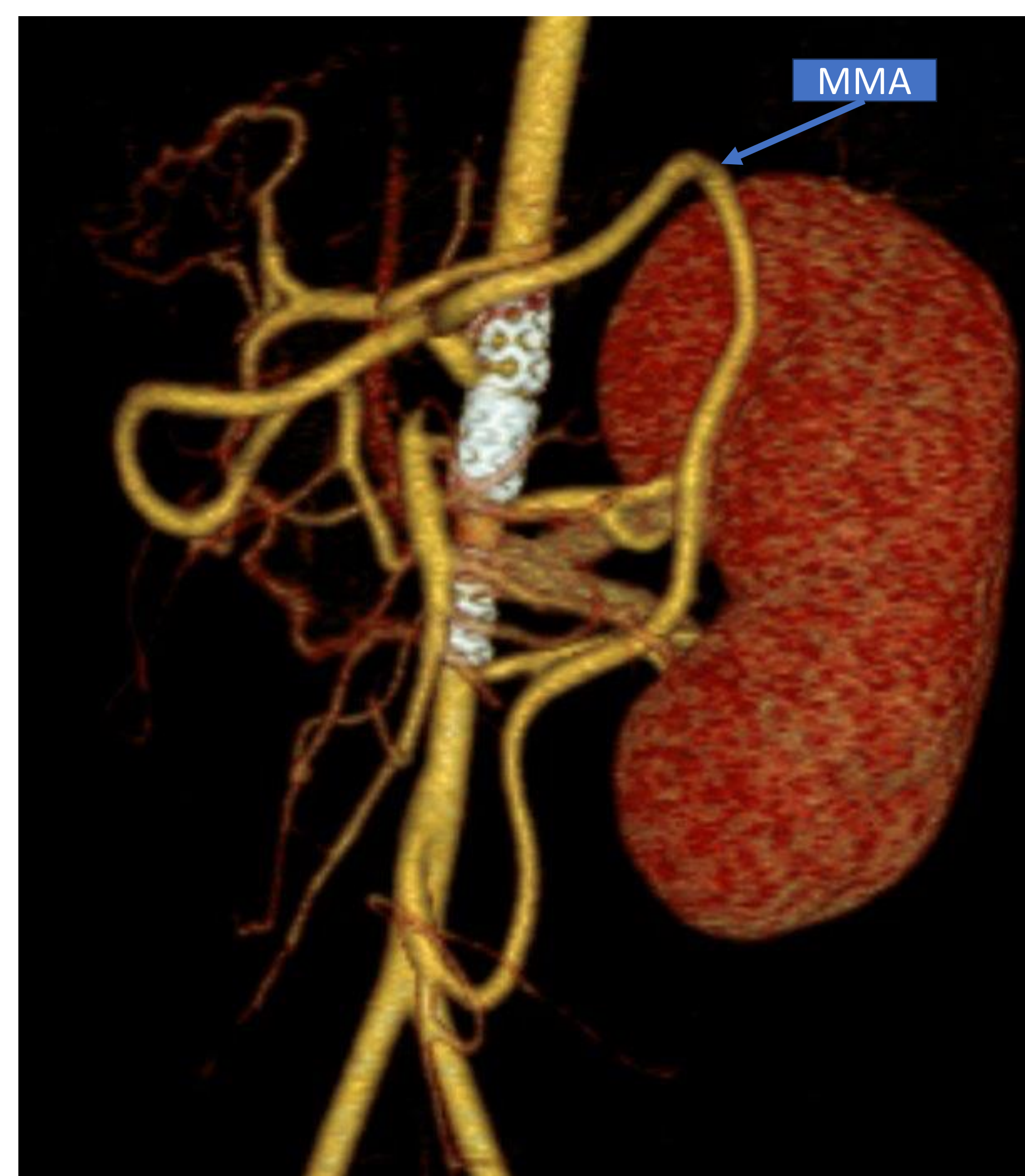


## Background

- **Midaortic syndrome (MAS):** rare condition in children and young adults, characterized by narrowing of the thoracic and/or abdominal aorta ± frequent visceral and renal artery involvement causing renovascular hypertension.
- Common symptoms: claudication, exercise intolerance, abdominal pain, headaches, failure to thrive
- Treatment: medication, endovascular intervention, and surgery (traditionally involving patch aortoplasty or aorto-aortic bypass procedures with prosthetic grafts)
- The **Mesenteric Artery Growth Improves Circulation (MAGIC)** procedure is a novel surgical technique using an autologous vessel, the meandering mesenteric artery (MMA), for aorto-aortic bypass.
- Avoids potential long-term complications associated with prosthetic grafts, such as increased infectious risk and aneurysm formation.

