

# Σκωληκοειδίτιδα στον 21<sup>ο</sup> αιώνα

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Ευχάριστα διλήμματα!

# Σκωληκοειδίτιδα

- Σχεδόν 100% ίαση!
- Χαμηλά ποσοστά επιπλοκών (2,5-8%).
- Σχεδόν μηδέν θνητότητα!
- Βελτίωση επιδόσεων στις επιλεγμένες σκωληκοειδίτιδες.

*Τι ψάχνουμε;*

# Σκωληκοειδίτιδα

- Μεγαλύτερη άνεση.
  - Ασθενών
  - Οικογένειας
- Μείωση κόστους.
  - Άμεσου.
  - Έμμεσου

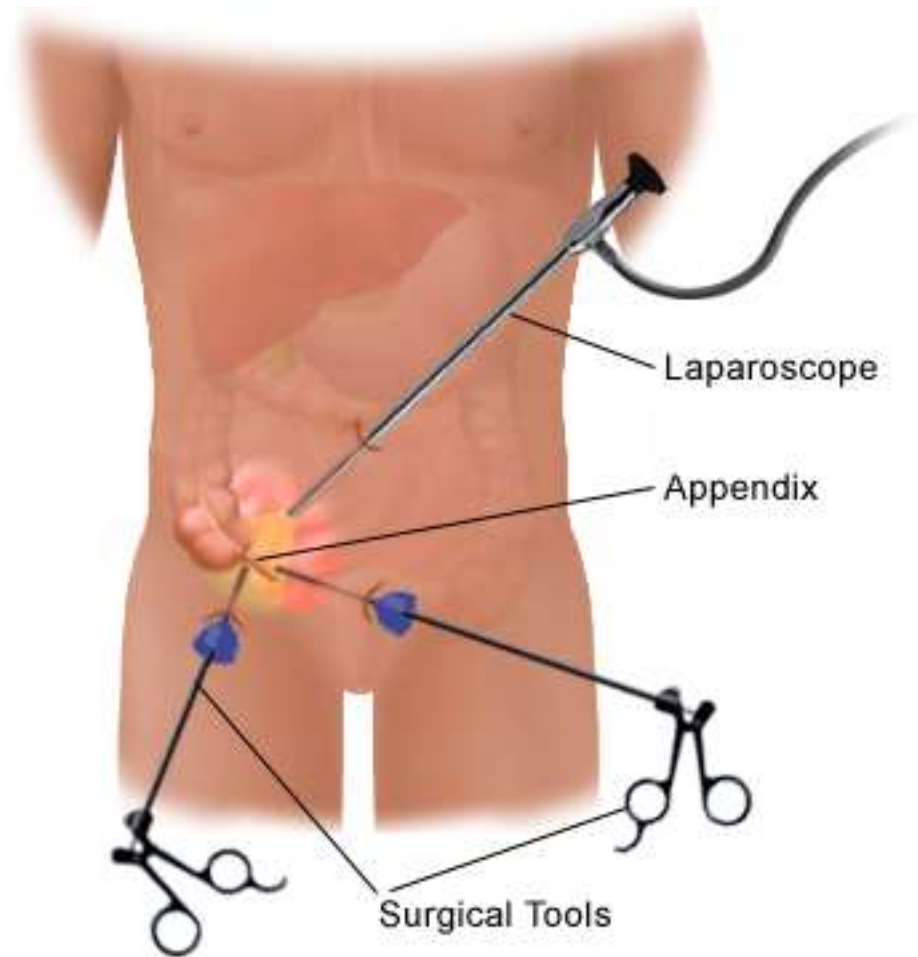
# Standard of Care: Διάγνωση

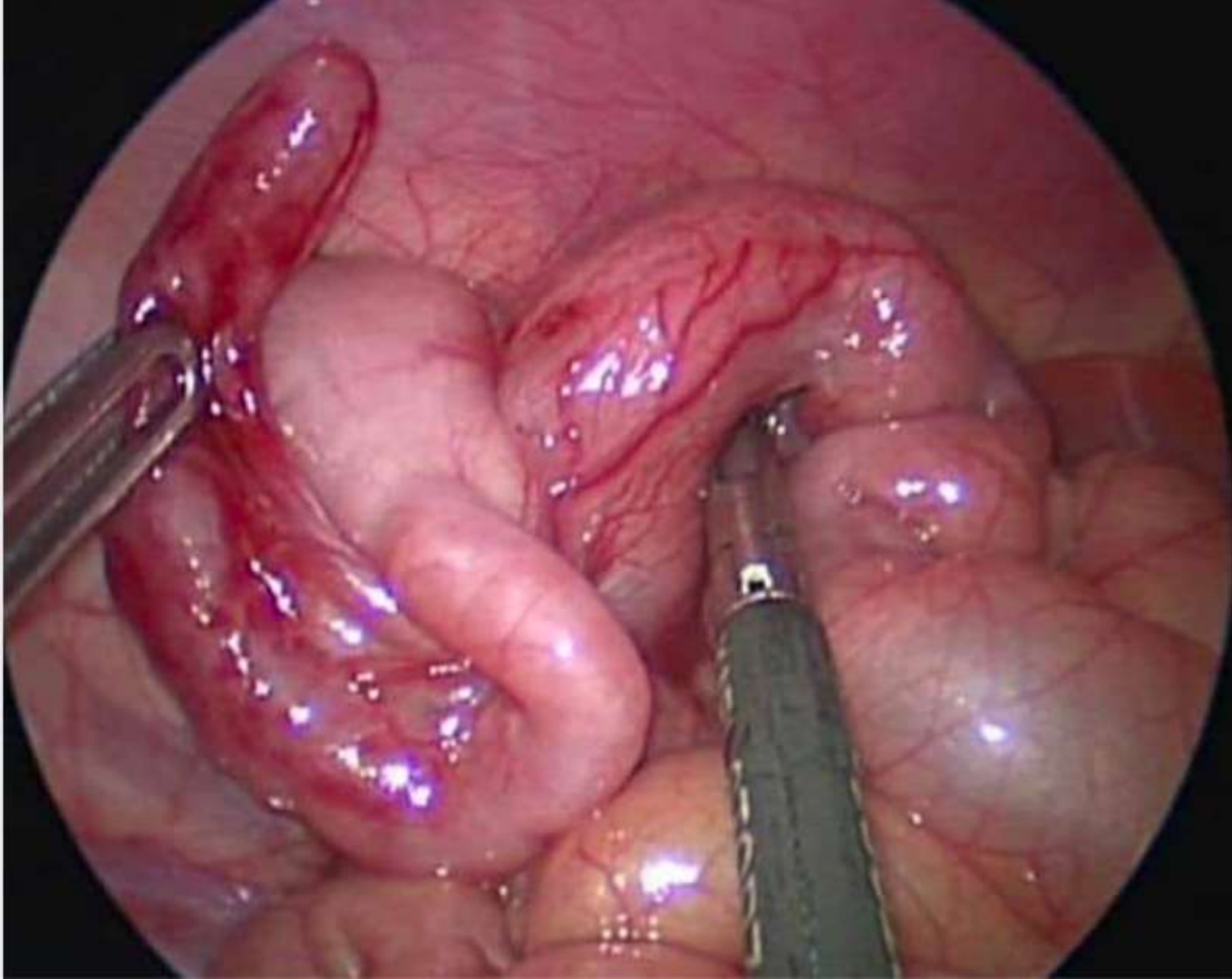
- Ιστορικό.
- Αντικειμενική Εξέταση.
- Εργαστηριακό Έλεγχος:
  - Γεν. Αίματος: PMNs.
  - CRP / Procalcitonin (επιπλεγμένες).
- Υπερηχογράφημα.
- Low dose CT.

