

Scoring systems for diagnosing acute appendicitis

To the Editor

I have enjoyed reading the recent article of Al-Hashemy and Selem¹ on the role of the scoring systems in acute appendicitis. This study raises a number of important points worthy of critical evaluation. The authors have used sensitivity and specificity to describe how good the scoring system was, but did not consider the patient population in which the test was performed. Results will differ depending on the prior probability of the disease. This varied between the different studies as shown in **Table 1**. The prior probability of appendicitis was high in the discussed study (64%, 80/125) and the majority of the patients were operated upon (88%, 110/125 patients). The predictive value of a positive test (PPV), which is the probability that a person with a positive result actually has the disease, should increase with increased prior probability. **Table 1** shows that Al-Hashemy and Selem's study had a high prior probability (64%) which had resulted in a high PPV (**Figure 1**), but the negative predictive value was one of the lowest (**Table 1**). The likelihood ratio is the likelihood that a person with the disease would have a particular test result divided by the likelihood that a person without the disease would have that result.² The likelihood ratio of Al-Hashemy and Selem study was also one of the lowest (**Table 1**).

Furthermore, there were multiple mistakes in the tables of Al-Hashemy and Selem's study. The numbers of true positives do not total 80 in **Table 3**.

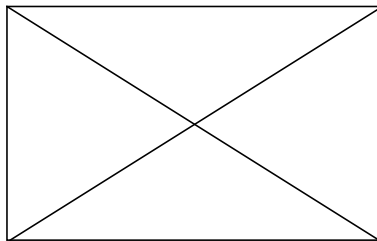


Figure 1 Relationship between the prior probability and positive predictive value of the cited studies. PPV - positive predictive value

The titles were also mistakenly written as "True +ve" in 3 columns of the table. Sensitivity should be specificity in the "other diagnosis column" in **Table 4**. Furthermore, 37 and not 48 are the number of patients who had appendicitis and a score of <7 (last paragraph of the result section). Appendicitis was also mistakenly written in the title. The efforts of the authors have to be acknowledged. Nevertheless, correcting the galley proofs is the main responsibility of the authors. With more in depth critical evaluation and care of the presentation of this work could have been better.

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Table 1 - Summary of the calculated diagnostic variables from those papers cited by Al-Hashemy and Selem.¹

Author	Year	Scoring system	Number	Sensitivity %	Specificity %	Prior probability %	PPV %	NPV %	LR
Fenyo ³	1987	Bayesian	830	92.2	91.4	30.8	82.5	95.4	10.72
Owen et al ⁴	1992	Alvarado	215	95.2	81.3	57.6	87.4	92.5	5.09
Kalan et al ⁵	1994	Modified A.	49	87.5	33.3	81.6	85.4	37.5	1.31
Fenyo et al ⁶	1997	Simplified	1167	73	87	33.6	75	85	5.61
Macklin et al ⁷	1997	Modified A.	118	76.3	78.8	32.2	63	87.5	6.81
Chan et al ⁸	2001	Alvarado	148	96	85.7	41.9	77.4	97.6	6.71
Al-Hashemy and Selem ¹	2004	Modified A.	125	53.8	80	64	82.6	49.3	2.69

Modified A. - Modified Alvarado, PPV - positive predictive value, NPV - negative predictive value, LR - likelihood ratio

Reply from the Author

I would like to thank Dr. Abu-Zidan for his his valuable comments. Also, we feel sorry for all the mistakes detected in **Tables 3 and 4**; the corrected tables are indicated in the erratum below. Although, the table presented by my colleague Dr. Abu-Zidan is very informative, on the other hand it shows that in the study by Kalan et al.⁴ whom used the same score, that the likelihood ratio (LR), is less than our LR and the prior probability percentage is higher than our study. Also, we totally agree regarding the last paragraph, that correcting the galley proof is the main responsibility of the authors.

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References

- Al-Hashemy AM, Selem MI. Appraisal of the modified Alvarado Score for acute appendicitis in adults. *Saudi Med J* 2004; 25: 1229-1231.
- Browner WS, Newman TB, Cummings SR. Designing a new study: III. Diagnostic tests. In: Hulley SB, Cummings SR, editors. Designing clinical research. Baltimore (MD): Williams and Wilkins; 1988. p. 87-97.
- Fenyö G. Routine use of a scoring system for decision-making in suspected acute appendicitis in adults. *Acta Chir Scand* 1987; 153: 545-551.
- Owen TD, Williams H, Stiff G, Jenkinson LR, Rees BL. Evaluation of the Alvarado score in acute appendicitis. *J R Soc Med* 1992; 85: 87-88.
- Kalan M, Rich AJ, Talbot D, Cunliffe WJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study. *Ann R Coll Surg Engl* 1994; 76: 418-419.
- Fenyö G, Lindberg G, Blind P, Enochsson L, Oberg A. Diagnostic decision support in suspected acute appendicitis: validation of a simplified scoring system. *Eur J Surg* 1997; 163: 831-838.
- Macklin CP, Radcliffe GS, Merei JM, Stringer MD. A prospective evaluation of the modified Alvarado score for acute appendicitis in children. *Ann R Coll Surg Engl* 1997; 79: 203-205.
- Chan MY, Teo BS, Ng BL. The Alvarado score and acute appendicitis. *Ann Acad Med Sing* 2001; 30: 510-512.

Erratum

In manuscript "Appraisal of the modified Alvarado Score for acute appendicitis in adults." Saudi Med J 2004; Vol. 25 (9): 1229-1231, Tables 3 and 4 should have appeared as follows:

Table 3 - Clinical diagnosis compared with modified Alvarado score in the diagnosis of acute appendicitis.

Variables	True +ve	True -ve	False +ve	False -ve	Accuracy %
Clinical diagnosis of acute appendicitis					
Male	55	6	15	0	80.3
Female	25	9	15	0	81.6
Total	80	15	30	0	76
MASS in acute appendicitis					
Male	31	21	0	24	64.4
Female	12	15	9	13	50
Total	43	36	9	37	63.2

Table 4 - Diagnostic accuracy of the modified Alvarado score.

Variables	Appendicitis	Other diagnosis
Total (N=80)		
Alvarado score ≥ 7	43	9
Alvarado score < 7	37	36
	Sensitivity = 53.9%	Specificity = 80%
Males (n=55)		
Alvarado score ≥ 7	31	0
Alvarado score < 7	24	21
	Sensitivity = 56.4%	Specificity = 100%
Females (n=25)		
Alvarado score ≥ 7	12	9
Alvarado score < 7	13	15
	Sensitivity = 48%	Specificity = 62.5%

Erratum

In manuscript "Seroprevalence of syphilis, hepatitis B and C, and human immunodeficiency virus infections among women." Saudi Med J 2004; Vol. 25 (12): 2037-2038, the received and accepted dates should have appeared as follows: Received 14th April 2004. Accepted for publication in final form 20th July 2004.