**Figure 1: Meandering Mesenteric Artery**



**Figure 2: MMA as MAGIC Graft**

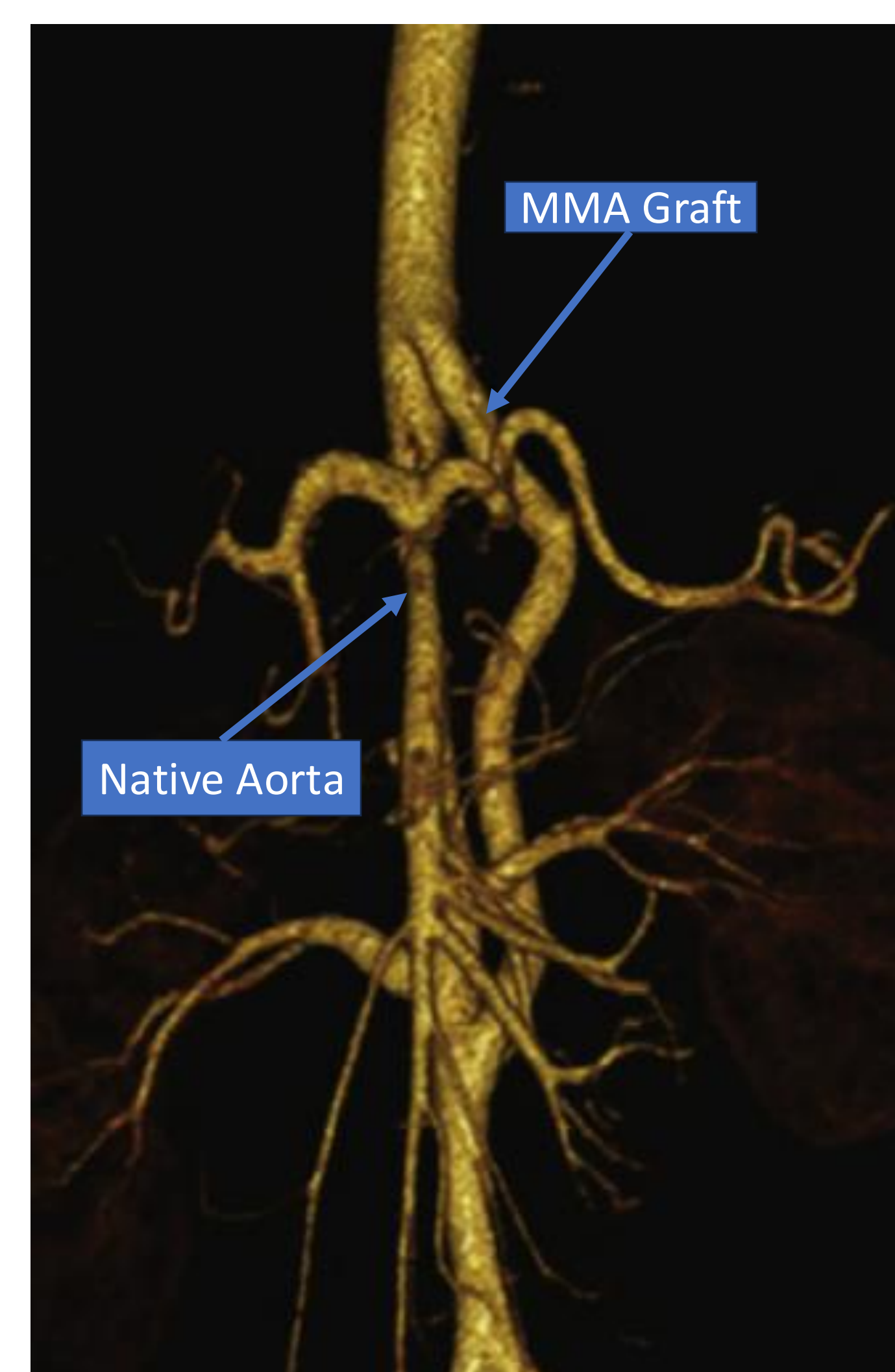


Image (Right) from: Kim SS, Stein DR, Ferguson MA, et al. Surgical management of pediatric renovascular hypertension and midaortic syndrome at a single-center multidisciplinary program. Journal of Vascular Surgery. 