

Background

- CT has assumed a paramount position in the evaluation of adults with suspected appendicitis.
- Radiation exposure from CT is of particular concern in children or young adults.
- Reducing the radiation dose by 50 to 80% does not significantly hinder the diagnosis of appendicitis.

Methods

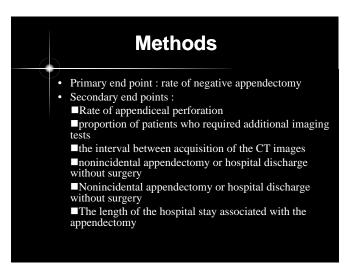
- noninferiority, single-institution, randomized trial.
- Patients 15 to 44 years of age who were undergoing CT examination for suspected appendicitis
- Emergency department physicians on service that led to the clinical suspicion of appendicitis

Methods

- CT scanners with 16, 64, or 256 detector rows (2 mSv in the low-dose group and 8 mSv in the standard-dose group)
- CT reports were initially prepared by one of three expert radiologists(day time)
- on-call radiologists during after hours
- An additional imaging test was defined as one performed within 7 days after the initial CT examination

Methods

- Final diagnosis was made on the basis of surgical and pathological findings.
- If not OP: medical records and telephone interviews 3 months after the patient's initial presentation
- Fisher's exact tests, Mann–Whitney U tests, and receiver-operating-characteristic analysis --- for analysis



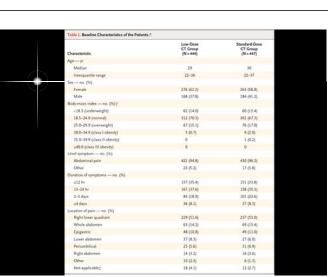
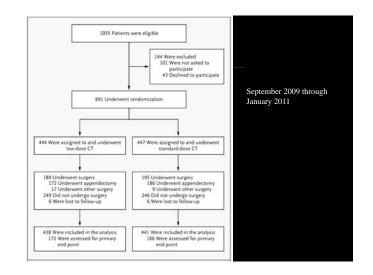
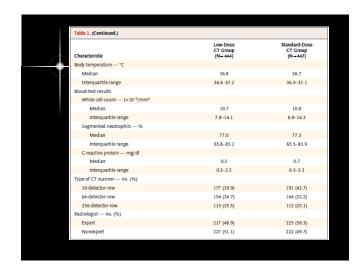
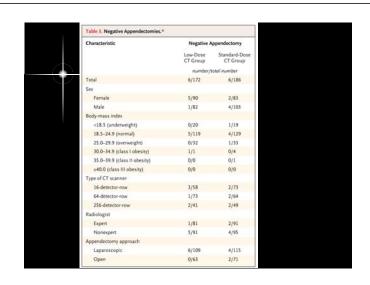


Table 2. Clinical Outcomes.*							
Outcome	CT Group	Standard-Dose CT Group	P Value†	Difference (95% CI)	Risk Ratio (95% CI)		
				percentage points			
Primary end point							
Negative appendectomy rate — no. of patients/ total no. (%)	6/172 (3.5)	6/186 (3.2)		0.3 (-3.8 to 4.6)	1.08 (0.37 to 3.13)		
Secondary end points							
Need for one or more additional imaging tests — no. of patients/total no. (%)	14/438 (3.2)	7/441 (1.6)	0.09	1.6 (-0.4 to 3.9)	2.01 (0.84 to 4.81)		
Interval between CT and nonincidental appendec- tomy — hr‡			0.02				
Median	7.1	5.6					
Interquartile range	4.3 to 11.7	3.4 to 9.2					
Interval between CT and discharge without surgery — hr			0.63				
Median	2.5	2.4					
Interquartile range	1.5 to 4.2	1.4 to 4.4					
Appendiceal perforation rate — no. of patients/total no. (%)	44/166 (26.5)§	42/180 (23.3)¶	0.46	3.2 (-5.9 to 12.4)	1.14 (0.79 to 1.64)		
Hospital stay associated with nonincidental appen- dectomy — days			0.54				
Median	3.4	3.2					
Interquartile range	2.7 to 4.1	2.5 to 4.1					







CT Result	Low-Dose CT Group (N = 433)	Standard-Dose CT Group (N=440)	Difference (95% CI)†	P Value‡
Diagnosis of appendicitis				
AUC	0.970	0.975	-0.005 (-0.030 to 0.020)	0.69
Sensitivity no. of patients/total no. (%)§	156/165 (94.5)	171/180 (95.0)	-0.5 (-5.6 to 4.5)	>0.99
Specificity no. of patients/total no. (%)§	250/268 (93.3)	244/260 (93.8)	-0.6 (-4.9 to 3.8)	0.72
Likelihood of appendicitis — no. of patients/total no. (%) ¶				
Diagnosis subsequently confirmed				0.03
Grade 1	2/165 (1.2)	4/180 (2.2)		
Grade 2	7/165 (4.2)	5/180 (2.8)		
Grade 3	13/165 (7.9)	11/180 (6.1)		
Grade 4	53/165 (32.1)	34/180 (18.9)		
Grade 5	90/165 (54.5)	126/180 (70.0)		
Diagnosis subsequently not confirmed				0.06
Grade 1	185/268 (69.0)	206/260 (79.2)		
Grade 2	65/268 (24.3)	38/260 (14.6)		
Grade 3	11/268 (4.1)	11/260 (4.2)		
Grade 4	3/268 (1.1)	3/260 (1.2)		
Grade 5	4/268 (1.5)	2/260 (0.8)		
Indeterminate interpretation, grade 3 — no. of patients/total no. (%)	24/433 (5.5)	22/440 (5.0)	0.5 (-2.5 to 3.6)	0.66
Diagnosis of appendiceal perforation				
Sensitivity — no. of patients/total no. (%)	16/44 (36.4)	23/42 (54.8)	-18.4 (-38.0 to 2.8)	0.09
Specificity - no. of patients/total no. (%)	110/121 (90.9)	121/138 (87.7)	3.2 (-4.6 to 11.0)	0.33

Discussion

- Low-dose CT group was noninferior to the standard-dose CT group with regard to negative appendectomy rates
- low-dose CT instead of standard-dose CT -- benefit from reduce radiation risk
- low-dose CT group VS standard-dose CT group --- more likely to require additional imaging tests, longer interval between the CT examination and appendectomy

Study limitation

- Study setting may have been biased toward low-dose CT
- Study was not sufficiently powered to conclusively analyze the some potential effects.
- Few of the patients included in the study were obese

Conclusion

• use of lowdose CT as the first-line imaging test was noninferior to standard-dose CT with respect to the negative appendectomy rate among young adults with suspected appendicitis.