Normal abdominal aortic diameter in pediatric patients on T1 weighted non-contrast MRI.

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Purpose: There is little data on normal values of the aortic abdominal diameter in children, with most studies evaluating the thoracic aorta in the cardiac MRI literature. This study aimed to establish normal MRI values for the diameter of the abdominal aorta in children.

Methods: Ninety children under the age of 13 years who underwent MRI of the abdomen for a variety of diagnoses were included. Exclusion criteria were: aortic pathology, abdominal tumor, or prior abdominal radiation. Two observers (a pediatric radiologist and a pediatric radiology fellow) measured the AP and transverse diameter of the abdominal aorta on non-contrast T1 weighted images (FSPGR TE 4.2 ms / TR 185 ms, 5 mm thick). An effective aortic diameter was calculated as the geometric mean of the AP and transverse diameters. The effective diameter was plotted against patient age at each of three levels: on slice above the celiac artery, one slice below the renal arteries, and one slice above the aortic bifurcation.

Results: There was a linear relationship between age and effective aortic diameter at each of the three levels. Above celiac artery level, diameter in cm = 0.5607 (age in years) + 6.25 (R²=0.8125). Below the renal arteries, aortic diameter in cm = 0.4855 (age in years) + 4.61 (R²=0.8045). Above the aortic bifurcation, aortic diameter in cm = 0.4973 (age in years) + 4.42 (R²=0.7845). Bland Altman plots showed moderate inter-observer agreement.

Conclusion: A linear relationship was established between effective aortic diameter and age. These data provide a guide to normal aortic diameter in children from newborn to 13 years of age. Further work normalizing these values to body surface area would be desirable.