# Standard of Care: Θεραπεία.

## Λαπαροσκοπική Σκωληκοειδεκτομή.

- Transumbilical vs Single port vs 2-3 ports.
- Εξιτήριο σε 24-48 ώρες.
- ...και σε επιλεγμένες αλλά...
- Σε παιδιά κάτω των 5 ετών;

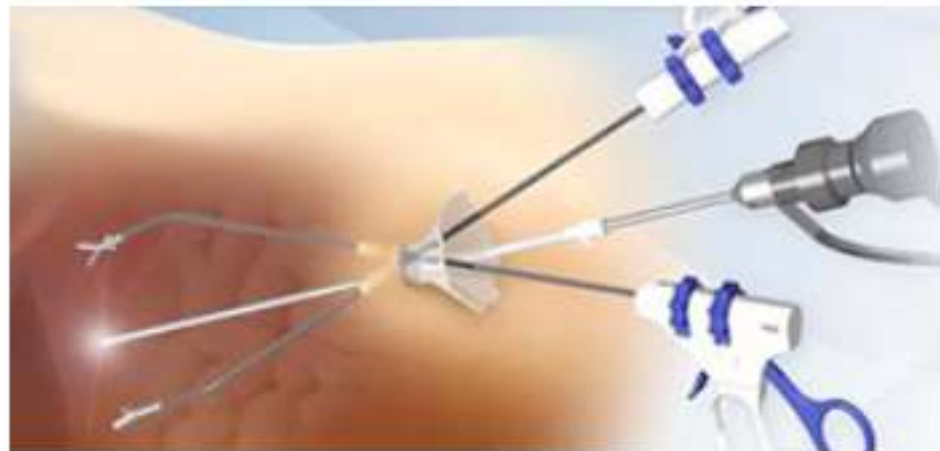












# Standard of Care: Θεραπεία.

## Λαπαροσκοπική Σκωληκοειδεκτομή.

- Single port vs 3 port.
- Εξιτήριο σε 24-48 ώρες.
- ...και σε επιπλεγμένες αλλά...
- Σε παιδιά κάτω των 5 ετών;

# Της μόδας...

- Συντηρητική αντιμετώπιση Μη Επιπλεγμένης Σκωληκοειδίτιδας (ΜΕΣ).
- Το «κίνημα» ξεκίνησε από τους ενήλικες με μεγάλο αριθμό μελετών.
- «Διάχυση» και στα παιδιά...

Που βρισκόμαστε στα παιδιά;;



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Journal of Pediatric Surgery

journal homepage: [www.elsevier.com/locate/jped surg](http://www.elsevier.com/locate/jped surg)



# Nonoperative management in children with early acute appendicitis: A systematic review☆☆☆☆



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# Οι μελέτες:

- 13 μελέτες
  - 4 αναδρομικές αναλύσεις.
  - 4 αναδρομικές συγκριτικές μελέτες.
  - 4 προδρομικές μη τυχαιοποιημένες.
  - 1 πιλοτική προδρομική τυχαιοποιημένη μελέτη.

## 2. Results

Fifteen articles met the inclusion criteria, covering thirteen studies: four retrospective analyses [28–31], four prospective cohort studies [32–35], four prospective nonrandomized comparative trials [36–41], and one pilot prospective RCT [42] (Table 2). Three articles were about one study at different time points [38–40].



Table 2

Summary of findings for the studies assessing the role of nonoperative management of acute appendicitis in children included in the review.

First author (year)	Class <sup>a</sup>	Patients in each arm		Age, years (mean)		Diagnostic method	NOM antibiotic regimen	Endpoint of antibiotics	Mean initial LOS, days		Initial treatment success <sup>b</sup> (%)		Subsequent appendectomy	Follow-up, months
		OM	NOM	OM	NOM				OM	NOM	OM	NOM		
Abes et al. (2007) [28]	4	–	16	–	5–13 (9)	C, I, L	IV ampicillin/sulbactam	Abdominal tenderness resolved 7 days total	–	N/S	–	15/16 (94%) 7 days	2/15	12
Armstrong et al. (2014) [29]	4	12	12	(12.2)	(12.5)	C, I	IV ciprofloxacin and metronidazole, or ampicillin, gentamicin, and metronidazole; discharged on oral amoxicillin/davulanic acid	IV duration of hospitalization; oral 3 days	1.3	1.5	12/12 (100%)	11/12 (92%)	2/11	Mean 5.3 (NOM) 6 (OM)
Koike et al. (2014) [30]	4	114	125	2–15	1–15 (7.01)	C, I, L	IV cefoperazone; discharged on oral cefcapene pivoxil if CRP > 1.0 mg/dL	IV 3–5 days; oral 5 days	6.7	4.4	114/114 (100%)	111/125 (89%) 1 day	10/111	18
Steiner et al. (2015) [31]	3	–	45	–	4–15 (9.4)	C, I, L	IV ceftriaxone and metronidazole; discharged on oral amoxicillin/davulanic acid	IV 48 h; oral 5 days	–	3.8	–	42/45 (93%)	2/42	14
Gortler et al. (2015) [32]	3	–	25	–	10–16 (13)	C, I	IV amoxicillin/davulanic acid and IV gentamicin; oral amoxicillin/davulanic acid for 24 h in hospital and at discharge	IV 48 h; oral 5 days	–	N/S	–	24/25 (96%)	1/24	2
Kaneko et al. (2004) [33]	3	2	22	N/S	(10.6)	I	IV flomoxef	Abdominal tenderness resolved N/S	N/S	N/S	2/2 (100%)	22/22 (100%) 6 days	6/22	36
Park et al. (2011) [34]	3	– <sup>1</sup>	107	–	5–86 (31)	C, I	IV cephalosporins (N/S) and IV metronidazole	10 days total	–	N/S	–	97/107 (91%) 2 days	5/97	Median 18
Paudel et al. (2010) [35]	3	–	96	–	10–60 (25.96)	C, I, L	IV ceftriaxone and metronidazole; discharged on oral cefixime and metronidazole	IV 72 h; oral 5 days	–	N/S	–	91/96 (95%)	6/85	6
Caruso et al. (2016) [36]	3	–	197	–	(9.6)	C, I, L	IV cefotaxime; discharged on unspecified oral antibiotics	IV 8 h; oral 7 days	–	4.9	–	115/197 (58%)	12/115	N/S
Hartwich et al. (2016) [37]	3	50	24	(12.1)	(12.6)	C, I	IV piperacillin–tazobactam; discharged on oral ampicillin/davulanic acid	10 days total	N/S	N/S	50/50 (100%)	21/24 (88%)	2/21	14
Minned et al. (2016) [40]	3	65	37	Median 12	Median 11	C, I, L	IV piperacillin–tazobactam, or IV ciprofloxacin hydrochloride and metronidazole hydrochloride; discharged on oral amoxicillin/davulanic acid, or oral ciprofloxacin and metronidazole	No signs of inflammation	20 h	37 h	60/65 (92%)	35/37 (95%)	7/35	12
Tanaka et al. (2015) [41]	3	86	78	5.7–15.9 (10.4)	6.2–15.4 (10.1)	C, I, L	IV cefmetazole; IV sulbactam/ampicillin and ceftazidime if WCC not decreased by 25% in 2 days; IV meropenem or imipenem/cilastatin and gentamicin if still no response	IV 48 h +; oral 8 days	6.5	6.6	82/86 (95%)	77/78 (99%)	22/77	Mean 52
Svensson et al. (2015) [42]	2	26	24	5.9–15.0 (median 11.2)	5.9–15.0 (median 11.2)	C, I, L	IV meropenem and metronidazole; discharged on oral ciprofloxacin and metronidazole	IV 48 h +; oral 8 days	34.5 h	51.5 h	26/26 (100%)	22/24 (92%)	7/22	12

C, clinical; I, imaging; IV, intravenous; L, laboratory; mo, months; NOM, nonoperative management; N/S, not specified in the original article; OM, operative management; WCC, white cell count; –, not applicable in the original article.

<sup>a</sup> Class has been determined with the Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence [27].<sup>b</sup> Treatment success is within 2 weeks, unless specified.

numbers are low and, aside from the one pilot prospective randomized study [42], the quality of the literature to date is poor. Reviewed papers have diverse diagnostic criteria, biased selection criteria, and widely variable antibiotic choice, operative approach, LOS and follow-up. This diversity only allows presentation of outcome ranges and precludes meta-analysis of results. Thus, before its place in clinical practice can be determined, higher level evidence of the noninferiority of NOM is required.

