Laparoscopy
for diagnosing equivocal appendicitis

Oscar Duffy

Surgical Intern

Cork University Hospital

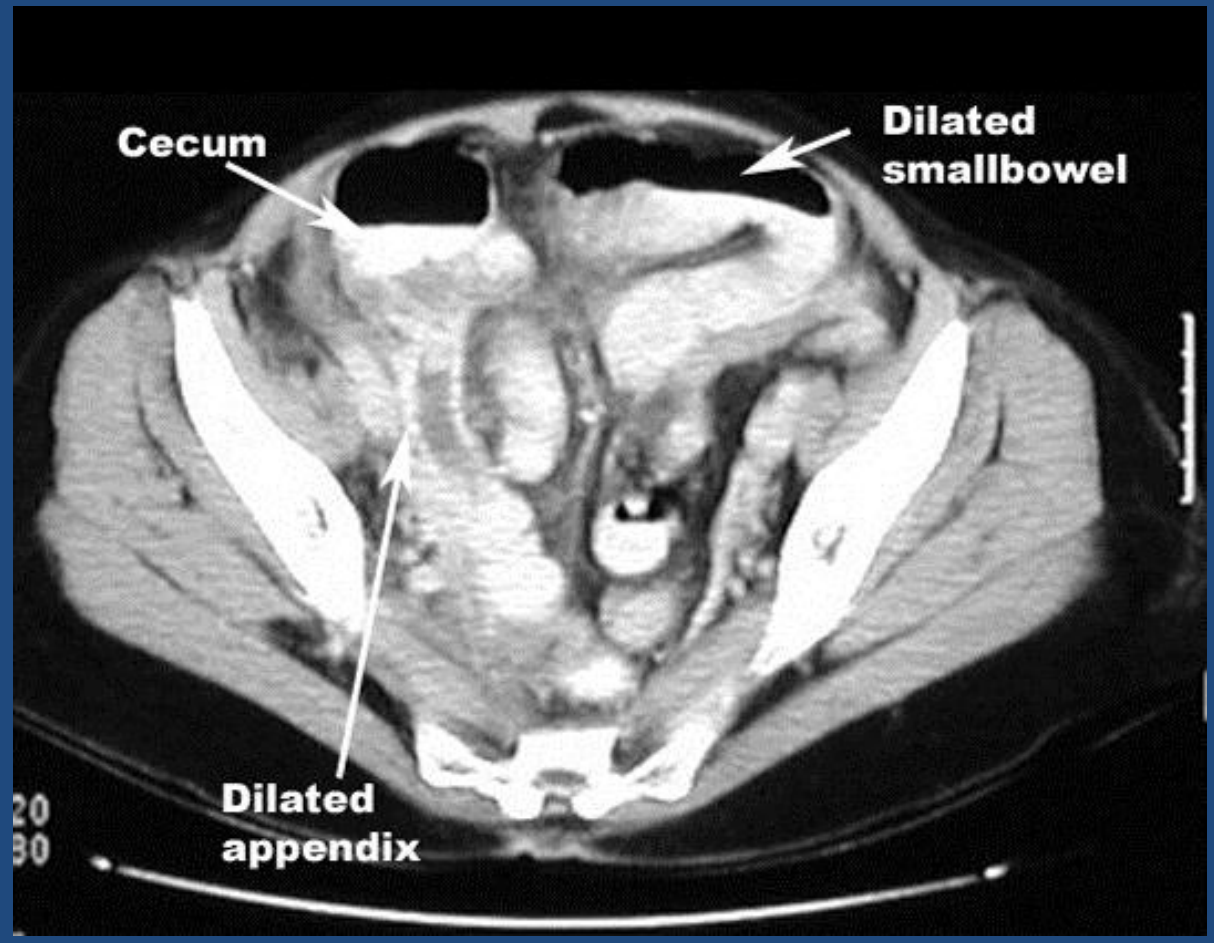
- Treatment is straightforward…diagnosis is not
- Negative appendicectomy rate 15-33% but can be as high as 47% *Anderson et al*
- The modified Alvarado scale
- Imaging originally thought to improve diagnostic accuracy
- Recently appropriateness of these modalities without surgical intervention has been questioned.