2021;74(1):79-89.e2. doi:10.1016/j.jvs.2020.12.053

**Our study aimed to evaluate long term outcomes following the MAGIC procedure for patients with Midaortic Syndrome.**

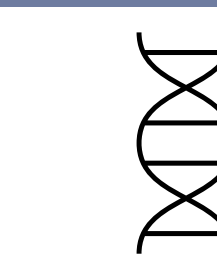
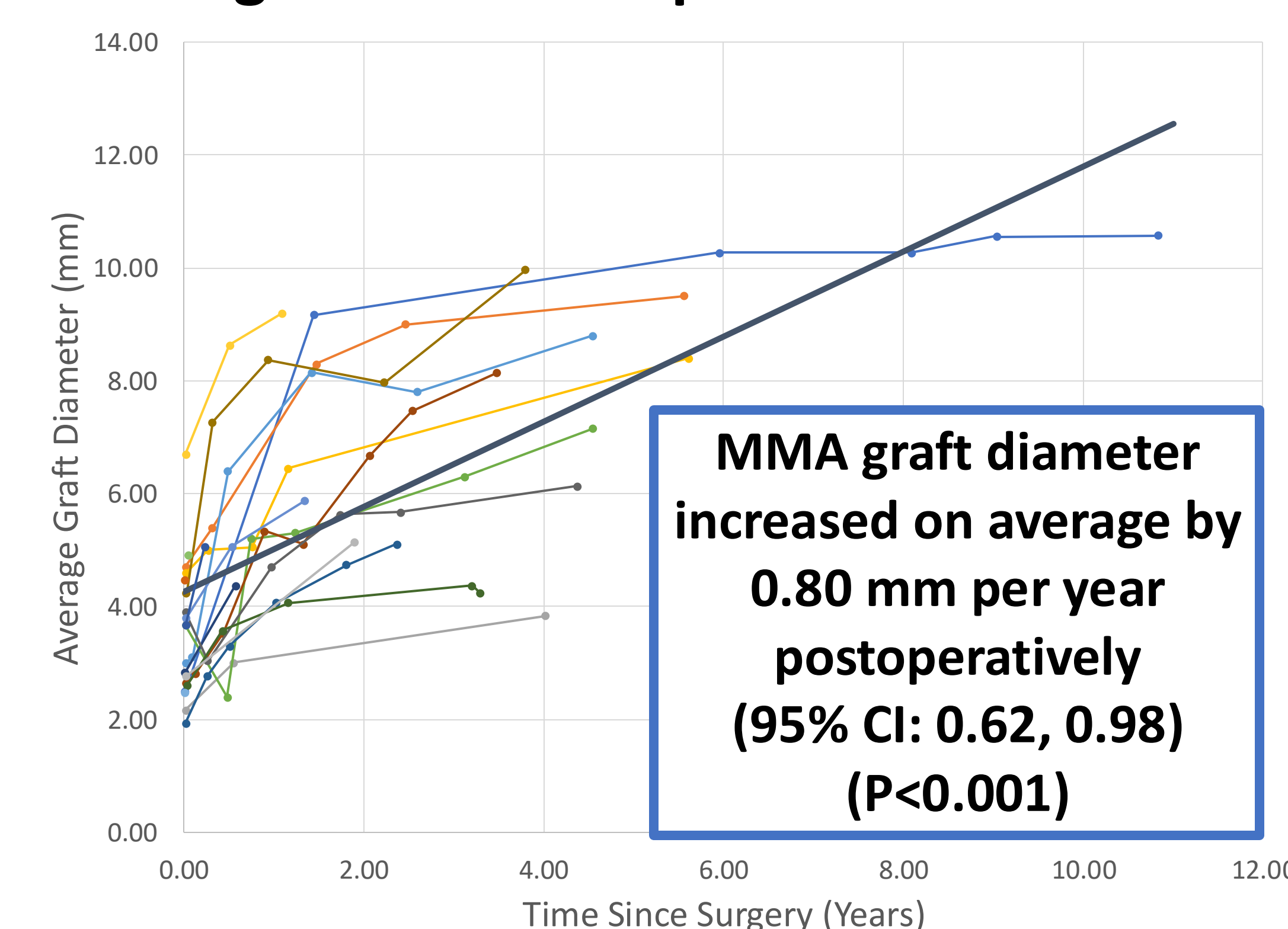
## Methods

