



# Correlation of True Lumen Femoral and Mesenteric Perfusion Pressure in Acute Aortic Dissection



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## Purpose

The purpose of this study of acute aortic dissection is to report the correlation between common iliac (CIA) and superior mesenteric artery (SMA) perfusion pressures when both arise exclusively from the true lumen, and to highlight the loss of the femoral pulse in these patients as an early indicator of visceral malperfusion.

## Background

- Visceral malperfusion is a feared complication of aortic dissection as it is a significant source of morbidity and mortality, and early signs can be obscure.
- It occurs when blood flow to vital organs is impaired, mainly to superior mesenteric, celiac and renal arteries.
- Two main mechanisms by which aortic dissection can cause visceral malperfusion are dynamic and static obstruction (1).
- Type A aortic dissection is associated with a 5% risk of mesenteric malperfusion (2), whereas Type B aortic dissection is associated with a 7% risk of mesenteric malperfusion (3).
- Patients with complicated type B aortic dissections have a rate of visceral ischemia between 14-25% and an estimated of in-hospital mortality secondary to visceral malperfusion ranging from 2-11% (4).
- Mesenteric and renal malperfusion are often comorbid.
- The current clinical standard to detect visceral malperfusion relies on signs of end-organ failure such as rising creatinine or lactate, acute abdomen, or oliguria.
- CT scan is the most common method used to detect malperfusion and assess the mechanism of obstruction.
- The presence of the femoral pulse is an easily obtained physical exam sign that could potentially be used as a sensitive early indicator of visceral malperfusion in the subset of patients in whom iliac and superior mesenteric artery perfusion are anatomically linked by exclusive true lumen perfusion.
- Early detection of visceral malperfusion could lead to earlier intervention, and better outcomes.

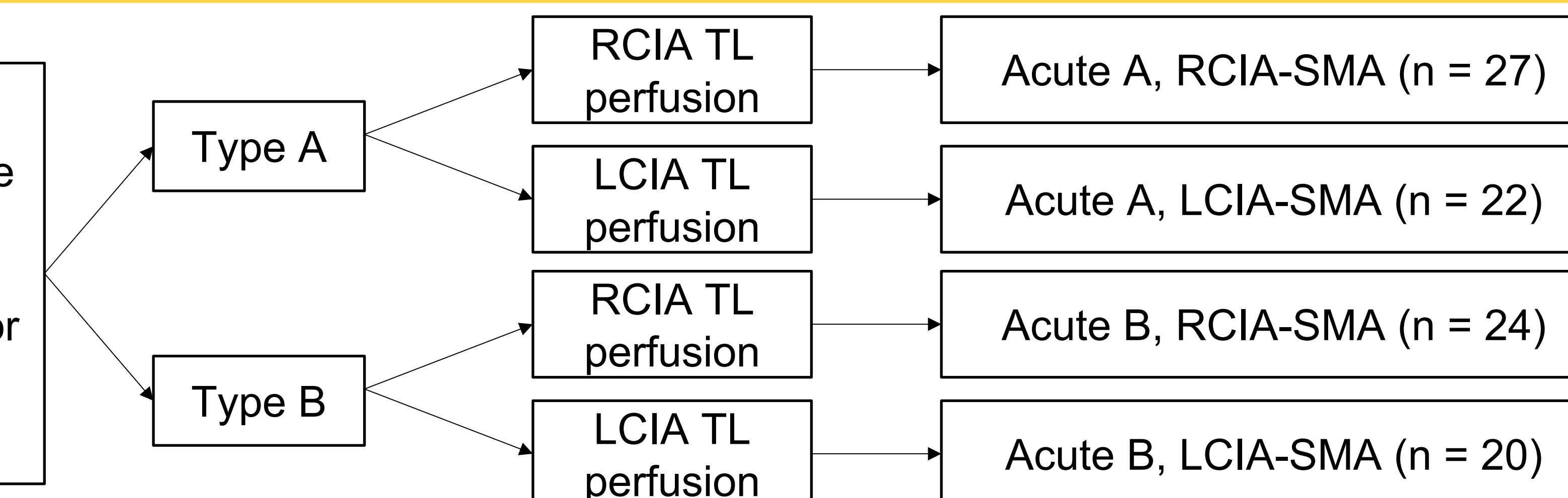
## Hypothesis

In the setting of aortic dissections in which the femoral and superior mesenteric arteries both originate exclusively off the true lumen of the aorta, *we hypothesize that* the femoral artery pressure correlates closely with superior mesenteric artery pressure, and as such, loss of the femoral pulse on physical exam would be due to dynamic obstruction and would be associated with mesenteric malperfusion.