Table-I: The Alvarado scoring system

	Mnemonic (MANTRELS)	*Value*
Symptoms	Migration	1
	Anorexia	1
	Nausea-Vomiting	1
Signs	Tenderness in RLQ	1
	Rebound Pain	2
	Elevation of temperature>37.3°C	1
Laboratory	Leukocytosis	1
	Shift to the left	1

Why not CT in equivocal appendicitis?

- ? Diagnostic Accuracy
- Negative Appendicectomy Rate
- Delay in Appendicectomy
- Radiation and Contrast
- Availability
- Cost



Diagnostic accuracy of CT in acute appendicitis

- No improvement in diagnostic accuracy compared with clinical assessment alone. *Steven et al*
- No correlation between CT findings and pathologically proved disease. *Weyvant et al*
- Liberal use of computed tomography scanning does not improve diagnostic accuracy in appendicitis. *Perez et al*

Table 2. Comparison Between Clinical Assessment, CT Scan, and Ultrasonography in the Diagnosis of Acute Appendicitis*

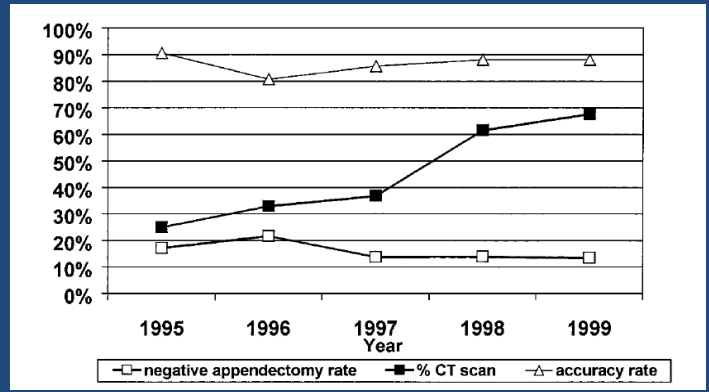
	H&P	CT Scan	Ultrasonography
Sensitivity	83	83.8	35.5
Specificity	31.7	40	71.2
Positive predictive value	86.7	83.8	81.3
Negative predictive value	25.7	40	23.9
Accuracy	74.9	74.5	43.4

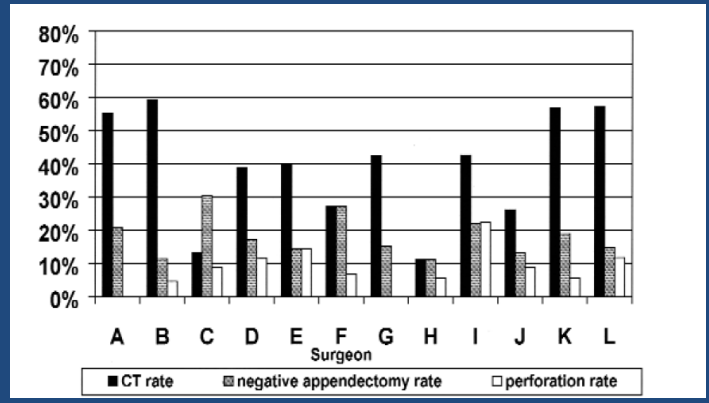
** Data are given as percentage. CT indicates computed tomographic; H&P, history and physical examination.*

Source: ***Computed Tomography and Ultrasonography Do Not Improve and May Delay the Diagnosis and Treatment of Acute Appendicitis Steven et al***

Effects of CT on negative appendicectomy rate

- Negative appendicectomy rate unaffected by imaging. *Steven et al, Vollman et al*
- The negative appendectomy rate and diagnostic accuracy for CT remained constant. *Weyvant et al*
- No correlation between CT use and the negative appendectomy rate.





Source: ***Interpretation of computed tomography does not correlate with laboratory or pathologic findings in surgically confirmed acute appendicitis Weyant et al***

CT delays appendicectomy

- Use of CT significantly delays appendicectomy.
- Perforation rates increase by five per cent every 12 hours after symptom onset. *Bickell et al*
- Patients with postoperative complications had longer evaluations than did those without. *Steven et al*

Table 3. Preoperative Care: Time From ED Admission to Surgical Consultation and Appendectomy*

