

**What is the Role for
Intra-operative Cultures in
Patients with Intra-abdominal
Infection?**

E. Patchen Dellinger

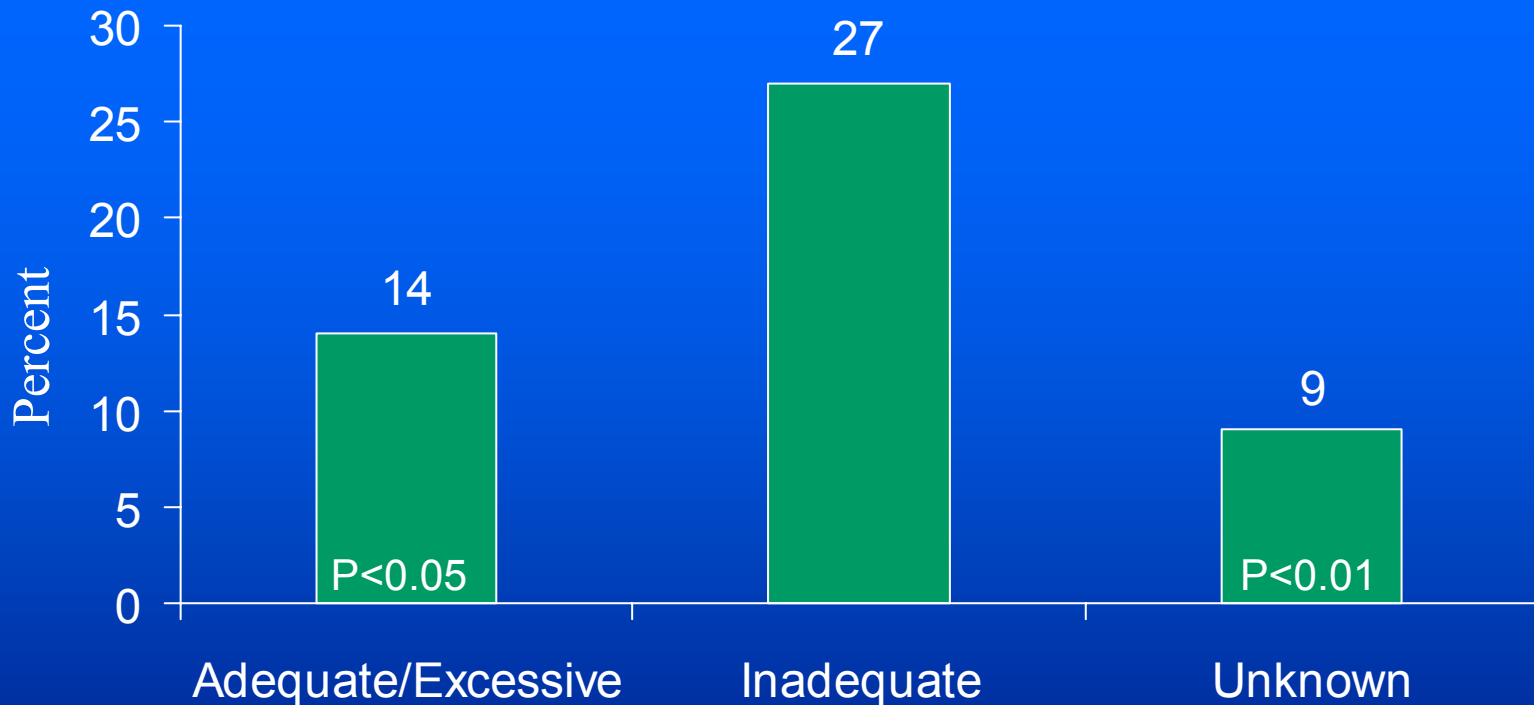
Cultures for Intra-Abdominal Infection

- Does it matter if the antibiotic is active against all of the pathogens in intra-abdominal infection?
- Do intra-operative cultures from intra-abdominal infection give accurate results?
- Does knowledge of culture results enable the clinician to change therapy to the benefit of the patient?
- When clinicians know culture results do they make changes in their treatment of patients with intra-abdominal infection?

