surgical complications appeared in 80 patients (13, 93%), 50 with seroma in the wound (8, 71%), 17 with abscess of the wound (2, 96%), 3 with hematoma (0, 52%), 1 with paralytic ileus (0, 17%), and 1 with intraabdominal abscess (0, 17%) and was treated with percutaneous drainage and antibiotics. There was 8 patients that needed reoperation (1,39%), 2 with abdominal sepsis, 2 with perforated gastric ulcer, 2 with acute cholecystitis, 1 with intestinal occlusion and 1 with intraabdominal hemorrhage **(Table VI).**

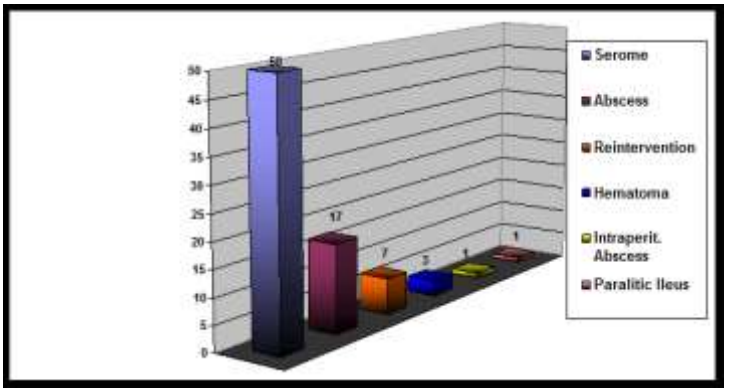

TABLE VI: *Surgical complications*

The anatomical pathology of the appendix reveled 33 acute catarrhal appendicitis, 97 flegmonose acute appendicitis, 332 suppurate acute appendicitis, 58 gangrenous acute appendicitis, 4 low grade of neuroendocrine carcinoma or carcinoids, 19 normal appendix, 27 with gynecological disease, 1 Meckel diverticulitis, and 3 acute cecal diverticulitis, all of them with normal appendix (8, 71%) **(Table VII)**. The hospitalization time was 2,1 days.

Alvarado Score and anatomical pathology confirmed acute appendicitis when the Score was 6 or more points **(Table VIII).**

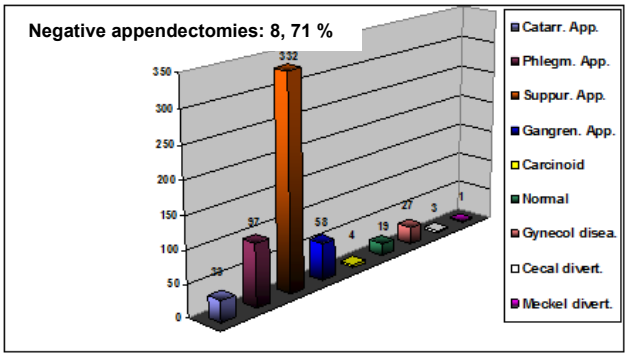

TABLE VII: Pathology

Alvarado Score	3	4	5	6	7	8	9	10	TOTAL
Discharge	2	8	8	2	0	0	0	0	**20**
Appendicits	0	0	0	88	99	135	119	83	**524**
Normal Appendix	0	0	2	15	1	1	0	0	**19**
Other disease	0	2	2	4	10	8	5	0	**31**
Total	**2**	**10**	**12**	**109**	**110**	**144**	**124**	**83**	**594**

TABLE VIII: *Relation between Alvarado Score and Pathology*

DISCUSION

Acute appendicitis is one of the most common etiologies of acute abdomen, that´s way the appendectomy is one of the surgery most important for the general surgeon. The big advances of the medicine reduced the mortality from 26% to 1% in the acute appendicitis. The average of negative appendectomies in the world literature is 20 to 40% of the cases, being higher in female in the procreating age (25 to 50%) (1) (5).

The prognostic is determinate by the perforation, 4% of mortality in perforated acute appendicitis and 0,7% in no perforated appendicitis, and the morbidity is 24% in the first case and 4% in the second one (6). That´s way we think that a opportune diagnostic is the key of the success of the treatment.

A surgeon familiarized with this disease can do the diagnosis with 97% of sensibility and specify like other imagen methods (7) (8) (9). Alvarado Score with 6 points can do the diagnostic in 80% of cases, with 7 points in 90%, with 8 points in 93%, with 9 points 95% and with 10 points 100% in our experience.

In our series, Alvarado score has a rising curve for the diagnostic sensibility. Alvarado Score is useful for beginner surgeons and clinic physicians to make diagnostic of acute appendicitis in patients with right lower pain.

Transvaginal echography can evaluate gynecological cases; urine laboratories can evaluate renal cases. A score with 6 or more points without clinical recovery can need a CT because of the great sensibility and specify of the study (11), if there is a contraindication for CT (female in procreating age, allergy to the iodine) the laparoscopic exploration is indicated (12).

When think that´s not necessary a CT in all patients with right lower pain because the clinic and physical examination in the first 24 hours in the guard center chad do the diagnostic in more than 90% of cases (13) (14) (15), and only those complicate cases can be able a CT studies.

