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Article: Effects of Timing to Diagnosis and Appendectomy in Pediatric Appendicitis. Pediatric Emergency Care. November 2015; 31(11) 753-758.

Clinical Question: How does duration of symptomatology before diagnosis and total time from symptom onset to surgery affect rates of perforation, hospital length of stay, and OR time?
Secondary question: How does time of diagnosis to surgery time affect these same variables?

Background: In childhood, abdominal pain and emergency abdominal surgery are most commonly related to appendicitis. The process of perforation is believed to start as luminal obstruction causing increased mucous production, bacterial growth and stasis. This causes stasis with increased wall tension, decreased blood and lymph flow progressing eventually to necrosis and perforation. Currently the American College of Surgeons recommends against interval appendectomies in pediatric patients with known perforations, no formal recommendations have been made regarding timing of surgical interventions. Recent prospective studies do show that perforation risk correlates with increased duration of symptoms; primarily associated with increased time to diagnosis.

Methods and Results: Prospective study conducted at an urban, level I, pediatric emergency department. Children enrolled were 4-17 years of age between May 2009 and April 2010. Diagnosis of appendicitis was made radiographically or clinically by a pediatric surgeon. Patients were excluded if they were pregnant or had chronic underlying medical problems. Information collected from each patient included: age, sex, time of symptom onset, time of diagnosis, OR transport time, OR time, post-operative hospital time. All specimens were reviewed by a pathologist to confirm appendicitis, perforation, and gangrene. The researchers used a logistic regression model to test the association between perforation and time from symptom onset to diagnosis grouping patients into less than 24 hours, 24-48 hours, and greater than 48 hours. A linear regression model was used to assess the association between perforation and duration of surgery and negative binominal regression to evaluate length of stay.

Researchers evaluated 342 patients for the study, enrolling 240. From the enrolled group, 4 were excluded because of incomplete data and 6 had negative pathology for appendicitis. A total of 230 patients were used in the study results, 64 (28%) had perforations. Average length of stay was 2.6 days with an average OR time of 58 minutes. Those patients found to have perforations did have an increased length of stay, 3.5 days with OR time of 69 minutes. Combining perforated and non-perforated appendicitis patients, symptom onset to diagnosis of greater than 48 hours resulted in a 55.7% increase in length of stay and 4.9 increases in odds of perforation than those with symptom duration less than 24 hours. In the same group, those with greater than 48 hours symptom onset to surgical intervention had 60.6% increase in length of stay and 3.6 times increase risk of perforation. Evaluation of time of diagnosis to surgery did not reveal any significance difference in length of stay, perforation rate, or OR time.

Discussion and Conclusion: Ultimately, the study did find that delay in diagnosis from onset of symptoms does increase the risk of perforation and length of stay in the hospital. This study also did not find any statistically significant difference in LOS, OR time or perforation rate between time of diagnosis and delay in surgical intervention greater than 6 hours. The study was small and therefore additional research would be needed, however, their findings are consistent with other literature investigating the same subject matter.