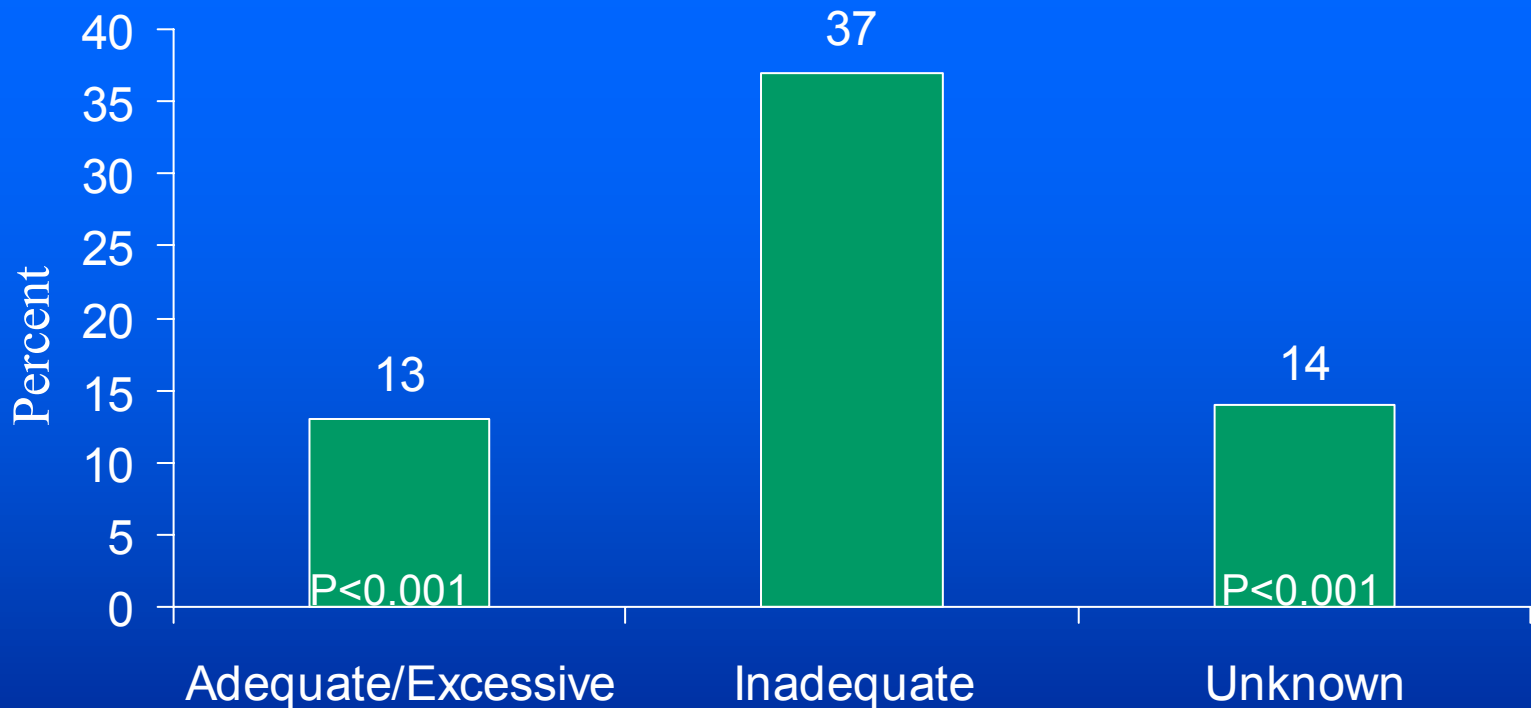
Antibiotics for Intra-Abdominal Infection