- **Study Design and Data Source:** Retrospective study of patients with MAS undergoing MAGIC procedure at Boston Children's Hospital
- **Study Period:** Between years 2012 to 2023
- **Variables of Interest:** Systolic Blood Pressure, Chronic Kidney Disease, Number of Anti-Hypertensives, MMA Diameter, Postoperative Interventions/Complications
- **Analysis:** Kruskal-Wallis Test, Fisher's Exact Test, Mann-Whitney U Test, and Longitudinal Analysis

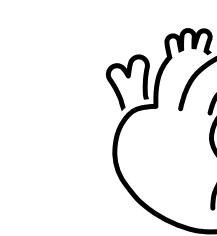
## Results

**Cohort:** 19 patients  
**Median Age at Presentation:** 5.0 years (Range: 0.17 – 15)  
**Median Age at Surgery:** 12.0 years (Range: 0.85 – 17.7)  
**Median Vessel Involvement:** 4 Vessels (Range: 2-4)  
**Median Follow Up:** 2.28 years (Range: 0.04 – 10.9)

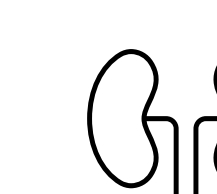
**Figure 3: Postoperative MMA Graft Growth throughout Follow Up in MAGIC Patients**



**Associated Syndromes:**  
4 patients (21.1%), Neurofibromatosis-1



**Evidence of Left Ventricular Hypertrophy:**  
12 patients (63.2%)



**Evidence of Renal Dysfunction:**  
8 Patients (42.1%)

**Table 1: Pre- and Postoperative Assessment of Hypertension and Chronic Kidney Disease**

	Preoperative	Discharge	P-Value	Latest Follow Up	P-Value
<b>N</b>	19	19		12	
<b>Hypertension Staging, N (%):</b>			0.629		0.010
Normotensive	4 (21.1%)	2 (10.5%)		7 (58.3%)	
Stage I	6 (33.3%)	8 (42.1%)		5 (41.7%)	
Stage II	9 (47.4%)	9 (47.4%)	0 (0.0%)		
<b>N</b>	19	19		19	
<b>Number of Anti-hypertensives Mean ± SD</b>	2.6 ± 1.5	2.1 ± 1.4	0.295	1.3 ± 1.2	0.006

**Table 2: Intraoperative Considerations and Postoperative Complications**

Settings	N (%)	Indications
<b>Intraoperative Considerations</b>	2 (10.5%)	compromised bowel requiring resection, diminished marginal artery pulse requiring MMA re-anastomosis
<b>Postoperative Re-operative Interventions</b>	5 (26.3%)	poor graft flow, rupture after angioplasty, small bowel obstruction, renal autotransplantation, ureteral obstruction, renal artery thrombosis
<b>Postoperative Transcatheter Interventions</b>	7 (36.8%)	graft stenosis/ pseudoaneurysm, renal artery stenosis, native aorta thrombus

## Limitations

- As a regional, national, and international referral center, follow-up data, especially for older documented patients, were incomplete
- Our data set was small and from a single institution making our data difficult to generalize

## Conclusions

- ❖ **MAGIC patients required significantly lower number of antihypertensives and had improvement in blood pressure after surgery**
- ❖ **The MMA grafts used for MAGIC continued to show significant growth over time**
- ❖ **These results support the use of native vessels for aortic reconstruction in MAS patients**