

Observation of Oral Contrast Media Filling Into Lumen Appendix

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Abstract

Background: CT scan has become the imaging modality of choice in diagnosing appendicitis in unusual cases, replacing appendicogram with very little reliability. However, there is still an appendicogram demand in particular hospital in Indonesia.

Objectives: This study aimed to obtain information on lumen appendix filling pattern with multi slice Multislice computed tomography (MSCT) scan using oral contrast media in patients without clinical appendicitis. Thus, it is able to provide additional information in the appendicogram interpretation.

Method: This study was descriptive observational to 30 subjects selected by consecutive from April to June 2012. Subjects who underwent an abdominal MSCT scan using oral contrast media were analyzed descriptively by sex, age and lumen appendix filling pattern.

Results: 30% of patients were men and women by 70%. The most common age group is 51-60 years (50%). Appendix of non-filling of 56.6%, partial filling of 43.3%, and no full filling appendix was obtained.

Conclusion: Appendix filling as an indicator of the presence of appendicitis was not reliable in an abdominal MSCT scan using oral water soluble contrast, thus it needs to be considered when interpreting the appendicogram results/

Keywords: MSCT, oral contrast, appendix without clinical appendicitis

Introduction

The appendix is a dead end tubular structure that is an out pouching of the cecal tip on the posteromedial side ¹. Appendicitis is one of the most common diseases in the emergency department and requires immediate surgical intervention. Typical cases have been diagnosed clinically and laboratories. Whereas, not typical cases especially in pediatric patients, parents and young women were required radiological assistance in making the diagnosis ². Immediate and precise appendicitis treatment will reduce the risk of morbidity and mortality

due to perforation and sepsis inflicted. There are various modalities in appendix imaging. Prior to the 1980s, barium appendix was still the main radiological method used for the diagnosis of acute appendicitis ³, however this modality was considered inaccurate. After 1990, CT scan was accepted as the primary imaging technology ⁴⁻⁶ for acute appendicitis due to visualization capabilities of the appendix, intestines and surrounding tissues ⁷.

Prior to 1997, surgeons agreed that 20% of appendectomy negative was still accepted because of high mortality in appendicitis coulson, however, it was unused any longer ⁸. Improvement in imaging technology resulted in CT scans capability to decrease negative appendectomy up to 3% ⁹. Therefore, Another result recommends CT scan as the diagnostic modality of choice for adult, pregnant and children. Appendix barium examination (appendicogram) is still obtained at Dr. Soetomo Teaching Hospital Surabaya. Therefore,

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that is encouraging researchers to reexamine the pattern of oral contrast media fillings into the appendix lumen in patients without clinical appendicitis at Dr. Soetomo Teaching Hospital Surabaya. Observations of oral contrast media filling patterns into the appendix lumen in patients without clinical appendicitis were performed by using dilute oral water-soluble contrast and observed with Multislice Computed Tomography (MSCT) 16-slice abdominal scan. There have been no previous similar studies. Therefore, This study aimed to obtain information on lumen appendix filling pattern with multi slice Multislice Computed Tomography (MSCT) scan using oral contrast media in patients without clinical appendicitis. Thus, it is able to provide additional information in the appendicogram interpretation

Method

The subjects of the study were group of patients with MSCT 16 slice abdominal scans examination using oral contrast media at Radiology Unit of Integrated Diagnostic Center Building in Dr. Soetomo Teaching Hospital Surabaya from April to June 2012. The subjects were sampled using consecutive sampling that fulfilled the inclusion criteria (Patients with abdominal MSCT examinations using oral contrast media, oral contrast medium had reached cecum or ileocecal junction) and exclusion criteria (patients of post-appendectomy, patients with appendicitis (inflammatory or tumor), oral contrast media did not reach the cecum). Moreover, the subjects had signed informed consent.

This study was a descriptive research with the observational method to determine the pattern of appendix lumen filling in patients without clinical appendicitis that given oral contrast media in CT scan unit of radiology section at Dr. Soetomo Teaching Hospital Surabaya with a total sample of 30 subjects. Subjects who had fulfilled the inclusion and exclusion criteria consumed oral contrast media water soluble urography of 76% by 10 ml that diluted with 1200 ml of water, since 6-8 hours before the examination until prior to the MSCT abdominal examination. Contrast water soluble media was easier to fill the narrow lumen than barium.

Results

Characteristics of Subjects

We obtained 30 subjects consisting of 9 men (30%) and 21 women (70%). This study obtained the

distribution of the most common age group; 51-60 by 15 subjects (50%), followed by the age group of 31-40 as many as 5 subjects (16.6%), age group of 11-20 years by 4 subjects (13.3%), and age group of 21-30, 41-50, and 61-70 each consisted by 2 subjects (6.6%). The observations of the 30 normal appendices showed that nothing was filled with full oral contrast media. The most common appendix was non-filled by 17 subjects (56.6%) with the distribution based on the age of the subjects. . The remaining 13 subjects (43.3%) experienced partial filling with the distribution based on the age of the subjects.