**Does it matter if the antibiotic
is active against all of the
pathogens in intra-abdominal
infection?**

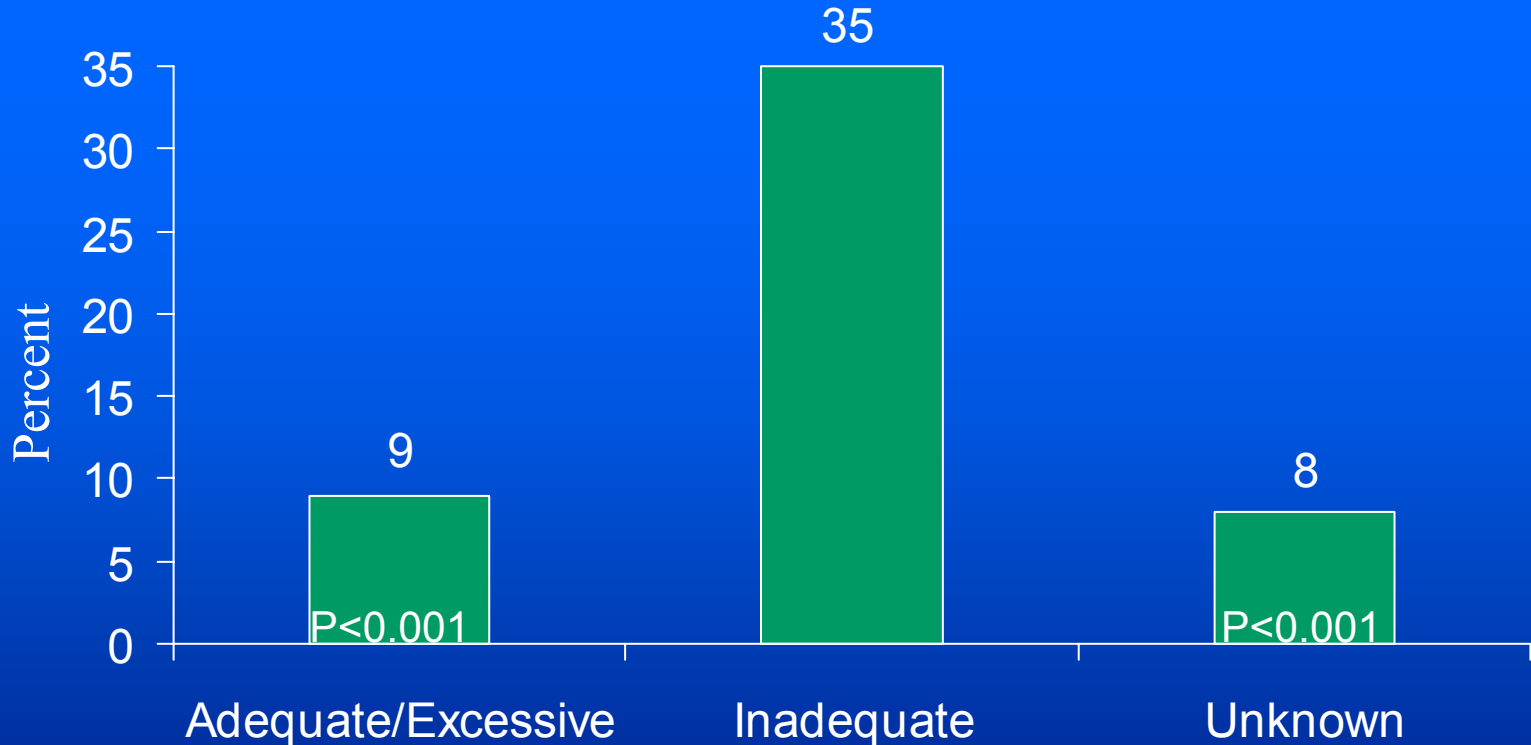
Surgical Peritonitis: Antibiotic Treatment vs Wound Infection



Surgical Peritonitis: Antibiotic Treatment vs Reoperation



Surgical Peritonitis: Antibiotic Treatment vs Intra-abdominal Abscess



Susceptibility of peritoneal isolates at operation: a predictor of postoperative infection

**Review of susceptibility data and clinical
outcome from 5 antimicrobial trials for
intraabdominal infections**

Case-control design

Hopkins. Am Surg 1993;59:791

Relationship of Failure to Presence of Resistant Organisms

<u>Resistant organisms present</u>	<u>Number</u>	<u>Failure (%)</u>
No	82	8 (10%)
Yes	93	36 (39%)