# Feasibility of a Nonoperative Management Strategy for Uncomplicated Acute Appendicitis in Children

Peter C Minneci, MD, MHS<sub>c</sub>, FACS, Jason P Sulkowski, MD, Kristine M Nacion, MPH, Justin B Mahida, MD, Jennifer N Cooper, PhD, MS, R Lawrence Moss, MD, FACS, Katherine J Deans, MD, MHS<sub>c</sub>, FACS

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- BACKGROUND:** For decades, urgent operation has been considered the only appropriate management of acute appendicitis in children. The purpose of this study was to investigate the feasibility of nonoperative management of uncomplicated acute appendicitis in children.
- STUDY DESIGN:** A prospective nonrandomized clinical trial of children with uncomplicated acute appendicitis comparing nonoperative management with urgent appendectomy was performed. The primary result was 30-day success rate of nonoperative management. Secondary outcomes included comparisons of disability days, missed school days, hospital length of stay, and measures of quality of life and health care satisfaction.
- RESULTS:** Seventy-seven patients were enrolled during October 2012 to October 2013; 30 chose nonoperative management and 47 chose surgery. There were no significant differences in demographic or clinical characteristics. The immediate and 30-day success rates of nonoperative management were 93% (28 of 30) and 90% (27 of 30). There was no evidence of progression of appendicitis to rupture at the time of surgery in the 3 patients for whom nonoperative management failed. Compared with the surgery group, the nonoperative group had fewer disability days (3 vs 17 days;  $p < 0.0001$ ), returned to school more quickly (3 vs 5 days;  $p = 0.008$ ), and exhibited higher quality of life scores in both the child (93 vs 88;  $p = 0.01$ ) and the parent (96 vs 90;  $p = 0.03$ ), but incurred a longer length of stay (38 vs 20 hours;  $p < 0.0001$ ).
- CONCLUSIONS:** Nonoperative management of uncomplicated acute appendicitis in children is feasible, with a high 30-day success rate and short-term benefits that include quicker recovery and improved quality of life scores. Additional follow-up will allow for determination of longer-term success rate, safety, and cost effectiveness. (J Am Coll Surg 2014;219:272–279. © 2014 by the American College of Surgeons)
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# Κριτήρια ένταξης

- Κοιλιακός πόνος < 48ώρες.
- Όχι διαλείπον
- WBC < 18.000
- USG: < 1,1 cm
- Όχι κοπρόλιθος
- Όχι επιπλεγμένη

και..

***Οι γονείς μπορούν να επιλέξουν τη μέθοδο!***

# Συντηρητική Θεραπεία

- IV piperacillin/tazobactam ή ciprofloxacin/metronidazole (κατ'ελάχιστον 24ώρες)
- NPO κατ'ελάχιστον 12ώρες.
- Μία τουλάχιστον δόση pos αντιβιοτικού στο νοσοκομείο.
- Σύνολο αντιβιοτικής αγωγής 10 ημέρες.

# Αποτελέσματα

- Επιτυχία στις 30 ημέρες παρακολούθησης 98%.
- Συνεχίζεται η παρακολούθηση για αποτελέσματα έτους.
- ***13/47 της επεμβατικής μεθόδου είχαν τελικά επιπλεγμένη σκωληκοειδίτιδα!!!!***



**Table 2.** Comparison of Outcomes at 30-Day Follow-Up

Outcomes	Nonoperative management (n = 28)	Surgery (n = 38)	p Value
Length of stay, h, median (IQR)	38.0 (31.0–42.0)	20.0 (16.0–34.0)	<0.0001
Days to return to normal activities, median (IQR)	3.0 (2.5–6.5)	16.5 (9.0–21.0)	<0.0001
Days of school missed, median (IQR)	3.0 (2.0–5.0)	5.0 (3.0–6.0)	0.008
Days for guardian to return to normal schedule, median (IQR)	2.0 (1.0–3.0)	3.0 (1.0–5.0)	0.12
Fevers, n (%)	2 (7.1)	4 (10.5)	1.00
Abdominal pain, n (%)	6 (21.4)	12 (31.6)	0.36
Nausea, n (%)	1 (3.6)	3 (7.9)	0.63
Vomiting, n (%)	3 (10.7)	3 (7.9)	0.69
Patients with an ED visit at 30 d, n (%)	2 (7.14)	4 (10.5)	1.00

ED, emergency department; IQR, interquartile range.



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## Journal of Pediatric Surgery

journal homepage: [www.elsevier.com/locate/jped surg](http://www.elsevier.com/locate/jped surg)



# A role for conservative antibiotic treatment in early appendicitis in children☆☆☆



Zvi Steiner<sup>a,b,\*</sup>, Genady Buklan<sup>a,b</sup>, Rodica Stackievicz<sup>b,c</sup>, Michael Gutermacher<sup>a,b</sup>, Ilan Erez<sup>a,b</sup>

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<sup>b</sup> Tel Aviv University, Tel Aviv, Israel

<sup>c</sup> Department of Radiology, Meir Medical Center, Kfar Saba, Israel



# Κριτήρια

- Διάγνωση «αρχόμενης» ΟΣ βάσει:
  - Κλινικής εικόνας;;
  - USG: >6χιλ.,υπερηχογενές περισκωληκοειδικό λίπος.
- ***Όταν σε USG >9χιλ. Με έντονη ευαισθησία ΔΛΒ τα παιδιά αντιμετωπίζονταν χειρουργικά!***

**Table 2**  
Ultrasound findings.

Parameter	Value
Appendix diameter (mm)	6.6–9, mean 7.6
Hyperechoic fat (positive finding)	33/42 (78%)
Fluid (positive finding)	17/42 (41%)

**Table 1**  
Epidemiological and clinical characteristics of the study group ( $N = 45$ ).

Variable	Value
Age (years)	4–15, mean 9.3
Gender	M/F = 33/12
Symptom duration (hours)	8–72, mean 26.5
Time to management (hours)	12–74, mean 28.1
Temperature (°C)	36.6–39.4, mean 37.3
Vomiting	20/45 (44%)
Diarrhea	8/45 (18%)
WBC (K/ $\mu$ L)	4150–22,400, mean 8960
Left shift	19/45 (42%)
CRP	0.15–8.1, mean 3.35
Hospitalization length (days)	2–5, mean 3.8
Management length (days)	2–5, mean 3.3

# Αντιμετώπιση

- Κεφτριαξόνη/μετρονιδαζόλη για 5 ημέρες iv !!!!
- Augmentin pos για άλλες 5 ημέρες.

# Αποτελέσματα

- Σε παρακολούθηση έως 14μην: επιτυχία 88%
- Δλδ υποτροπή 12%.



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## Journal of Pediatric Surgery

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# Long-term outcomes of operative versus nonoperative treatment for uncomplicated appendicitis



Yujiro Tanaka <sup>a,\*</sup>, Hiroo Uchida <sup>b</sup>, Hiroshi Kawashima <sup>a</sup>, Michimasa Fujiogi <sup>a</sup>, Shinya Takazawa <sup>a,c</sup>, Kyoichi Deie <sup>a,c</sup>, Hizuru Amano <sup>a</sup>

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# Κριτήρια

- Κλινικοεργαστηριακή διάγνωση;;
- USG > 6χιλ.
- Επιλογή ασθενούς!!!

