

STRONG CHILDREN'S RESEARCH CENTER

Summer 2013 Research Scholar

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ABSTRACT

Title: The Impact of Preoperative Imaging on the Efficiency of Care for Pediatric Appendicitis

Background: Early diagnosis in pediatric appendicitis is important in lowering the risk of perforations and surgical site infections (10). Most hospitals utilize a computed tomography (CT) scan in diagnosis, though there has been a gradual shift towards the use of ultrasound (US) in order to decrease radiation exposure (4). Some studies have argued that though accuracy may be compromised with an US, the decreased time taken to diagnose appendicitis using this tool is beneficial in avoiding further complications (10).

Objective: We have previously shown that there was no significant difference in surgical outcome based on whether a CT scan or an US was used as the imaging modality in diagnosis of pediatric appendicitis (9). In this study, we will use a retrospective review to examine the efficiency of these imaging modalities alone and together by calculating the time taken for a patient to enter the operating room after check in to the Emergency Department (ED).

Results: Between 2007 and 2011, a total of 762 patients underwent appendectomies, of which 568 met the inclusion criteria and were used in this study. Out of this population, a certain percentage of patients fell into each patient outcome group in the Early and Late periods.

An unpaired t-test was performed to compare the average time differences for each combination of patient outcome and imaging modality in the Early and Late periods of the study time frame. There was no significant difference between any of the groups in these two time periods, indicating that no external variables altered the time duration for a patient to reach the OR after ED check in the Early and Late periods. Some combinations of patient outcome and imaging modality that were used to compare the Early and Late periods included either 1 or no patients, so these groups were not analyzed.

An unpaired t-test was used to compare the time difference based on patient outcome and imaging modality. For AA in boys, the time duration until reaching the OR was significantly longer when a CT was used in comparison to an US. In addition, the use of either a CT or an US in this case took significantly longer than when no imaging was done. A CT scan also took a significantly longer time than no scans in the case of PA for boys. For girls, the use of a CT or an US significantly increased the time to the OR in comparison to no scans in cases of both AA and PA. In addition, the use of both scans for females with AA significantly increased the time duration in comparison to the use of only a CT scan or an US. Because there was only 1 patient in the group of NA cases that received both scans, no analysis was performed using this patient.

Conclusion: The findings of this study indicate that the efficiency of care for pediatric appendicitis varies based on the type of imaging that is used in diagnosis. These results are especially important in pediatric appendicitis because of the urgency of the condition. According to a study conducted by Teixeira et al. (2012), a delay of more than six hours in performing an appendectomy is associated with surgical site infections, especially for patients with non-

perforated appendixes. It is therefore, crucial to minimize the time that it takes for a patient to reach the OR when presenting with appendicitis.

Although we have reported that there is no significant difference in surgical outcome after either a CT scan or an US is used in diagnosis, this study shows that the use imaging modalities can affect the efficiency of caring for these patients. Most notably, the significant increase in time with the use of a CT scan over an US in boys with AA is one to be considered, given that the majority of patients with appendicitis in this population were diagnosed with AA. Though the increased use of US since the start of the Late period should be maintained in order to minimize this time difference, perhaps a heavier focus should be placed on an accurate history and physical examination of the patient in diagnosis, to further shorten the time taken to reach the OR. This has been supported in a study by York et al. (2005), which argues that the utilization of imaging in diagnosis serves to delay surgical treatment and increase healthcare costs without appreciably increasing diagnostic accuracy. The findings of our preliminary and current study support this argument, indicating that there may be an overreliance on imaging in diagnosis of pediatric appendicitis.

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