- Relative risk if resistant organisms present at initial laparotomy = 1.9 (1.5-2.4)
- Independent predictor

Antimicrobial resistance & failure in post-operative peritonitis

Mortality

Adequate therapy (n=46)	12 (26%)
Inadequate therapy (n=54)	27 (50%)

- Relative risk of failure if resistant organisms present at initial laparotomy = 1.9 (1.2-3.3)
- Independent predictor of failure

Affect of Inappropriate Antibiotics

Community-Acquired IAI (n=425)

Upper 38%, colon 27%, gastroduod 22%

Appropriate antibiotic 371 (87%)

Inappropriate antibiotic 54 (13%)

Additional risk with inappropriate: RR

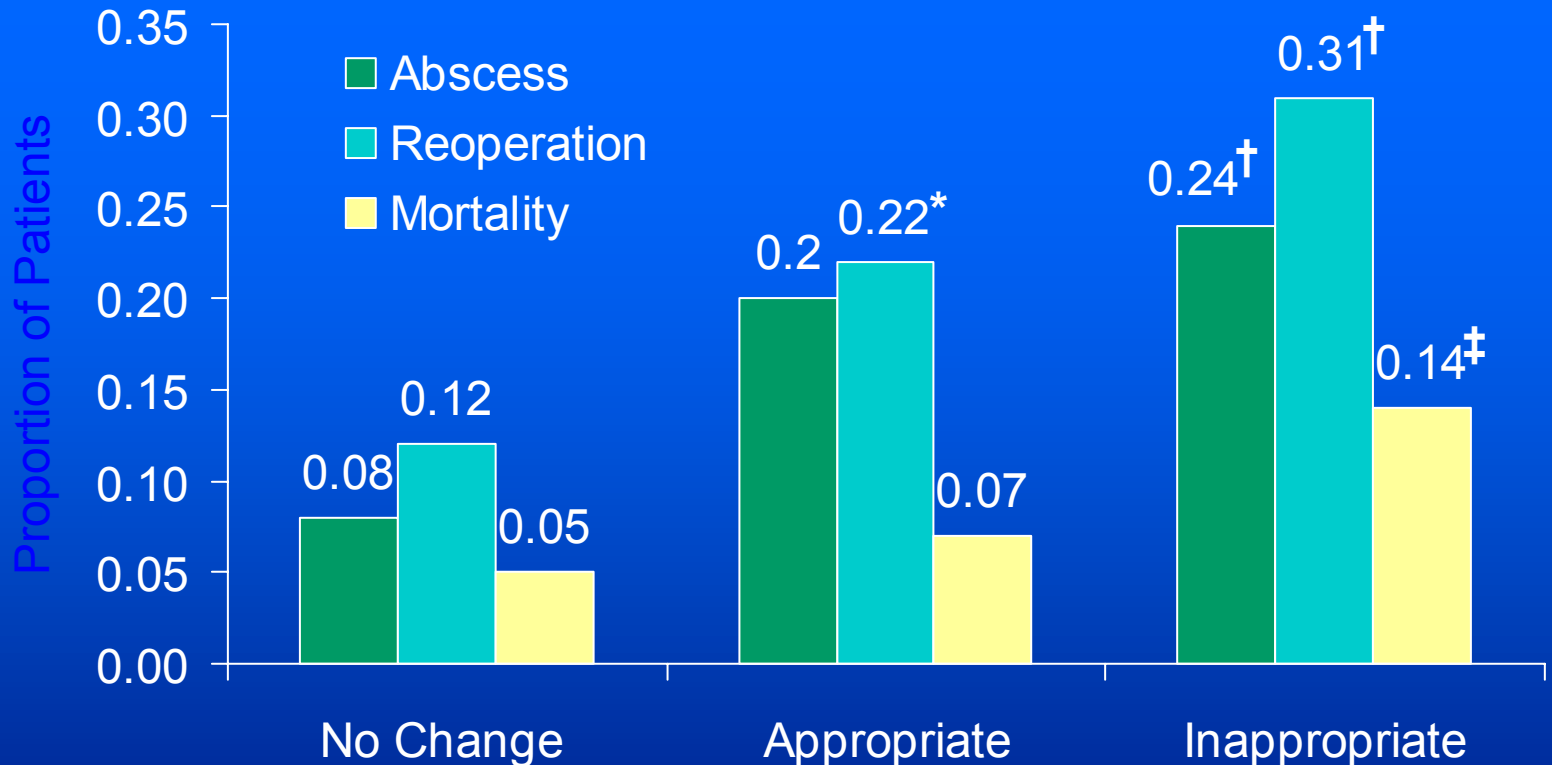
Additional antibiotic required 3.8

Reoperation required 5.1

Cultures for Intra-Abdominal Infection

**Does knowledge of culture
results enable the clinician to
change therapy to the benefit
of the patient?**

Surgical Peritonitis: Effect of Antibiotic Change



*P<0.01 vs no change.

†P<0.02 vs no change.

‡P<0.001 vs no change

Cultures for Intra-Abdominal Infection

When clinicians know culture results do they make changes in their treatment of patients with intra-abdominal infection?

Surgical Peritonitis: Antibiotic Change

No Change	372 (78%)
Change	108 (22%)
Change to appropriate	41 (38%)
Change to inappropriate	67 (62%)

Cultures for Lower Intestinal Perforation

Perforated appendix	100
Perforated colon	15
Bacterial species/culture	4.7
Aerobic	40%
Anaerobic	60%
Influenced antibiotic mgmt	7%
Unexpected resistance to cefoxitin	27%