Any pain in the right lower abdominal must be evaluated by a surgeon familiarized with the syndrome, his capacity can do the diagnostic and take the decision to explore the patient (16) (17) (18). Echography is useful for female patients, not to diagnostic appendicitis, but to diagnostic gynecological cases (10). Alvarado Score is a practical guide to alert to an experience surgeons and clinic physicians (19) (20) (21) (22) that a right lower pain can be an acute appendicitis.

Like Denizbasi (23), we think that wen CT is not accessible, a simple system of Score just like Alvarado described is useful for the diagnostic for acute appendicitis.

Bibliography

1.- Izbicki JR, Knoefel WT, Wilker DK, et al.: Accurate diagnosis of acute appendicitis: a retrospective and prospective analysis of 686 patients. Eur. J. Surg. 1992. 158: 227-231.

2.- Van Way CW, Murphy JR, Dunn EL, et al.: A feasibility study of computer aided diagnosis in appendicitis. Surg. Gynecol. Obstet. 1982. 155: 685-688.

3.- Ohmann C, Yang Q, Franke C.: Diagnostic scores for acute appendicitis. Abdominal Pain Study Group. Eur. J. Surg. 1995. 161: 273-281.

4.- Alvarado A.: A practical score for the early diagnosis of acute appendicitis. Ann. Emerg. Med. 1986. 15: 557-564.

5.- Lau WY, Fan ST, Yiu TF, et al.: Negative findings at appendectomy. Am. J. Surg. 1984. 148: 375-378.

6.- Margenthaler J, Longo W. Risk factors for adverse outcomes after the surgical treatment of appendicitis in adults. Ann. Surg. 2003. 238: 59-66

7.- Yıldırım E, Karagülle E, Kırbaş I, et al.: Alvarado scores and pain onset in relation to multislice CT findings in acute appendicitis. Diagn. Interv. Radiol. 2008. 14: 14-18.

8.- Douglas CD, Macpherson NE, Davidson P, et al.: Randomised controlled trial of ultrasonography in diagnosis of acute appendicitis, incorporating the Alvarado score. BMJ. 2000. 321: 919-922.

9.- Hong JJ, Cohn SM, Ekeh AP, et al.: Prospective randomized study of clinical assessment versus computed tomography for the diagnosis of acute appendicitis. Surg. Infect. 2003. 4: 231-239.

10.- Bongard F, Landers DV, Lewis F.: Diferential diagnosis of acute appendicitis and pelvic inflammatory disease. A prospective analysis. Am. J. Surg. 1985. 150: 90-96.

11.- Birnbaum BA, Jeffrey RB Jr.: CT and sonographic evaluation of acute right lower quadrant abdominal pain. AJR. 1998. 170: 361-371.

12.- Garfield JL, Birkhahn RH, Gaeta TJ, et al.: Diagnostic pathways and delays on route to operative intervention in acute appendicitis. Am. Surg. 2004. 70: 1010-1013.

13.- Shelton T, McKinlay R, Schwartz RW.: Acute appendicitis current: diagnosis and treatment. Curr. Surg. 2003. 60: .502-505.

14.- Middleton SB, Whitbread T, Morgans BT, et al.: Combination of skin temperature and a single white cell count does not improve diagnostic accuracy in acute appendicitis. Br. J. Surg. 1996. 83: 499-501.

15.- Ford R, Passinault W, Morse M.: Diagnostic ultrasound for suspected appendicitis: Does the added cost produce a better outcome?. Am. Surg. 1994. 60: 895-898.

16.- Al Qahtani HH, Muhammad AA.: Alvarado score as an admission criterion for suspected appendicitis in adults. The Soudi Journal of Gastroenterology. 2004. 10: 86-91.

17.- Turhan AN, Kapan S, Kutukcu E, et al.: Comparison of operative and non operative management of acute appendicitis. Ulus. Trauma. Acil. Cerrahi. Derg. 2009. 15(5): 459-462.

18.- Barber MD, McLaren J, Rainey JB.: Recurrent appendisitis. Br. J. Surg. 1997. 84: 110-112.

19.- Kalan M, Talbot D, Culniffe WF, et al.: Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study. Ann. R. Coll. Surg. Eng. 1994. 76(6): 148-419.

20.- Owen TD, Williams H, Stiff G, st al.: Evaluation of the Alvarado score of acute appendicitis. J. R. Soc. Med. 1992. 85(2): 87-88.

21.- Brigand C, Steinmetz J-P, Rohr S.: The usefullnes of scores in the diagnosis of appendicitis. Journal de Chirurgie. 2009. 146: 2-7.

22.- Winn RD, Laura S, Douglas C, et al.: Protocol-based approach to suspected appendicitis, incorporating the Alvarado score and outpatient and antibiotics. ANZ. J Surg. 2004. 74: 324-329.

23.- Denizbasi A, Unluer EE.: The role of the emergency medicine resident using the Alvarado Score in the diagnosis in acute appendicitis compared with general surgery resident. Eur. J. Emerg. Med. 2003. 10: 296-301.