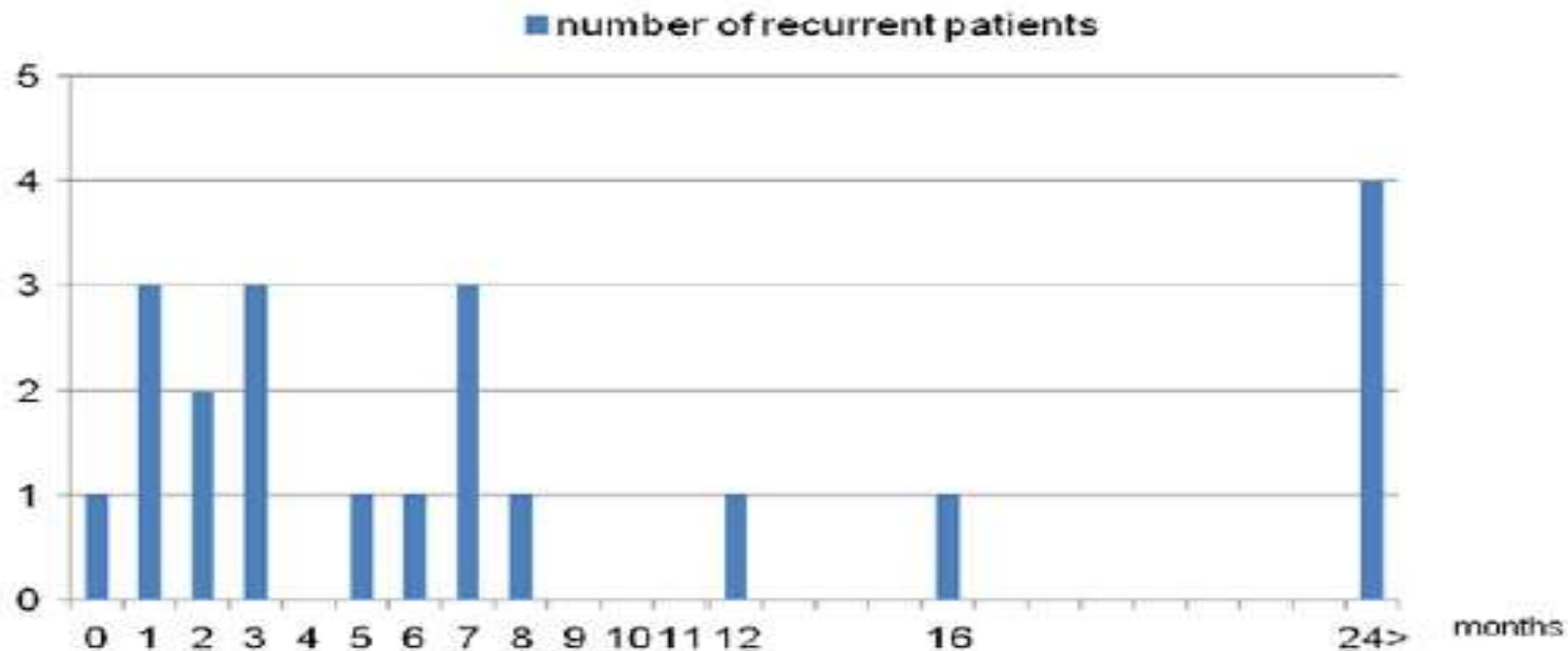
# Συντηρητική μέθοδος

- Cefmedazole iv (2 ημέρες), επι αποτυχίας,
- Ampicillin/sulbactam + ceftazidime iv (2ημέρες), επί αποτυχίας,
- Meropenem....
- IV μέχρι κλινικοεργαστηριακής θεραπείας...

# Αποτελέσματα

- Επιτυχία άμεσα 98.7%.
- Υποτροπή σε παρακολούθηση 4 ετών 28,6%.





**Fig. 1.** The timing of recurrence after successful nonoperative treatment is shown. One patient was treated at another hospital at the time of recurrence more than 1 year after the initial treatment, but could not be tracked for the precise date of recurrence.

**Table 2**  
Patient characteristics.

	Nonoperative treatment without recurrence ( <i>n</i> = 55)	Nonoperative treatment with recurrence ( <i>n</i> = 22)	<i>P</i> -value
Age (years)	10.0 ± 2.1 (range, 6.17–15.4)	10.3 ± 2.0 (range, 7.1–15.2)	0.57
Male/Female	38/17	15/7	1
Height (cm)	137 ± 13	137 ± 13	0.94
Weight (kg)	32.0 ± 10.1	31.4 ± 9.9	0.81
Duration of symptoms (h)	21.5 ± 15.0	22.4 ± 16.6	0.84
WBC (× 10 <sup>9</sup> /L)	14.2 ± 3.5	15.8 ± 3.9	0.12
Maximum CRP (mg/dL)	4.3 ± 4.1	5.1 ± 5.8	0.59
Maximum diameter of appendix (mm)	8.5 ± 2.1	9.5 ± 2.3	0.11
Presence of appendicolith	10/55 (18.2%)	8/22 (36.4%)	0.089
First line antibiotics only	47/55 (85.5%)	19/22 (86.4%)	1
Hospital stay for nonoperative treatment (d)	6.4 ± 2.5	6.4 ± 2.8	0.88

WBC, white blood cell; CRP, C-reactive protein.

Ann Surg. 2015 Jan;261(1):67-71. doi: 10.1097/SLA.0000000000000835.

# **Nonoperative treatment with antibiotics versus surgery for acute nonperforated appendicitis in children: a pilot randomized controlled trial.**

Svensson JF<sup>1</sup>, Patkova B, Almström M, Naji H, Hall NJ, Eaton S, Pierro A, Wester T.

# Η μελέτη

- Σύνολο 50 ασθενείς
  - 26 χειρουργήθηκαν.
  - 24 αντιβιοτική αγωγή.

# Αποτελέσματα

- Επιτυχία συντηρητικής:
  - 22/24 (άμεσα)
  - 13/24 μακροπρόθεσμα (38% υποτροπή) αλλά...
- ***Σε 6 από τα παιδιά που χειρουργήθηκαν για υποτροπιάζον ΚΑ, τα ευρήματα ήταν αρνητικά!!!!***

# Πίσω στην μετα-ανάλυση...

- Υποτροπή: 5.2- 38% (RCT).
- Κόστος συνολικά: υψηλότερο...μάλλον.
- LOS: ???
- **Για την ανθεκτικότητα στα αντιβιοτικά ποιός θα μιλήσει;;;**



## Letter to the Editor

## Are we doing right suggesting a non-operative management for suspected appendicitis in children? ☆

Dear Editor,

Recently many authors have been reporting their findings regarding the value of the conservative treatment in cases of non-complicated appendicitis [1–10].

The data from the different trials and the numerous meta-analyses seems to support the theory that a non-operative management might be the correct solution.

However, many doubts arise as to the terminology used, the methodology and the interpretation of the data.

Probably the titles should be changed adding the term “suspected” since the diagnosis is only anatomopathological until there is evidence to the contrary.

Science and progress are based on a simple triad: hypothesis, reasoning, and thesis. From a correct hypothesis, wrong reasoning can lead to an incorrect statement.

This emerges from the data on the non-surgical treatment of appendicitis. What data allow a clinician to diagnose appendicitis correctly? Probably the clinical picture together with the laboratory tests and the radiological results. Starting with the clinical picture, the validity of considering the surgical evaluation homogeneous can be certainly challenged. Literature data report that the patients are evaluated by more surgeons but do not state whether these patients are re-evaluated by the same surgeon at 48 h from the beginning of treatment. This is indeed a bias that causes several false positives and false negatives. Conversely, little can be said on the interpretation of laboratory data since they are objective data. However, regarding the radiological evaluation, several aspects are to be questioned and carefully analyzed. Some patients are studied using CT scan, a test that cannot be performed in all hospitals and does not have an ideal cost–benefit ratio for both the patient and the hospital. Also, a CT scan can be very invasive, especially for pediatric patients.

When abdominal US scan is used instead, the study inclusion criteria do not specify how many radiologists perform such procedure. Ultrasound scan is an operator-dependent procedure with some limitations related to the type of probe used as well as to the position of the appendix inside the abdomen. It is difficult to measure the diameter with certainty; in addition, it is much more difficult to visualize correctly the appendix at each ultrasound scan. Is the appendix always placed in the right iliac ditch? From my experience as a surgeon, many of the uncomplicated appendixes are in a retrocaecal or sub-hepatic position. Are they always and clearly visualized and measured?