	ED Admission to Surgical Consultation, h	ED Admission to Appendectomy, h
H&P	4.7 ± 5.2	10.3 ± 14.1
H&P and abdominal x-ray films	4.9 ± 2.9	11.2 ± 9.8
Ultrasonography	6.4 ± 7.4	13.1 ± 10.2
CT scan	7.8 ± 10.8	19.5 ± 31.3
Patients with complication	8.0 ± 12.7	16.4 ± 28.7
Patients without complication	4.8 ± 3.3	10.8 ± 9.3

** Data are given as mean ± SD. ED indicates emergency department; H&P, history and physical examination; and CT, computed tomographic.*

Source: ***Computed Tomography and Ultrasonography Do Not Improve and May Delay the Diagnosis and Treatment of Acute Appendicitis Steven et al***

Radiation

- Children more at risk
- No reduction in appendicectomy rate with the potential for harmful radiation
  Vollman et al, Patrick et al

Contrast Associated Events

Cost and Availability

Advantages of Diagnostic Laparoscopy

- High diagnostic accuracy
- Significantly in women
- Therapeutic possibilities
- Safe

High Diagnostic Accuracy

- Retrospective studies show a diagnostic accuracy 95 to 99 per cent in acute appendicitis. *Andren-Sandberg et al*
- Diagnostic accuracy in all cases of 90 to 92 per cent *Saddique et al, Gadish et al*
- In up to 30% of cases the diagnosis was changed. *Golash et al*
- Reduces frequency of unnecessary appendicectomy by 20-30 per cent *Golash et al, Andren-Sandberg et al*

Table III: Diagnosis After Operation In Atypical Presentation (n =101)

Disease	No. of patients
Appendicitis	80
Ruptured ovarian cyst	05
Ruptured ectopic pregnancy	01
Primary peritonitis	02
Mesenteric adenitis	03
Urinary tract infection	03
Perforated Duodenal Ulcer	01
Non-specific abdominal pain	06

Source: ***Atypical presentation of appendicitis: Diagnosis and management Saddique et al***

Significantly reduces negative appendicectomy rate in premenopausal women

- Negative appendicectomy rates higher than for men.
- Routine use significantly reduces unnecessary appendicectomies in young females. *Larsonn et al, Garbarino et al*
- Diagnostic accuracy approaches 100 per cent. *Larsonn et al, Van Dalen R et al*
- Superior to transabdominal and transvaginal ultrasonography in assessment of adnexal organs when diagnosis was in doubt. *Lim et al*