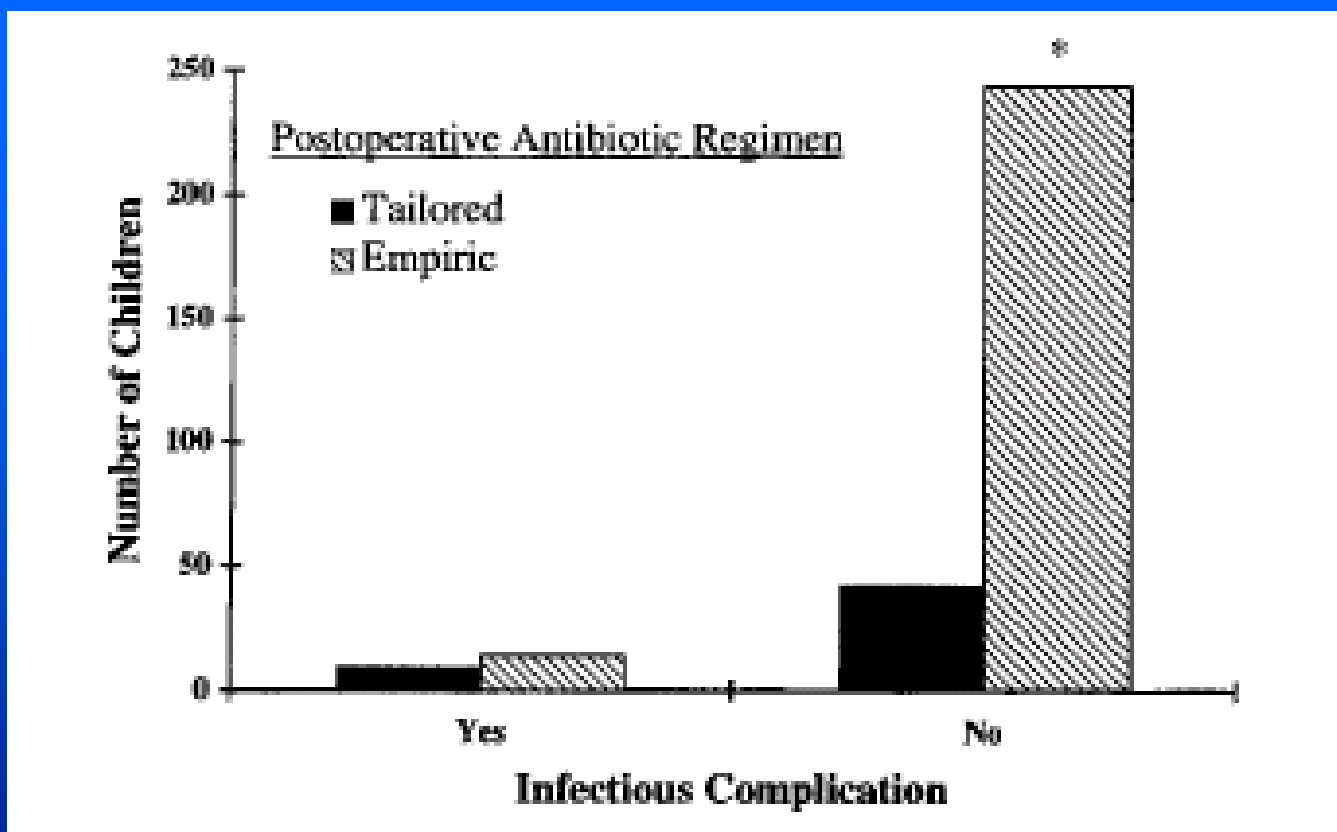
Perforated Appendicitis in Children

Use of Operative Cultures

Patients	296
Positive cultures	287
Antibiotics changed postoperatively	16%

Perforated Appendicitis in Children

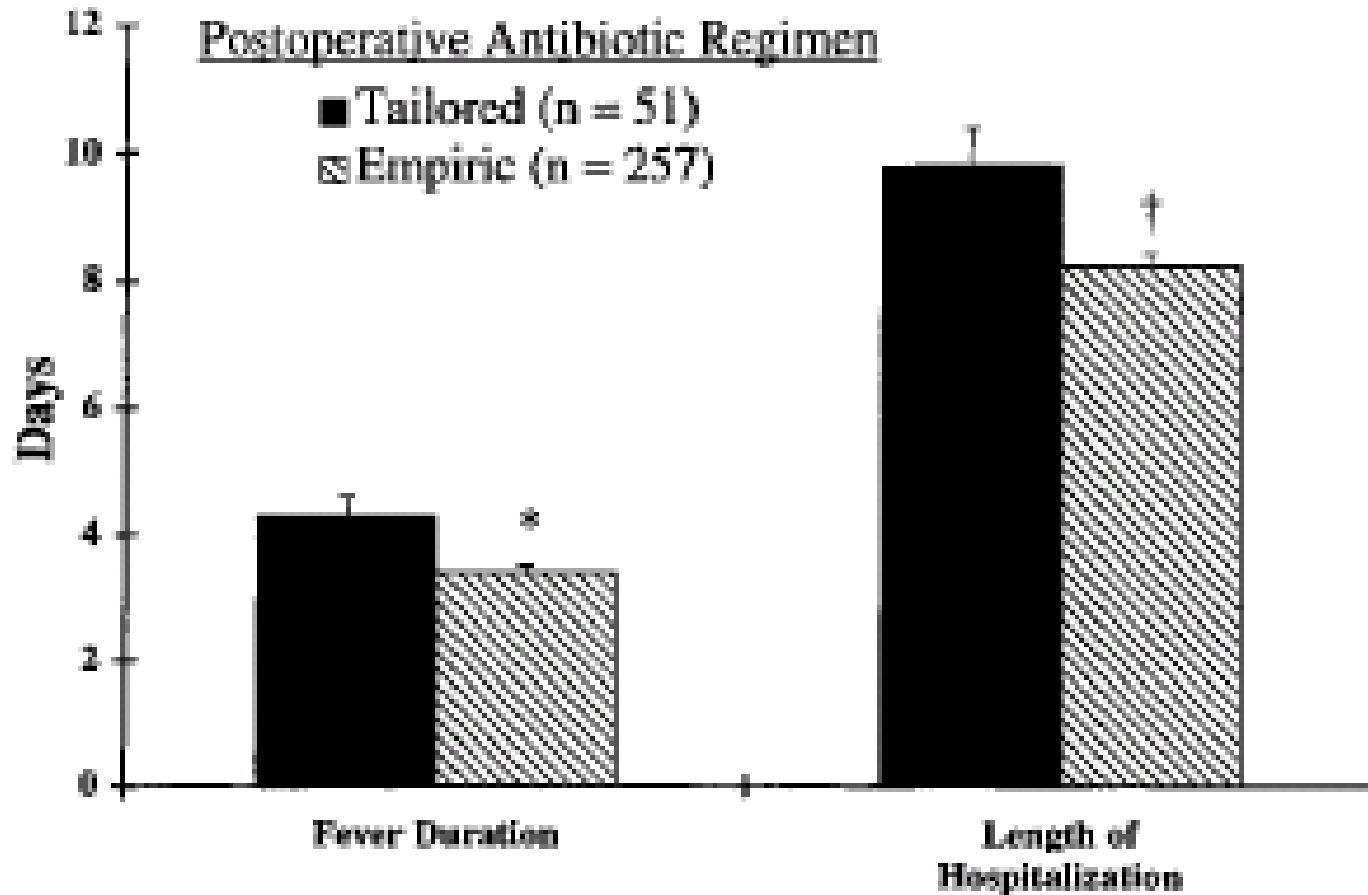
Use of Operative Cultures



Kokoska, J Pediat Surg 1999;34:749

Perforated Appendicitis in Children

Use of Operative Cultures



Appendicitis in Children

Use of Operative Cultures

Nonperforated appendicitis	320
Wound infection	9 (3%)
IAI abscess	10 (3%)
Perforated appendicitis	179
Wound infection	20 (11%)
IAI abscess	11 (6%)
No significant difference with or without culture	

Appendicitis in Children

Use of Operative Cultures

Very few antibiotic changes made secondary to culture info

Wound infections lower with “triple antibiotic” preop compared with single agent (cefoxitin)

Triple	7%
Single	17%

$P < 0.05$

Use of Culture Data in Children with Appendicitis (n=269)

Acute appendicitis	201 (75%)
Perforated	49 (18%)
Negative/normal	19 (7%)

