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Does getting sick make kids weaker? The effect of appendicitis on muscle mass

Appendicitis is a common illness that can often be treated with a laparoscopic appendectomy, which is a relatively routine surgery. If it is caught early, patients are often able to go home the same or next day. However, if the appendicitis is not found early enough, the appendix can rupture. After the appendix ruptures, a patient may need surgery as well as multiple days in the hospitals to recover. In adult patients, serious illnesses, like ruptured appendicitis have been shown to decrease the muscle mass in some patients. Patients who lose more of their muscle mass have been shown to have worse outcomes after surgery compared to other patients who have the same operation but do not lose as much muscle. When muscle mass is lost, it is called sarcopenia. Researchers do not know if the same changes in muscle mass happen in children when they become sick. We looked at children with perforated appendicitis to see if their muscle mass changed after their illness. Specifically, we wanted to know if their illness led to a decrease in muscle mass, or sarcopenia.

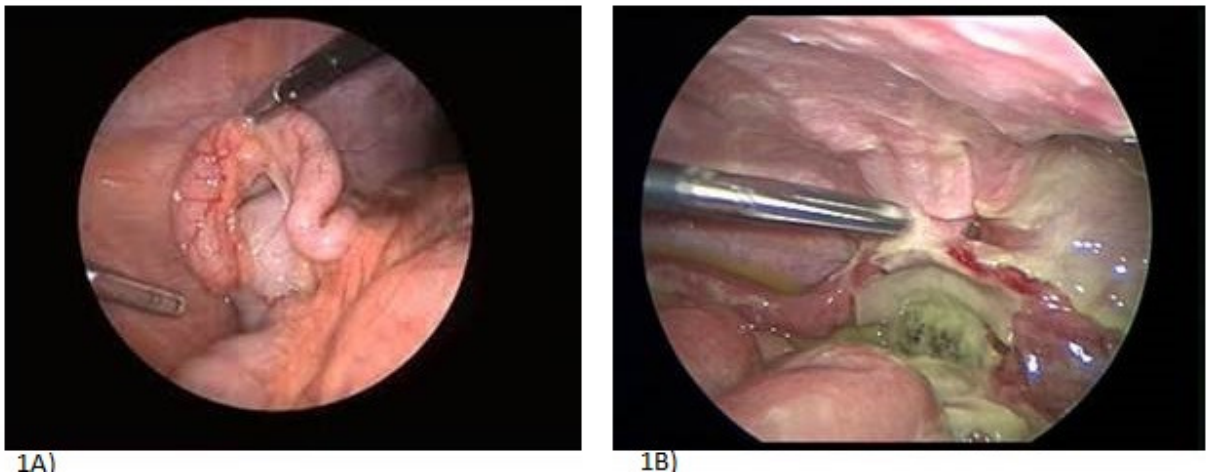

Fig. 1. Picture of mildly inflamed appendix (1A) and perforated appendicitis (1B) taken during laparoscopic appendectomy.

We looked at 36 children who had ruptured appendicitis and needed to spend several days in the hospital because they were very ill from their appendicitis. We chose ruptured appendicitis because it occurs in otherwise healthy patients who then become ill for a relatively short amount of time. Many children with ruptured appendicitis have a CT scan when they come to the hospital. A CT scan of the abdomen shows many of the muscles inside the abdomen. One of these muscles that is visible, the psoas, has been shown to be a good representative of overall skeletal muscle mass. For our study, we measured the size of the psoas muscle when children arrived at the hospital with ruptured appendicitis, and then compared it to the size of the psoas muscle in the same children if they had another CT scan after their surgery. We also looked at their overall weight change by comparing their body mass index (or BMI) before and after surgery. A BMI tells you how much a person weighs compared to how tall they are. A normal BMI is 18-25; a BMI of greater than 25 indicates someone who is overweight for their height, and a BMI of less than 18 indicates someone who is underweight for their height.

Fig. 2. Computed tomography scan of normal patient showing the location of the psoas muscles bilaterally (circled in red). (Source: http://ar.utmb.edu/webpath/radiol/radnorm/abct29.htm)

We found that getting sick with ruptured appendicitis caused a decrease in BMI of 0.8 kg/m^2 from when the children were first admitted to when they were discharged from the hospital. We also found that the measurements of their psoas muscle decreased 0.81 % per day over their treatment. This decrease happened regardless of the child's starting BMI, their gender, or their race. This means that if a patient were admitted for 9 days for treatment of their appendicitis, they would lose approximately 7% of their muscle mass. These findings show that when healthy children become seriously ill for even a relatively short amount of time, that illness can cause them to lose muscle mass. What we don't know is whether or not that decrease in muscle mass, or sarcopenia, causes children to be at risk for worse outcomes after surgery like adults have, such as increased chances of having a complication. We are currently looking into ways to figure out what a normal psoas muscle measurement is in children of all ages, and to see what effect sarcopenia has on their ability to recover from surgery.

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