How many abdominal US scans clearly show the appendixes? Could the radiologists involved in the studies always and clearly visualize and

describe the appendix even if it was not inflamed, independently from the study? [11–14].

Therefore, it is extremely difficult to be able to obtain comparable data when 2 elements out of 3 are operator-dependent (either surgeon or radiologist).

The failure rate of a non-surgical treatment varies, depending on the study, from 25% to 60% after one year; obviously, it is necessary to consider that any treatment involves expenses in terms of medicinal products and human resources.

Conversely, would it be acceptable for a patient to receive surgery if informed that there is a recurrence or failure rate of between 25% and 60% after a year? Are we sure that the patient would agree to receive such specific surgery?

How many patients receive non-surgical treatment but do not actually have a “true” appendicitis? Patient recruitment is based only on a suspected diagnosis.

Likewise, how many patients receive surgery before their histological examination shows that they did not have appendicitis at all?

Have failure rates between 25% and 45% ever been reported in literature? The only data questioned by to recorded surgical cases are complications, which are mostly wound infections or abdominal abscesses, probably caused by an incorrect post-operative short-term antibiotic therapy, as it is very often reported. Back to the hypothesis that the antibiotics are useful to treat cases of “suspected” appendicitis, this is undoubtedly true, however, studies must be done to clarify when we are dealing with cases of “true” appendicitis instead. The data must be as comparable as possible, with clinical and radiological evaluation always performed by the same clinical operators [10–16].

Therefore, should we rely on US diagnosis only? Consequently, how should we treat abdominal pain when we find high WC values, high PCR, a clinical picture positive for suspected appendicitis but US scans do not show the appendix but only presence of liquid in the right iliac septum?

Unless otherwise proven, the diagnosis is only histological.

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# Να δούμε τι θέλουν και οι γονείς;

Research

JAMA Surgery | **Original Investigation** | ASSOCIATION OF VA SURGEONS

## Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis

Alexis L. Hanson, BA; Ross D. Crosby, PhD; Marc D. Basson, MD, PhD, MBA



# Χαρακτηριστικά μελέτης

- Web based
- 1728 άτομα, (4/2016 – 6/2016)
- Διάγνωση σκωληκοειδίτιδας στις 02.00 σε ΕΙ.
- Παρουσίαση επιλογών.
  - Λαπ/κή σκωλ/μή.
  - Ανοιχτή σκωλ/μή.
  - Συντηρητική αντιμετώπιση.
- Επιλογή για ίδιο και για παιδί.

## From: Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis

JAMA Surg. 2018;153(5):471-478. doi:10.1001/jamasurg.2017.5310

### Antibiotic treatment alone

You will be admitted to the hospital, given intravenous antibiotics for 3 days and observed closely.<sup>10-12</sup> If all goes well, you will be discharged on a course of oral antibiotics for 2 weeks.<sup>13</sup> You will probably not be allowed to eat for a couple of days until it is clear that the antibiotics are working, but will receive fluids intravenously. There is about a 3 in 4 chance that if you choose this, you will avoid surgery.<sup>11,14</sup> The main risk of this approach is that you still might end up needing surgery:

- The antibiotics may not work and you might need an operation for this episode of appendicitis anyway. There is a 12.5% chance that this will happen before you leave the hospital and another 10.5% chance that you will need an operation within 2-4 weeks after discharge.<sup>3</sup> If you do need surgery for an antibiotic failure, the overall rate of complications is about 8% after the appendectomy, twice the complication rate of 4% if the appendectomy were done right at the start.<sup>3</sup>
- The appendicitis might also happen again later on because you would still have your appendix. There is a 6% chance that this would happen.<sup>3,11</sup> This includes the risk that your second episode of appendicitis might be a perforated appendicitis, which would require slightly more complicated treatment and pose slightly higher risks. There is about a 1 in 200 chance of that happening.<sup>3</sup>

# From: **Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis**

JAMA Surg. 2018;153(5):471-478. doi:10.1001/jamasurg.2017.5310

Treatment	# of Days in Hospital	Incision Size	Recurrence Risk	Complication Rate	Need for antibiotics	Need for Anesthesia
<b>Laparoscopic appendectomy</b>	1 day	2 holes: 1/5 in. 1 hole: 1/2 in.	None	4%	One dose before surgery	Yes (Risk of dying from anesthesia < 1:100,000)
<b>Open surgical appendectomy</b>	2 days	1 incision: 3-5 in.	None	4%	One dose before surgery	Yes (Risk of dying from anesthesia < 1:100,000)
<b>Antibiotic treatment alone</b>	3 days	None	Within 1 month: 23% chance	29% chance of appendectomy with 8% complication rate if you end up having an appendectomy  1 in 200 chance of perforated appendicitis	3 days at the hospital  14 days oral at home	None
			Long Term: 6% chance			

# From: Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis

JAMA Surg. 2018;153(5):471-478. doi:10.1001/jamasurg.2017.5310

**Table 3. Results of Web Survey Self-choice**

Variable	Respondents Who Made Choice for Self, No. (%)			P Value
	Laparoscopic Surgery	Open Surgery	Antibiotics Alone	
All respondents	1482 (85.8)	84 (4.9)	162 (9.4)	
Age, y				
20-29 (17.0%)	254 (86.4)	7 (2.4)	33 (11.2)	<.001
60-69 (13.9%)	211 (87.6)	18 (7.5)	12 (5.0)	
Education beyond college (48.4%)	696 (83.4)	34 (4.1)	105 (12.6)	<.001
Surgeon occupation (11.9%)	177 (86.3)	17 (8.3)	11 (5.4)	.008
Self-identify as other than non-Hispanic white race/ethnicity (9.3%)	121 (75.2)	16 (9.9)	24 (14.9)	<.001
Have not had/do not know someone who has had appendicitis (43.3%)	639 (85.5)	27 (3.6)	81 (10.8)	.03
Have friends/family who have had surgery (97.3%)	1440 (85.9)	78 (4.7)	159 (9.5)	.03
Do not have friends/family who have ever been hospitalized (4.4%)	57 (75.0)	7 (9.2)	12 (15.8)	.02

Table Title:  
Results of Web Survey Self-choice

# From: Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis

JAMA Surg. 2018;153(5):471-478. doi:10.1001/jamasurg.2017.5310

**Table 4. Results of Web Survey Child Choice**

Variable	Respondents Who Made Choice for Child, No. (%)			P Value
	Laparoscopic Surgery	Open Surgery	Antibiotics Alone	
All respondents	1372 (79.4)	106 (6.1)	250 (14.5)	
Age, y				
40-49 (20.3%)	280 (79.8)	15 (4.3)	56 (16.0)	<.001
60-69 (13.9%)	194 (80.5)	17 (7.1)	30 (12.4)	
Education beyond college (48.4%)	656 (78.6)	42 (5.0)	137 (16.4)	.005
Surgeon occupation (11.9%)	173 (84.4)	18 (8.8)	14 (6.8)	.002
Have not had/do not know someone who has had appendicitis (43.3%)	581 (77.8)	36 (4.8)	130 (17.4)	.003

Table Title:  
Results of Web Survey Child Choice

From: **Patient Preferences for Surgery or Antibiotics for the Treatment of Acute Appendicitis**

JAMA Surg. 2018;153(5):471-478. doi:10.1001/jamasurg.2017.5310

**Table 2. Rank of Importance of Factors in Treatment Self-choice and Child Choice<sup>a</sup>**

Factor	Mean (SD)					
	Self-choice			Child Choice		
	Laparoscopic Surgery (n = 1482)	Open Surgery (n = 84)	Antibiotics Alone (n = 162)	Laparoscopic Surgery (n = 1372)	Open Surgery (n = 106)	Antibiotics Alone (n = 250)
Quick treatment	4.69 (0.73)	4.61 (0.91)	3.67 (1.16)	4.76 (0.66)	4.76 (0.72)	3.99 (1.15)
Pain	3.69 (1.15)	3.52 (1.23)	3.35 (1.21)	4.31 (0.96)	4.11 (1.17)	4.16 (1.10)
Avoiding surgery	2.38 (1.18)	1.88 (1.09)	4.36 (1.03)	2.62 (1.23)	2.23 (1.34)	4.33 (1.10)
Avoiding recurrence	4.62 (0.79)	4.56 (1.06)	3.52 (1.12)	4.67 (0.76)	4.52 (1.11)	3.78 (1.17)
Avoiding complications	4.50 (0.79)	4.50 (0.99)	4.25 (0.91)	4.63 (0.72)	4.54 (0.94)	4.45 (0.90)

<sup>a</sup> Results given as scores on a Likert-type scale of 1 to 5. All results were significant at  $P < .002$ .

