

# WINNER POSTER 1



## Do CT scans Accurately Predict the Presence of Appendicoliths in Appendicitis?

James Mariadason, Prabhat Bhattarai, Shreya Shah, Katie Mitaszka, Marc Wallack, Hussein Matari



Metropolitan Hospital Center

### INTRODUCTION BACKGROUND

- The accepted treatment of acute appendicitis has been surgery for over a century.
- NOMA (Non-Operative Management of Appendicitis) for appendiceal abscess is 120 years old (Ochsner-Scherren).
- NOMA is now a viable alternative to surgery for uncomplicated appendicitis.
- Its popularity doubled during COVID.
- Recent trials confirmed that NOMA was non-inferior to surgery provided appendicoliths were absent on the CT scan.

### OBJECTIVE/HYPOTHESIS

#### Objective:

To determine if CT identification of appendicoliths is accurate enough to decide surgery versus NOMA.

#### Hypothesis:

**CT identification is too unreliable to be the cornerstone of decision-making.**

### METHODS

- This is a retrospective EMR review. Incidental and interval appendectomies were excluded.
- Only those with preoperative CT's were included. Identification of appendicoliths on CT was compared to appendicoliths in pathology.
- Annual PPV, NPV, sensitivity, and specificity rates were calculated and two cohorts created; Cohort A (2001 to 2010) was compared to Cohort B (2011 to 2019) to see if better equipment and experience improved accuracy.

### RESULTS

Cohort A; average Sensitivity 48 %, specificity 90 %, PPV 69% and NPV 80%.

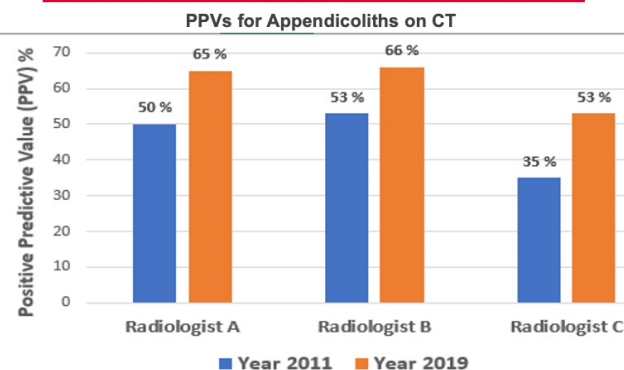
Cohort B, Sensitivity rose to 65% and NPV to 86% but Specificity fell to 81% and PPV to 56%. More advanced equipment and experience did not improve accuracy overall.

### TABLES

Year Cohort A	Appendectomy with CT	TN	FN	FP	TP	CT Sensitivity for Fecalith	CT Specificity for Fecalith	PPV %	NPV %
2001	63	44	10	3	6	37%	94%	66	81
2002	68	52	11	2	3	21%	96 %	60	82
2003	83	62	11	3	7	39%	95 %	70	85
2004	82	50	14	7	11	44%	88%	61	78
2005	78	45	13	7	13	50%	86%	65	77
2006	82	50	11	2	19	63%	96%	90	82
2007	82	45	17	4	16	48%	92%	80	73
2008	78	50	14	5	9	39%	91%	64	78
2009	95	52	16	12	15	48%	81%	56	76
2010	89	58	8	6	17	68%	91%	74	88
Total	800	508	125	51	116	48%	90%	69	80

Year Cohort B	Appendectomy with CT	TN	FN	FP	TP	CT Sensitivity for Fecalith	CT Specificity for Fecalith	PPV %	NPV %
2011	87	49	7	16	15	68%	75%	48	88
2012	88	58	3	14	13	81%	80%	48	95
2013	98	62	10	17	9	47%	78%	53	86
2014	80	51	8	7	14	64%	88%	66	86
2015	98	56	8	14	20	71%	80%	59	88
2016	77	46	9	11	11	55%	81%	50	84
2017	78	51	6	4	17	74%	93%	81	89
2018	76	42	8	11	15	65%	79%	58	84
2019	78	35	13	11	19	59%	76%	59	73
Total	760	450	72	105	133	65%	81%	56	86

### FIGURE



### DISCUSSION

- Surgery has been the gold standard for acute appendicitis for > 100 years.
- NOMA is new ; COVID made it popular
- The main cause of appendicitis is no longer thought to be appendicoliths.
- Appendicoliths do cause perforation and gangrene
- Therefore, their identification is crucial
- CT interpretation is assumed to be reliable
- Our study challenges this.

### CONCLUSIONS

Our study demonstrates that currently CT scan readings do not accurately predict the presence of appendicoliths. When NOMA is being discussed as an alternative to surgery, appendicolith identification should be used with caution as a deciding factor for NOMA versus surgery.

### REFERENCES

- CODA Collaborative. (2020). A randomized trial comparing antibiotics with appendectomy for appendicitis. *New England Journal of Medicine*, 383(20), 1907-1919.
- Di Saverio, S., Podda, M., De Simone, B., Ceresoli, M., Augustin, G., Gori, A., ... & Catena, F. (2020). Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines. *World Journal of Emergency Surgery*, 15, 1-42.
- Singh, J. P., & Mariadason, J. G. (2013). Role of the faecolith in modern-day appendicitis. *The Annals of the Royal College of Surgeons of England*, 95(1), 48-51.
- Ochsner, A. J. (1902). A handbook of appendicitis. GP Engelhard & Company.
- Bailey, H. (1930). The Ochsner-Sherren (Delayed) treatment of acute appendicitis: Indications and technique. *British Medical Journal*, 1(3603), 140.
- MacBurney, C. (1894). The incision made in the abdominal wall in cases of appendicitis. *Annals of Surgery*, 20, 38-43.
- Salminen, P., Paajanen, H., Rautio, T., Nordström, P., Aarnio, M., Rantanen, T., ... & Grönroos, J. M. (2015). Antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis: The appac randomized clinical trial. *Journal of American Medical Association*, 313(23), 2340-2348.
- Sallinen V, Akl. E.A, You I.J, Agarwal A., et al. (2016). Meta-analysis of antibiotics versus appendectomy for non-perforated acute appendicitis. *British Journal of Surgery*, 6,103: 656-667.