Of positive cultures:

7 sensitive, 14 resistant

Only 4 of 14 had antibiotics changed

Affect of Cultures for Appendicitis

21 patients with appendicitis and culture info

	<u>Number (%)</u>	<u>Cultured</u>	<u>Pos Culture</u>
Non-inflamed	220 (31%)	46%	9%
Suppurative	432 (60%)	70%	25%
Gangrenous	23 (3%)	91%	33%
Perforated/abscess	46 (6%)	83%	42%

Affect of Cultures for Appendicitis

721 patients with appendicitis and culture info

39 patients with wound infections (20) or intra-abdominal abscess (19)

No evidence that culture information was used to guide therapy

Cultures for Intra-Abdominal Infection

**Do intra-operative cultures
from intra-abdominal infection
give accurate results?**

Perforated Appendicitis in Children

Use of Operative Cultures

- 19 patients developed postoperative abscesses**
- 2 of these 19 abscesses had at least one organism in common with an organism found in the original operative culture**

Isolates from Perforated Appendicitis

	<u>Isolates/Pt</u>
Bennion, Ann Surg 1989	>10
Kokoska, J Ped Surg 1991	2.7
Frauln, Canad J Surg 1993	4.7
McNamara, SG&O 1993	3.2
Mosdell, Am J Surg 1994	2.5
Celik, Ped Surg Interntl 2003	1.1
Gladman, Ann Roy Coll Surg 2004	1.8
Krobot, Eur J Clin Microbiol Inf Dis 2004	1.7
Percent Anaerobes	7 – 76%

To Culture or Not To Culture?

Empiric coverage is necessary for initial antibiotic choice

Antimicrobial susceptibility does matter

Accuracy of cultures is variable

Clinicians often ignore culture results that are available

To Culture or Not To Culture?

Changed antibiotic regimens do not seem to be as effective as initial regimens

Changing to appropriate antibiotics is better than changing to inappropriate antibiotics

In treatment of infectious complications the surgical management is often more important than the specific antibiotic choice

To Culture or Not To Culture?

- **I culture selectively**
 - Diffuse peritonitis
 - High risk patient
- **I do not culture**
 - Simple appendicitis
 - Gross fecal contamination