# Τι συμπεραίνεται;

- Η διάγνωση παραμένει πρόκληση με παραμέτρους που «δεν μπαίνουν στο ζύγι».
- Κατάχρηση αντιβιοτικών.
  - Μακρά θεραπεία σε νόσο που θεραπεύεται και αλλιώς.
  - Μήπως καταλήξουμε να θεραπεύουμε με ευκολία παιδιά που δεν χρειάζεται;
- Στρες υποτροπής για το προσωπικό.
- Κέρδος συζητήσιμο (κόστος, LOS).
- Απαιτούνται αξιόπιστες RCTs (δύσκολο)!!
- Μην παίρνουμε για δεδομένο τι πραγματικά θα ήθελαν οι γονείς.



# Από την άλλη...

Journal of Pediatric Surgery 52 (2017) 1760–1763



Contents lists available at ScienceDirect

## Journal of Pediatric Surgery

journal homepage: [www.elsevier.com/locate/jped surg](http://www.elsevier.com/locate/jped surg)



### Resource savings and outcomes associated with outpatient laparoscopic appendectomy for nonperforated appendicitis<sup>☆,☆☆</sup>



Lori A. Gurien<sup>a,b,\*</sup>, Jeffrey M. Burford<sup>a</sup>, Patrick C. Bonasso<sup>a,b</sup>, Melvin S. Dassinger<sup>a</sup>

<sup>a</sup> Department of Pediatric Surgery, Arkansas Children's Hospital, 1 Children's Way, Slot 837, Little Rock, AR 72202, USA

<sup>b</sup> Department of Pediatric Surgery, Arkansas Children's Hospital Research Institute, 13 Children's Way, Little Rock, AR 72202, USA



# Fast track

Όλες οι λαπαροσκοπικές σκωληκοειδεκτομές, μη επιπλεγμένες, το 2015.

Group A: ODC.

Group B: εισαγωγή με εξιτηρίο  $<24$  ώρες.

Group C: εισαγωγή με εξιτήριο  $>24$  ώρες.

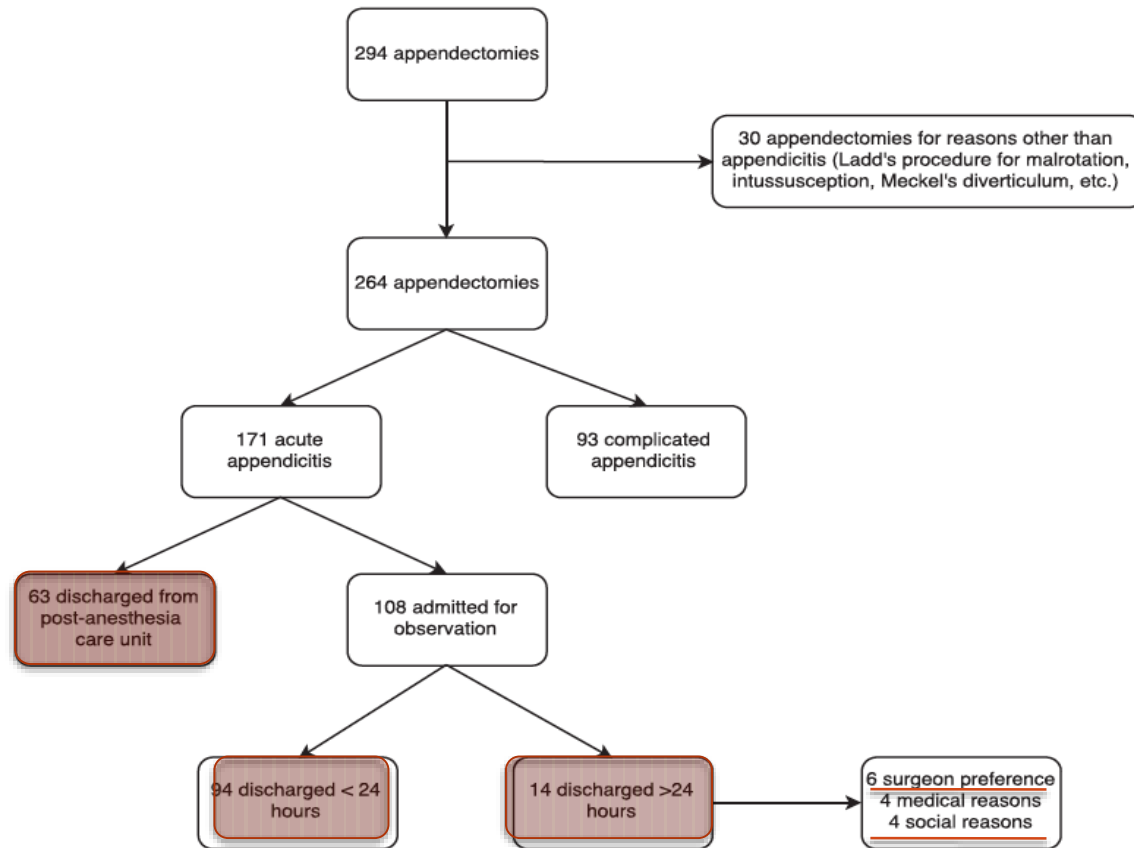


Fig. 1. Flow diagram of pediatric patients who underwent appendectomy during the study period.

# Αποτελέσματα

**Table 2**

Outcomes and charges for different appendectomy discharge groups.

	PACU- discharge  <i>N</i> = 63	Admission <24 h  <i>N</i> = 94	Admission >24 h  <i>N</i> = 14	<i>p</i> -value
Postoperative ED or clinic visits	5	8	0	<i>p</i> = 0.98
Readmissions	0	1	0	
Complications	1	0	0	
Mean difference in patient charges	Reference	\$1007	\$2237	

PACU, postanesthesia care unit; ED, emergency department.