Therapeutic Possibilities

- Cost
- Hospital stay

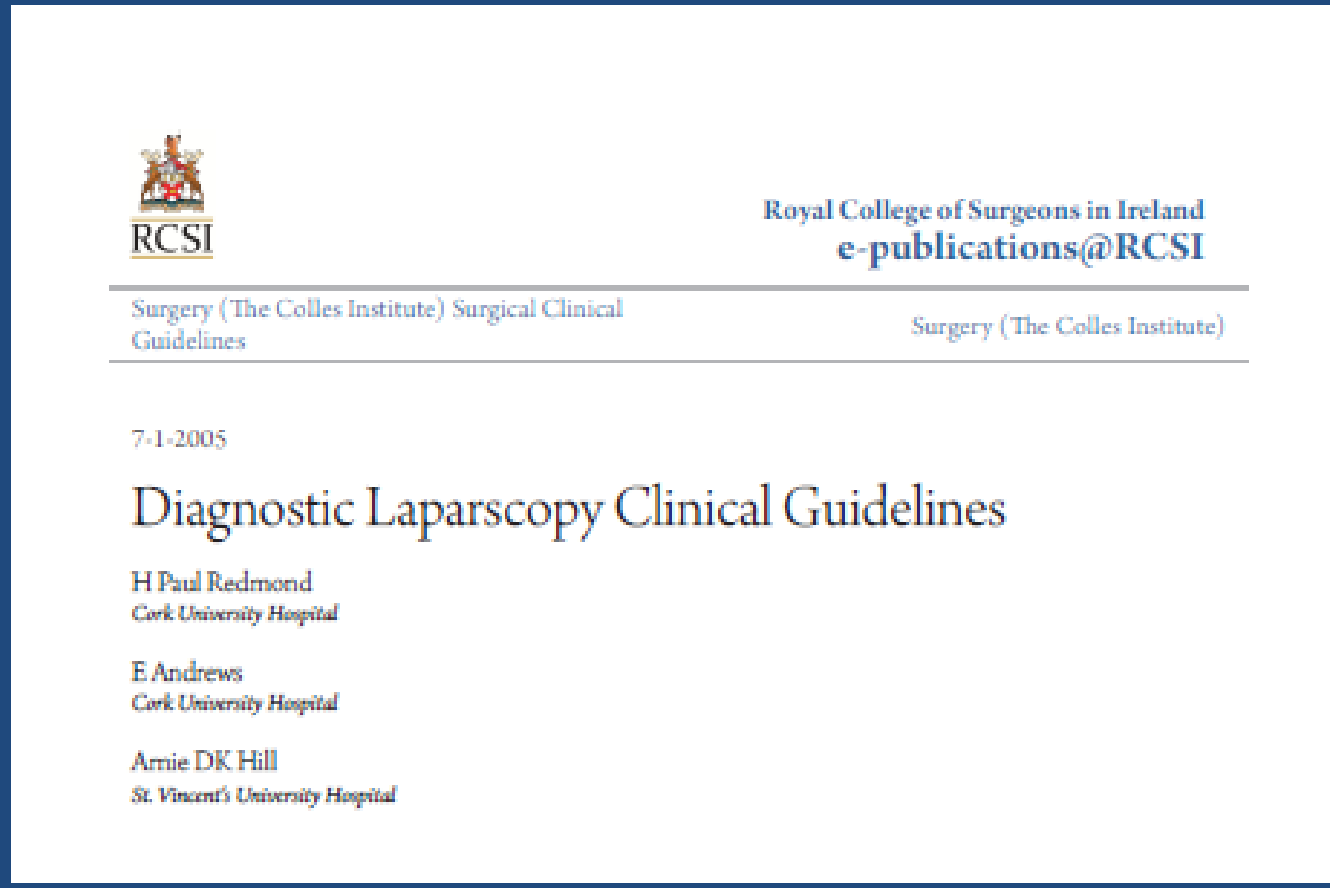
Safe

- General anaesthetic
- Port site placement

RCSI Guidelines

‘It is reasonable to confirm the diagnosis of acute appendicitis with laparoscopy and laparoscopic appendicectomy is an acceptable approach.’

‘Women of child-bearing age suspected of having acute appendicitis be considered for diagnostic laparoscopy prior to the planned appendicectomy.’


RCSI

Royal College of Surgeons in Ireland
e-publications@RCSI

Surgery (The Colles Institute) Surgical Clinical Guidelines

Surgery (The Colles Institute)

7-1-2005

Diagnostic Laparscopy Clinical Guidelines

H Paul Redmond
Cork University Hospital

E Andrews
Cork University Hospital

Arnie DK Hill
St. Vincent's University Hospital

The normal appearing appendix

For Removing it

- Sensitivity at laparoscopic inspection is 92 per cent.
- Macroscopic inspection not reliable.
- Does not diagnose mucosal inflammation.
- Early appendicitis.

For Leaving it

- Unnecessary operation, extra injury, extra time, extra complications, prolonged recovery.
- Limits the diagnostic value of laparoscopy.
- Rarely misses any acute appendicitis that requires appendicectomy.
- Irish Guidelines agree that it is safe to leave a normal appearing appendix.

Macroscopic assessment of the appendix at diagnostic laparoscopy is reliable

M. Kraemer,[1,3] C. Ohmann,[2] R. Leppert,[3] Q. Yang[2]

[1] Department of Colorectal Surgery, Singapore General Hospital, Outram Road, Singapore 169608
[2] Theoretical Surgery Unit, Department of General and Trauma Surgery, Heinrich Heine Universitt, Moorenstr. 5, Dsseldorf, Germany
[3] Surgical Clinic and Policlinic, Julius Maximilians University, Josef-Schneider-Str. 2, 97080, Wrzburg, Germany

Received: 7 September 1999/Accepted: 21 October 1999/Online publication: 30 May 2000

Conclusions

- Data on accuracy of CT versus Diagnostic Laparoscopy is conflicting.
- Diagnostic laparoscopy has the additional benefit of being therapeutic.
- Premenopausal women benefit the most from this procedure.
- Given its excellent diagnostic yield, low morbidity and easy availability, one should consider the early use of diagnostic laparoscopy instead of CT scan in cases of equivocal appendicitis.

Thank You

" No single evaluation can substitute for the diagnostic accuracy of the experienced physician."