



# Masqueraders of Appendicitis

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## BACKGROUND

- Appendicitis is the most common surgical emergency of the abdomen in children. Despite it being a common diagnosis, there is a paucity of literature on pathologic findings.
- In the current paradigm of care, the follow-up for routine appendectomies has been streamlined such that a formal review of pathology with the patient is often overlooked.
- There is a new evolving paradigm of non-operative management of appendicitis in adults which mandates that an analysis of the largest set of pathologic specimens in children is needed before pediatric application.
- Our goal was to identify the incidence of atypical diagnoses detected among appendectomy specimens to better elucidate diagnoses that could potentially be missed in non-operative management.

## METHODS

- Our study is an IRB-approved (062012-049) retrospective review of pediatric patients (N=6816) who underwent appendectomies at an independent children's hospital over an 11 year period (January 2000 to December 2010).
- Inclusion criteria required age <17 and surgery for presumed appendicitis thus excluding incidental appendectomies (N=269) from this sample with a final review of 6547 specimens
- The pathologic diagnosis of each appendectomy specimen was analyzed and documented.
- Percentages of all types of pathologic appendicitis, negative appendicitis, and other atypical diagnoses were calculated.

### DATA POINTS ANALYZED:

#### Demographics :

- Age
- Gender
- Insurance

#### Outcome:

- Pathologic classification of appendicitis or alternative incidental pathologic finding

## RESULTS

- Demographics were obtained from a smaller sample (N=1311) as a proxy likely representative of the entire group (average age 10.3 years, 60% males, 40 females).

PATHOLOGY RESULTS OF SPECIMENS		
DIAGNOSIS	N	% of total
True appendicitis	5998	92%
Negative appendicitis	325	5%
<u>Other Diagnoses</u>	224	3.4%
Tumors	4	<1%
Carcinoid tumor	3	
Burkitt lymphoma	1	
Other specific infection	58	0.9%
Adenovirus	25	
Enterobius	27	
Cryptosporidium	1	
Spirochete	1	
Non-specific inflammatory changes	58	0.9%
Melanosis	2	
Lymphoid hyperplasia	48	
Xanthogranulomatous inflammation	2	
Eosinophilic infiltrate	6	
Extra-appendiceal pathology	31	0.5%
Paratubal cyst	6	
Ovarian cyst	2	
Intussusception	1	
Omental torsion/necrosis	5	
Cystic lymphangioma	1	
Meckel's diverticulum	16	
Non-inflammatory obstruction	71	1%
Fecalith	34	
Fibrous obliteration	24	
Cystic fibrosis	1	
Mucocele	2	
Foreign body	2	<0.1%

### Demographics

Age	10.3 ± 3.7
Female	40%
Male	60%

- Of the total cases, 5998 (92%) subjects showed true appendicitis including acute non-perforated, perforated, chronic, suppurative, gangrenous, and catarrhal appendicitis.
- In 224 subjects (3.4%), diagnoses other than appendicitis were identified: non-inflammatory obstruction (N=71), other infectious etiologies (N=58), non-specific inflammatory changes (n=58), extra-appendiceal pathology (N=31), tumors (N=4), and foreign body (N=2).
- Additionally, 6 patients with true appendicitis had co-existing carcinoid tumors. 325 specimens (5%) were documented as negative appendectomy.

## CONCLUSION

- Largest pathologic analysis of appendiceal specimens quantifying the incidental findings that masquerade as appendicitis in the pediatric population
- Streamlining care and same-day discharge for pediatric patients may be concerning if a patient has a diagnosis other than the suspected appendicitis which may go unrecognized.
- The other etiologies detected (3.4%) including infections and tumors reinforce the importance of pathologic review in post-operative follow-up to appropriately diagnose uncommon conditions that may necessitate further work-up and treatment.
- Possibility of missing an alternative or co-incidental diagnosis such as carcinoid tumor in the non-operative management of appendicitis merits reflection in planning operative versus non-operative management.

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