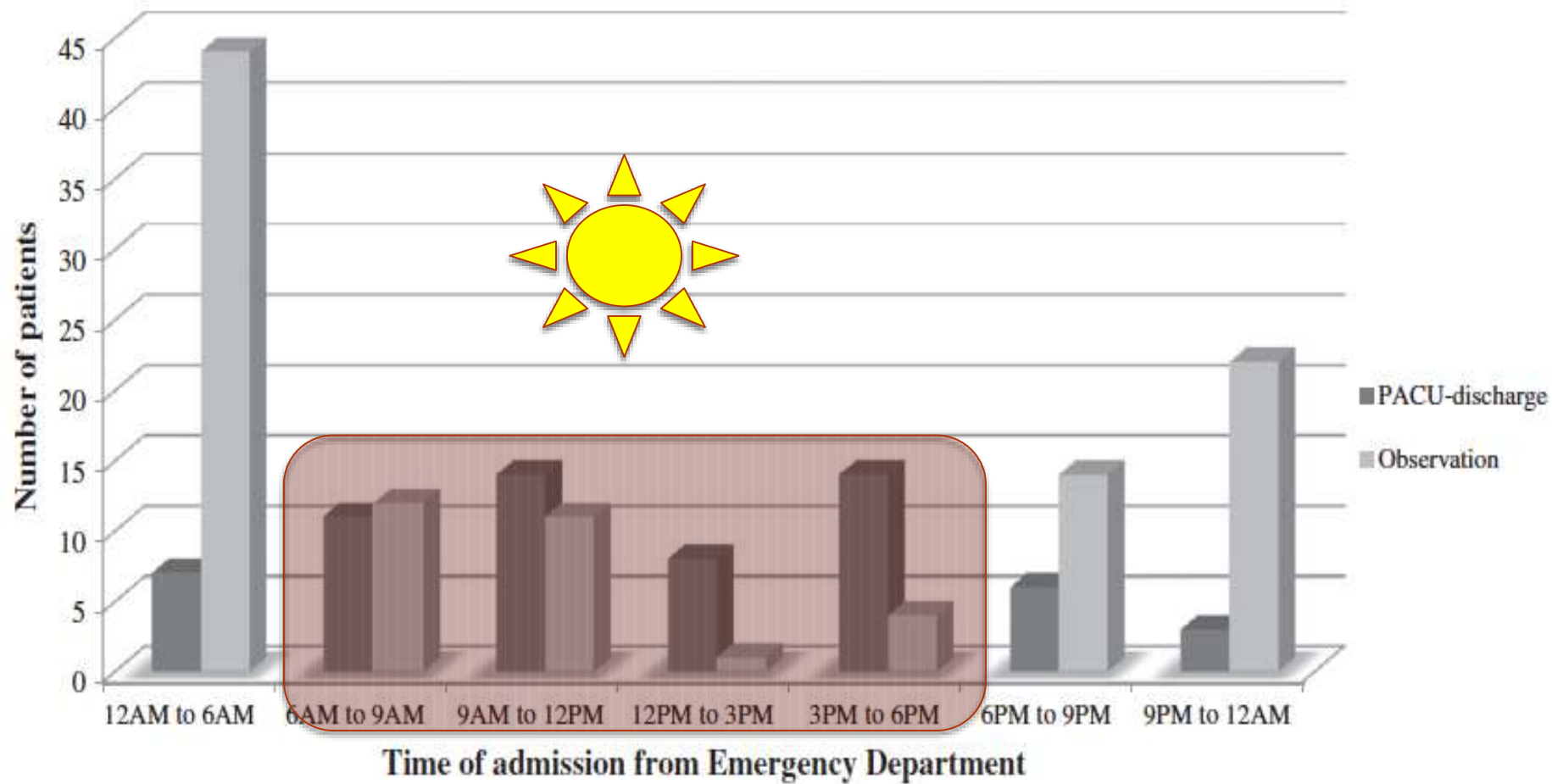
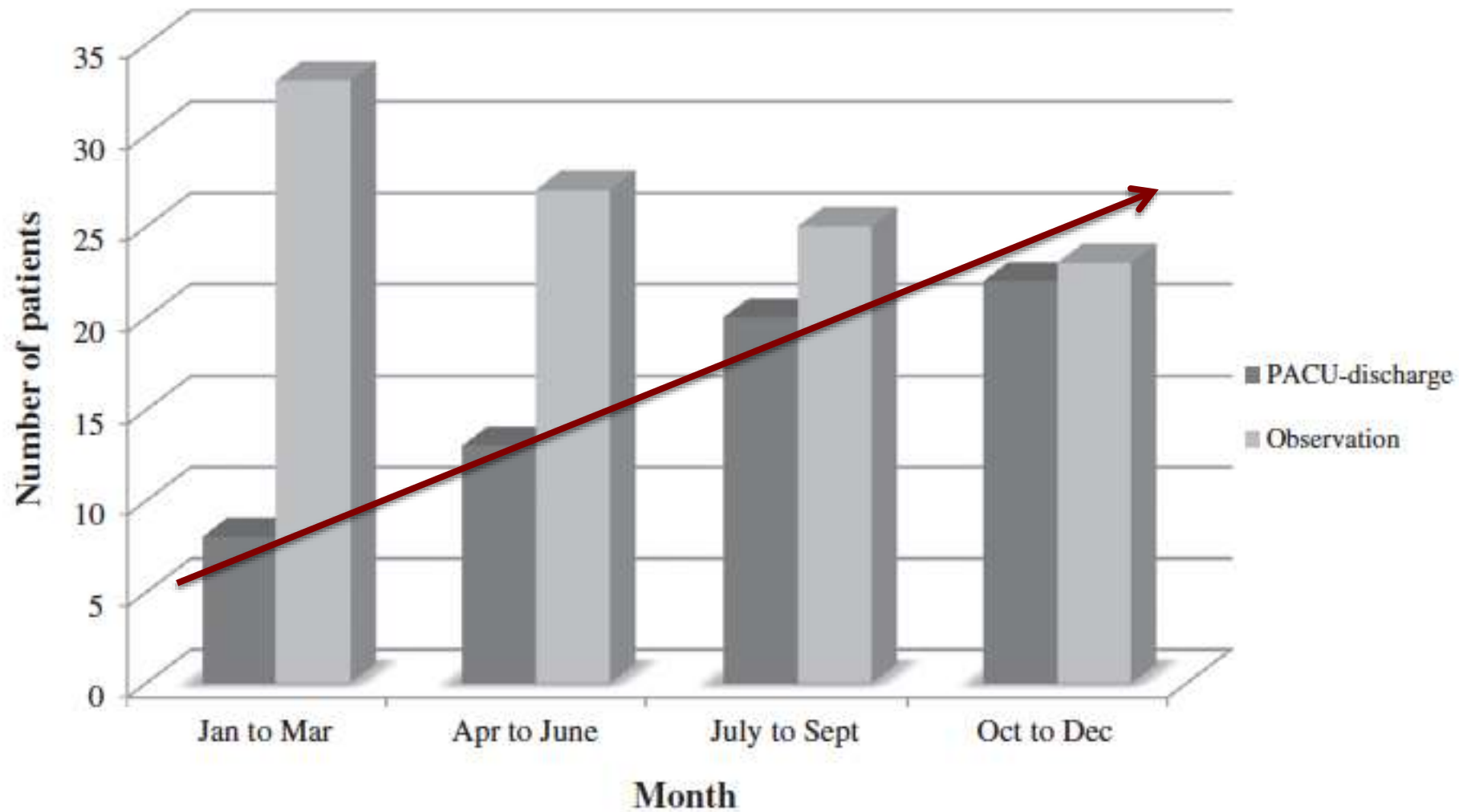


Fig. 2. Association between time of day and outpatient appendectomies.



# Fast track

Αρχή 2015 20%, τέλος 2015 49%  
2016: 42%

LOS (ώρες, λεπτά)/Cost

Gr. ODC: 3,6

Gr. εισαγωγή με εξιτηρίο <24 ώρες: 11,47 /+1000\$

Gr. εισαγωγή με εξιτήριο >24 ώρες: 33,19 / +2200\$

Extra bonus:

***“Due to rapidity of process patients experienced more standardized, uniform care!”***

# Με τις επιλεγμένες τι γίνεται;

- Στο σκωληκοειδικό απόστημα πιο συντηρητική αντιμετώπιση = λιγότερες επιπλοκές.

Surgery. 2010 Jun;147(6):818-29. doi: 10.1016/j.surg.2009.11.013. Epub 2010 Feb 10.

FULL-TEXT ARTICLE

DAKE

**A meta-analysis comparing conservative treatment versus acute appendectomy for complicated appendicitis (abscess or phlegmon).**

Simillis C<sup>1</sup>, Symeonides P, Shorthouse AJ, Tekkis PP.



# Με ρήξη χωρίς απόστημα όμως;;;

- Πιο συγκεχυμένη εικόνα.