The distribution of observational data on the appendix filled with oral contrast media showed that mostly in the age group of 51-60 by 5 subjects (38.4%), followed by the age group of 31-40 by 3 subjects (23.1%), age group of 11-20 by 2 subjects (15.4%) and age group of 21-30, 41-50, and 61-70 each consisted by 1 subject (7.7%). Furthermore, it showed the distribution of 17 non-filling subjects with age group of 51-60 by 10 subjects (58.8%), followed by the age group of 11-20 as many as 2 subjects (11.7%), 3-40 by 2 subjects (11.7%), age group of 21-30, 41-50, and 61-70 each consisted by 1 subject (5.8%). It also showed a comparison picture of the oral contrast media filling pattern in the normal appendix by age. The results showed that the non-filled and partially-filled appendix were at the age of 51-60 years old, however, the total of non-filled was more than partially-filled

Discussion

No full-filled appendix was found in the 30 subjects. The partial filling appendix was 43.3% (13 subjects) and the remaining of 56.6% (17 subjects) was non-filling appendix. In the non-filling appendix (17 subjects), there were 58.8% (10 subjects) in the age group of 51-60. Followed by age group of 11-20 by 11.7% (2 subjects), 31-40 by 11.7% (2 subjects), and 21-30, 41-50, and 61-70 were consisted of 1 subject (5.8%) respectively. This phenomenon showed that not all appendices were normal full-filling following by oral contrast administration. These results were in accordance with previous study that mentioned that oral contrast was not required in appendicitis diagnosis because it was unreliable to fill the normal appendix, and also non-filling appendix was not indicated an appendix obstruction¹⁰. A study by Schisgall using barium swallow in children suspected of acute appendicitis reported that 92% of partial filling and 58% of non-

visualized (non-filling) were normal appendices¹¹. A study by Sakover using barium enema in the normal appendix reported that there were 5.5% of partial filling, 12.5% of non-filling, and 21.7% appeared at the spot delay from 82% of full filling¹². Rice et al. mentioned that 5-10% of the normal appendix was not filled by barium¹³. The results were in accordance with the theory that normal appendix lumen may contain contrast material, air or slightly fecal material^{14,15}. Thirty patients who underwent of MSCT abdominal scan at the CT Unit in the Integrated Diagnostic Center Building Dr. Soetomo Teaching Hospital Surabaya were consisted of 30% male and 70% female with age range from 12 to 70 years old. Most common age group was 51-60 (50%), followed by age group of 31-40 (16.6%), 11-20 (13.3%) and the rest were evenly distributed in age group 21-30 years, 41-50 years, and 61-70 years of 6.6% respectively. This suggested that other imaging modalities with low radiation exposure will be selected at the age of the child and the reproductive age.

Schey mentioned that non-filling appendices might be due to their retro scale location¹⁶. Sakover reported that the non-visualization of the appendix was related to the location of a true pelvic appendix or colitis was obtained in the right-sided colon¹². The absence of a full filling appendix in this study might be understandable because the normal peristaltic activity of the appendix will cause contrast in and out repeatedly. Therefore, when the picture was taken, there was no contrast filling or partially filled into the appendix lumen even though the contrast was in sufficient quantity in the cecum.

The presence of a small mucous flap covering the normal appendix orifice might functionally as a valve that allowed the appendix contents to flow out and prevented the contrast of the cecum from entering the appendix¹⁷. The fact that the distal portion of the appendix might become obliterated in elderly and some might have fibrosis since birth¹⁷. It should be considered as one of the causes of partial filling as well as non-filling in the normal appendix, which in this study, 50% of the sample was dominated by the age group of 51-60 (15 subjects).

The ability of CT scans to visualize the appendix structure in more detail also allowed appendix filling assessment to be different compared to appendicograms. Because the appendicogram inaccurately represented the tip of the appendix, thus full filling of the appendicogram might appear as partial filling on the MSCT scan. Partial filling and non-filling might occur in normal appendices

as examined using MSCT scans with oral water soluble contrast in which the ability to fill the very narrow lumen better than barium. The same conditions could occur in appendicograms that were currently being performed for appendicitis diagnostics. Meanwhile, the opinion that non-visualized/non-filling appendix with mass effect description as a pathognomonic sign for appendicitis could not be used as a reference because the mass effect might cause by the other factors such as ileitis, sesitis, small bowel obstruction, and pelvic inflammatory disease¹⁸.

Conclusion

In MSCT abdominal scan using oral water soluble contrast, normal appendices also experienced partial filling and non-filling without any signs of obstruction, therefore the appendix lumen filling as an indicator of appendicitis was not reliable. The same results could occur in barium appendix examination (appendicogram), thus it needs to be considered when interpreting the results of appendicogram.

Ethical Clearance: The study has been approved by ethical committee in Dr. Soetomo Teaching Hospital Surabaya, Indonesia.

Conflict of Interest: The author reports no conflict of interest of this work.

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