



## RE: Temporal Changes of Intra-Appendiceal Air at CT in the Diagnosis of Acute Appendicitis

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**Index terms:** Air; Computed tomography; Obstruction

Dear Editor:

We read with great interest the original article by Hong et al, entitled "Intra-appendiceal air at CT: is it a useful or a confusing sign for the diagnosis of acute appendicitis?", which was published in the *Korean Journal of Radiology (KJR)*, January 2016 (1). The authors presented the diagnostic value of the amount and patterns of intra-appendiceal air at computed tomography (CT) in cases of acute appendicitis. They reported that when acute appendicitis develops with luminal obstruction, the retained intra-appendiceal air is gradually absorbed, and

ultimately disappears (2). Therefore, it is important to recognize the time interval between the onset of symptoms and CT scan. They also reported the range of time interval between CT and surgery, but information on the time interval between the onset of symptoms and CT scan were not provided. However, we think that the interpretation of the amount and appearance of the intra-appendiceal air would be changed within this time interval because of the aforementioned reason. We want to emphasize that the amount of the intra-appendiceal air measured in the early stage of inflammation could be much more than the amount of intra-appendiceal air measured in the late stages. This may consequently affect the statistical results and main conclusion of the study, which was that air is more frequently observed within a normal appendix than within an inflamed appendix.

## REFERENCES

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**Response**

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Thank you for your comment.

We herein respond to the letter and have performed additional chart review to assess the time interval between the onset of symptoms and CT examination in the 458 study subjects. Our results showed that the time interval in the 102 patients with appendicitis was 2 hours to 14 days (mean ± SD, 22.2 ± 36.3 hours), and in the 356 patients without appendicitis it was 1 hour to 16 days (mean ± SD, 24.4 ± 56.1 hours). The difference between the two groups was not statistically significant by Student's *t* test (*p* = 0.630). For subgroups with intra-appendiceal air as demonstrated from the data provided by reader 1, the time interval in 14 patients with appendicitis ranged from 5 hours to 5 days (mean ± SD, 22.3 ± 30.4 hours), and in 289 patients without appendicitis it ranged from 1 hour to 16 days (mean ± SD, 26.0 ± 60.6 hours). In the subgroup of patients with intra-appendiceal air, the time interval was not significantly different between the patients with appendicitis and without appendicitis (*p* = 0.681). The duration of symptoms is subjectively reported by patients, and we do not think it accurately represents the duration of the pathologic process.

For the 102 patients with acute appendicitis, we assessed the time interval based on the presence or absence of intraluminal air. It was not significantly different between the 14 cases with intraluminal air (mean ± SD, 22.3 ± 30.4 hours) and 88 without air (mean ± SD, 21.9 ± 37.3 hours) (*p* = 0.962). We had access to pathologic results on the stage of acute appendicitis in 102 patients whose diagnoses were surgically confirmed. The stages of inflammation in 14 patients with air were early in 3, suppurative in 4, gangrenous in 6, and perforated in 1. Regardless of the different stages in the 14 cases, the amount of intraluminal air was mostly less than one-third of the appendiceal length, except in one case, in which it was between one-third and two-thirds of appendiceal length. In patients without intra-appendiceal air, the stages were as follows: 5 early, 54 suppurative, 19 gangrenous, and 10 perforated. When the grade of inflammation was categorized into early (early and suppurative appendicitis) and advanced (gangrenous and perforated appendicitis) stages, there was no significant difference between cases with and without intraluminal air in the subgroup of patients with acute appendicitis as assessed by a chi-square test (*p* = 0.215) (Table 1).

The present results imply that the amount of air measured in the published article was not affected by either disease stage in patients with appendicitis or by the time interval between the onset of symptoms and the administration of a CT scan. Since the amount of air was similar in the majority of cases of appendicitis regardless of the stage of inflammation, we believe it has little effect on our conclusions in the published manuscript.

**Table 1. Stage of Inflammation in Patients with Acute Appendicitis Based on Presence or Absence of Intra-Appendiceal Air**

	Patients with Appendicitis		<i>P</i>
	With Air	Without Air	
Grade of inflammation			0.215
Early (early and suppurative)	7 (3 and 4)	59 (5 and 54)	
Advanced (gangrenous and perforated)	7 (6 and 1)	29 (19 and 10)	

Data are number of patients. Numbers in parentheses are number of patients in each disease stage.