ORIGINAL ARTICLE

ONLINE FIRST

## Early vs Interval Appendectomy for Children With Perforated Appendicitis

Martin L. Blakely, MD, MS; Regan Williams, MD; Melvin S. Dassinger, MD; James W. Eubanks III, MD; Peter Fischer, MD, MS; Eunice Y. Huang, MD, MS; Elizabeth Paton, PNP; Barbara Culbreath, BSN, CCRC; Allison Hester, PNP; Christian Streck, MD; S. Douglas Hixson, MD; Max R. Langham Jr, MD

*Arch Surg.* 2011;146(6):660-665. Published online  
February 21, 2011. doi:10.1001/archsurg.2011.6

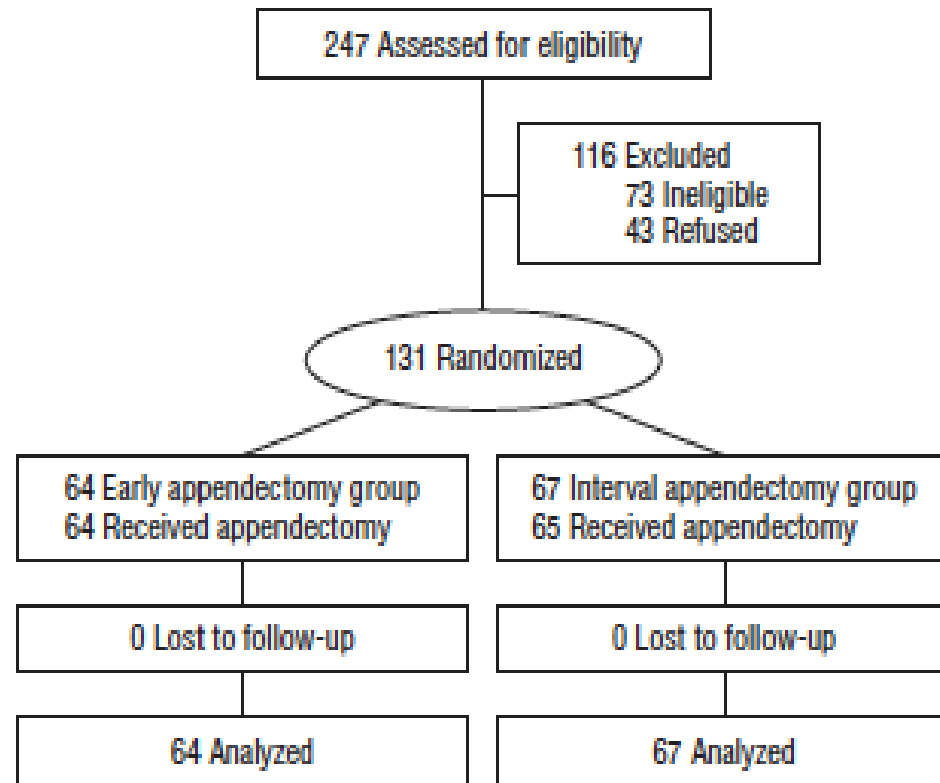
# Κριτήρια

## Εντός:

- Ρήξη σκωληκοειδούς βάσει κλινικοεργαστηριακής εικόνας και απεικόνισης.
- Τελική απόφαση από ειδικευμένο Παιδοχειρουργό (established accuracy 92%)

## Εκτός:

- Σκωληκοειδικό απόστημα.
- Μακρινός τόπος διαμονής.



**Figure.** Flow diagram of trial: exclusion, enrollment, randomization, and follow-up.

# Αρχική αντιμετώπιση

- Ανάνηψη / ανάταξη ισορροπίας ύδατος ηλεκτρολυτών.
- Ceftazidime + Clindamycin Q 8hrs.
- Τυχαιοποίηση

# Οριστική Αντιμετώπιση

- Α) άμεσα σκωληκοειδεκτομή.
- Β) iv αντιβιοτικά και επιστροφή 6-8 εβδομάδες μετά το εξιτήριο για σκωληκοειδεκτομή.

Κριτήρια διακοπής iv αντιβιοτικών:  $\Theta < 38^{\circ} \text{C}$  για 48 ώρες, εξομάλυνση WBC.

Κριτήρια εξιτηρίου: Επαρκής σίτιση, έλεγχος πόνου και κινητοποίηση χωρίς βοήθεια.

Συνέχιση αγωγής με pos αντιβιοτικό, ελεύθερη επιλογή του κάθε θεράποντος.

# Αποτελέσματα

34% υποβλήθηκαν εκτάκτως νωρίτερα σε σκληροειδεκτομή.

Time away from activities: Gra.A: 13.8 d vs 19.4 d  
( $p < .001$ )

LOS: Gr. A: 9d vs 11.2d ( $p = 0.03$ )

Adverse events: Gr. A: 30% vs 55% ( $p = 0.003$ )

Operative time: 113' vs 112'

**Table 3. Adverse Events After Early or Interval Appendectomy**

Event	No. (%)		RR Associated With Interval Appendectomy (95% CI)	P Value
	Early (n=64)	Interval (n=67)		
Any adverse event	19 (30)	37 (55)	1.86 (1.21-2.87)	.003
Intra-abdominal abscess	12 (19)	25 (37)	1.99 (1.10-3.62)	.02
Small bowel obstruction	0	7 (10.4)		.01
Wound infection	6 (9.4)	6 (9.0)	0.94 (0.32-2.76)	.91
Unplanned readmission	5 (8)	21 (31)	3.94 (1.59-9.84)	.01
CVL-related adverse event	1 (1.6)	4 (6.0)	0.88 (0.21-3.72)	1
IR procedure-related adverse event	0	1 (1.5)		1
Recurrent appendicitis	0	6 (9)		.01

Abbreviations: CI, confidence interval; CVL, central venous line; IR, interventional radiology; RR, relative risk.

*Πόσο πρέπει να μένουν τα παιδιά  
με ρήξη σκωληκοειδούς στο  
νοσοκομείο για IV αγωγή;;*





ELSEVIER

# **A complete course of intravenous antibiotics vs a combination of intravenous and oral antibiotics for perforated appendicitis in children: a prospective, randomized trial**

**Jason D. Fraser, Pablo Aguayo, Charles M. Leys, Scott J. Keckler, Jason G. Newland, Susan W. Sharp, John P. Murphy, Charles L. Snyder, Ronald J. Sharp, Walter S. Andrews, George W. Holcomb III, Daniel J. Ostlie, Shawn D. St. Peter\***

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## Journal of Pediatric Surgery

journal homepage: [www.elsevier.com/locate/jped surg](http://www.elsevier.com/locate/jped surg)



# Early transition to oral antibiotics for treatment of perforated appendicitis in pediatric patients: Confirmation of the safety and efficacy of a growing national trend



Tara J. Loux, Gavin A. Falk, Cathy A. Burnweit \*, Carmen Ramos, Colin Knight, Leopoldo Malvezzi

Department of Pediatric Surgery, *Miami Children's Hospital*, Miami, FL

# Υπόθεση;

- Εφόσον τα παιδιά ανέχονται ροσ δίαιτα έως και την 4<sup>η</sup> μτχ ημέρα και
- Απύρετα για 12 ώρες,
- Συνέχιση αγωγής ροσ στο σπίτι.

# Αποτέλεσμα

- 42% τουλάχιστον των παιδιών κατάφεραν να πληρούν τις προϋποθέσεις.
- LOS μειώθηκε προφανώς.
- Μειώθηκαν οι έξτρα απεικονίσεις.
- Επανεισαγωγές ίδιες (αν και έδειξαν τάσεις μείωσης όσο το προσωπικό εξοικειωνόταν με το νέο πρωτόκολλο).
- Εκτιμώμενη εξοικονόμηση σε περίπτωση πανεθνικής εφαρμογής: 150 εκ. \$.

# Και τι αποκομίσαμε απο όλα αυτά;;

- Δεν υπάρχουν επαρκή στοιχεία να υποστηρίξουν αλλαγή αντιμετώπισης της οξείας σκωληκοειδίτιδας.
- Τάση είναι για fast track ODC σκωληκοειδεκτομές.
- Το σκωληκοειδικό απόστημα θα πρέπει να αντιμετωπίζεται συντηρητικά.
- Οι επιπλεγμένες σκωληκοειδίτιδες θα πρέπει να αντιμετωπίζονται χειρουργικά.
- Σε επιλεγμένες περιπτώσεις η συνέχιση αντιβιοτικής αγωγής σε παιδιά με επιπλεγμένη σκωληκοειδίτιδα μπορεί να γίνεται ρος στο σπίτι.

Ευχαριστώ!

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??????