## Methods

- We performed a retrospective review of 488 patients with acute aortic dissection at the University of Michigan presenting from 1996 to 2022.
- The study aims to evaluate the association between CIA and SMA pressures in patients with the SMA and at least one common iliac artery receiving exclusive true lumen perfusion.
- Patients' branch artery systolic pressures were measured in mmHg by intraluminal catheter.
- The pressure readings were then subdivided into groups based on type of acute aortic dissection and laterality of the iliac artery.
- Within these subgroups, SMA and CIA pressures were recorded and analyzed.
- Patients were excluded if they did not have appropriate imaging studies available to delineate branch vessel anatomy or if they did not have pre-intervention systolic pressures measured for the branch vessels of interest.

UMich patients with acute aortic dissection and endovascular pressure measurements taken prior to intervention (n=488)

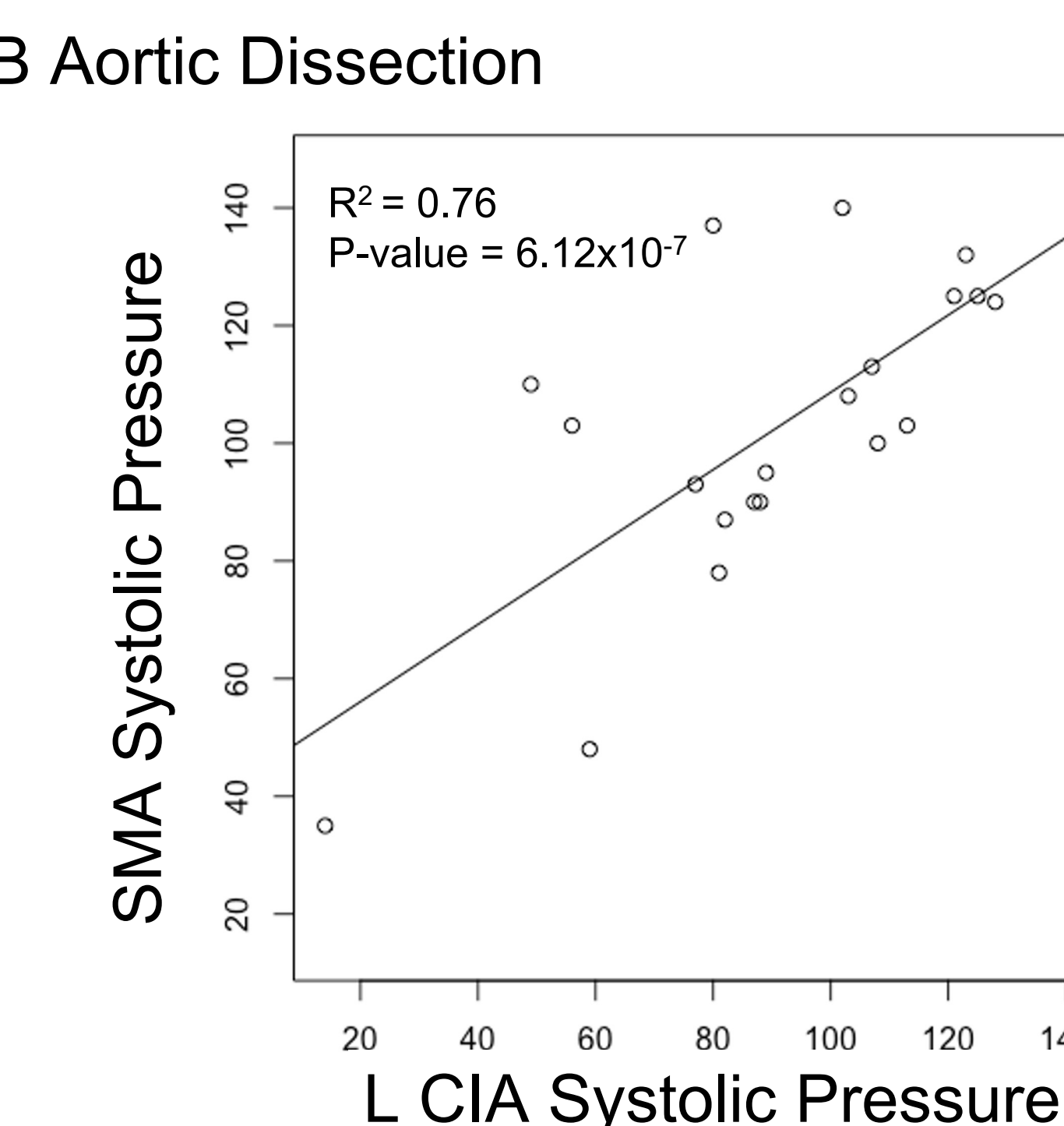
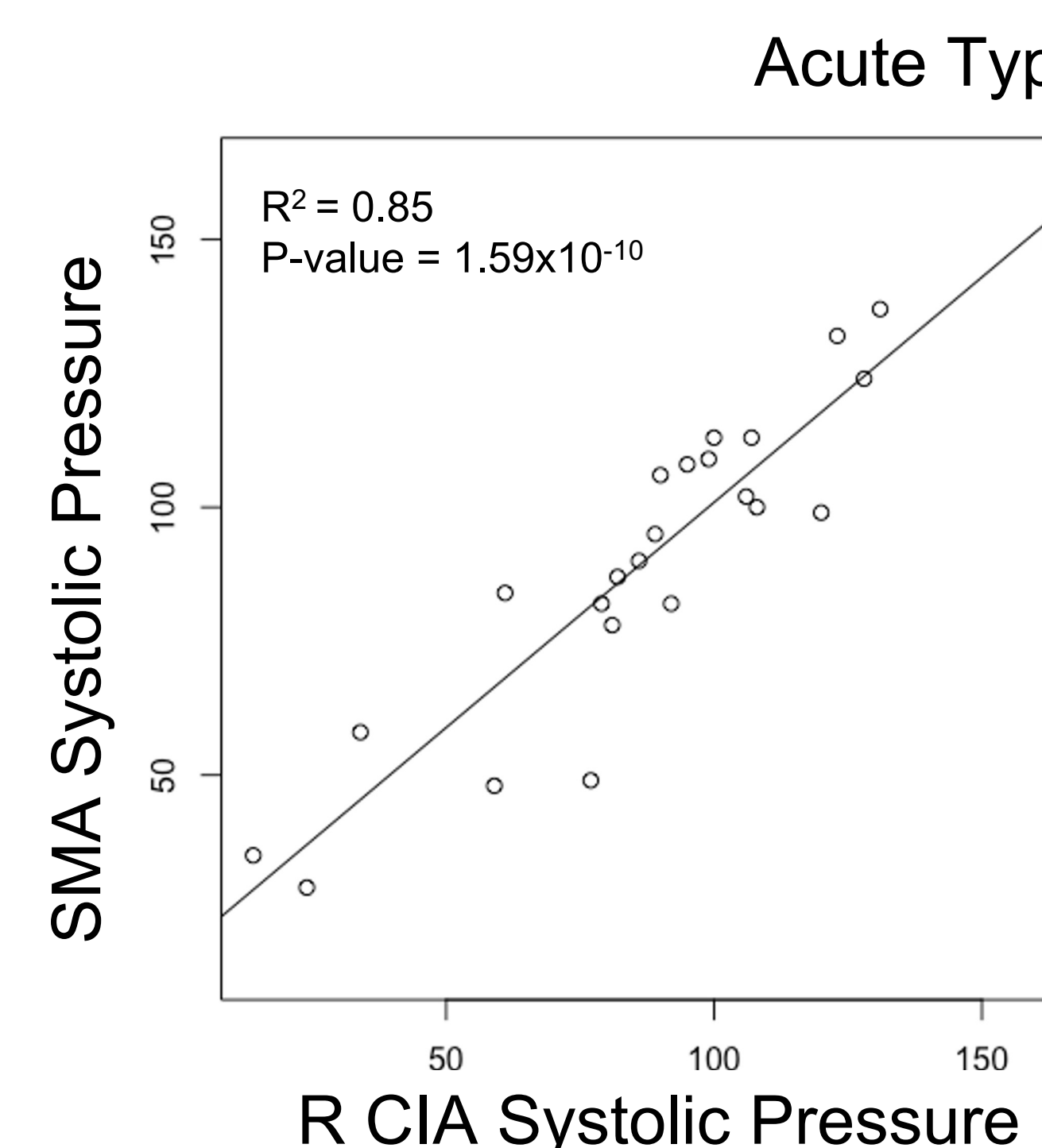
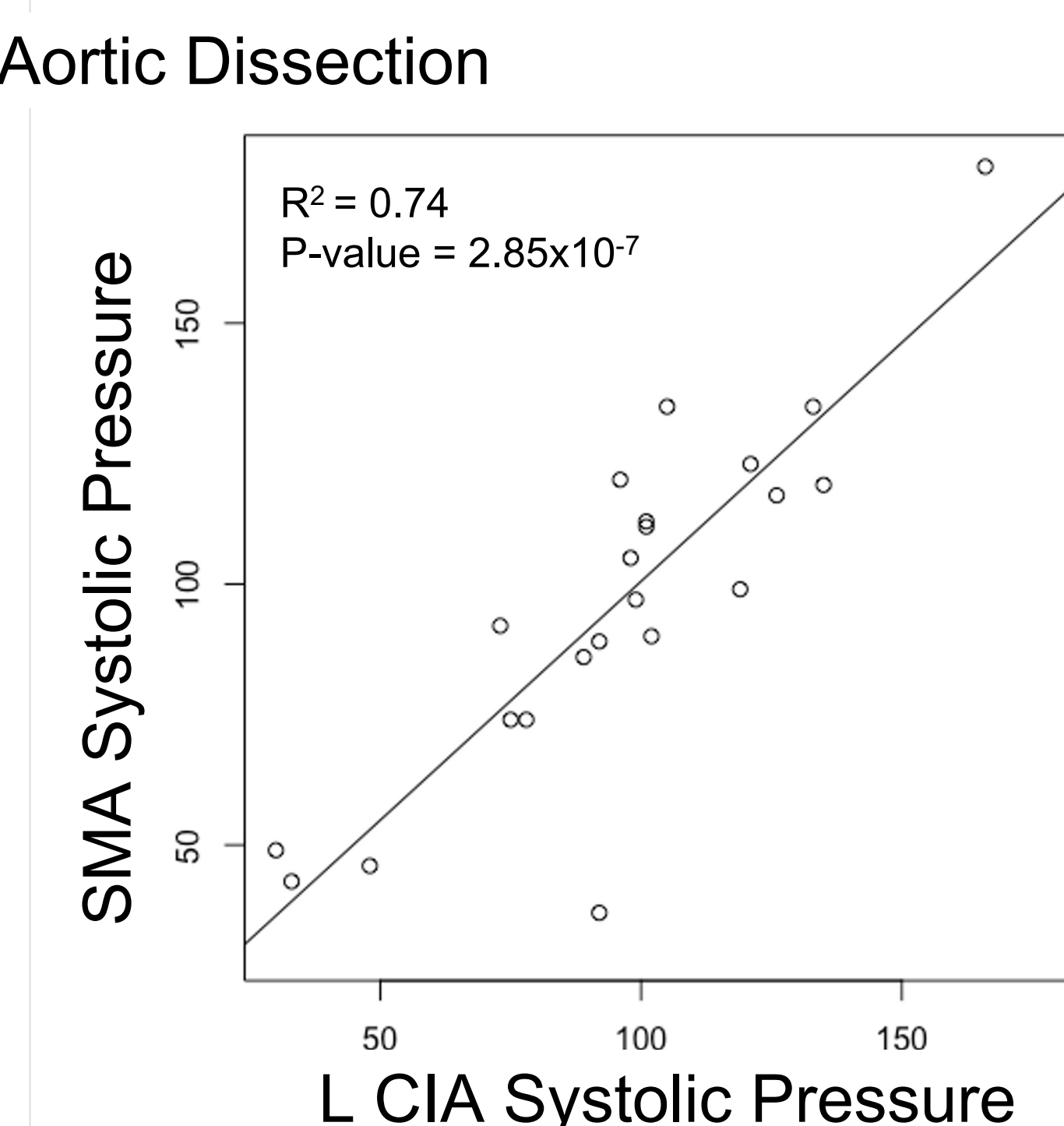
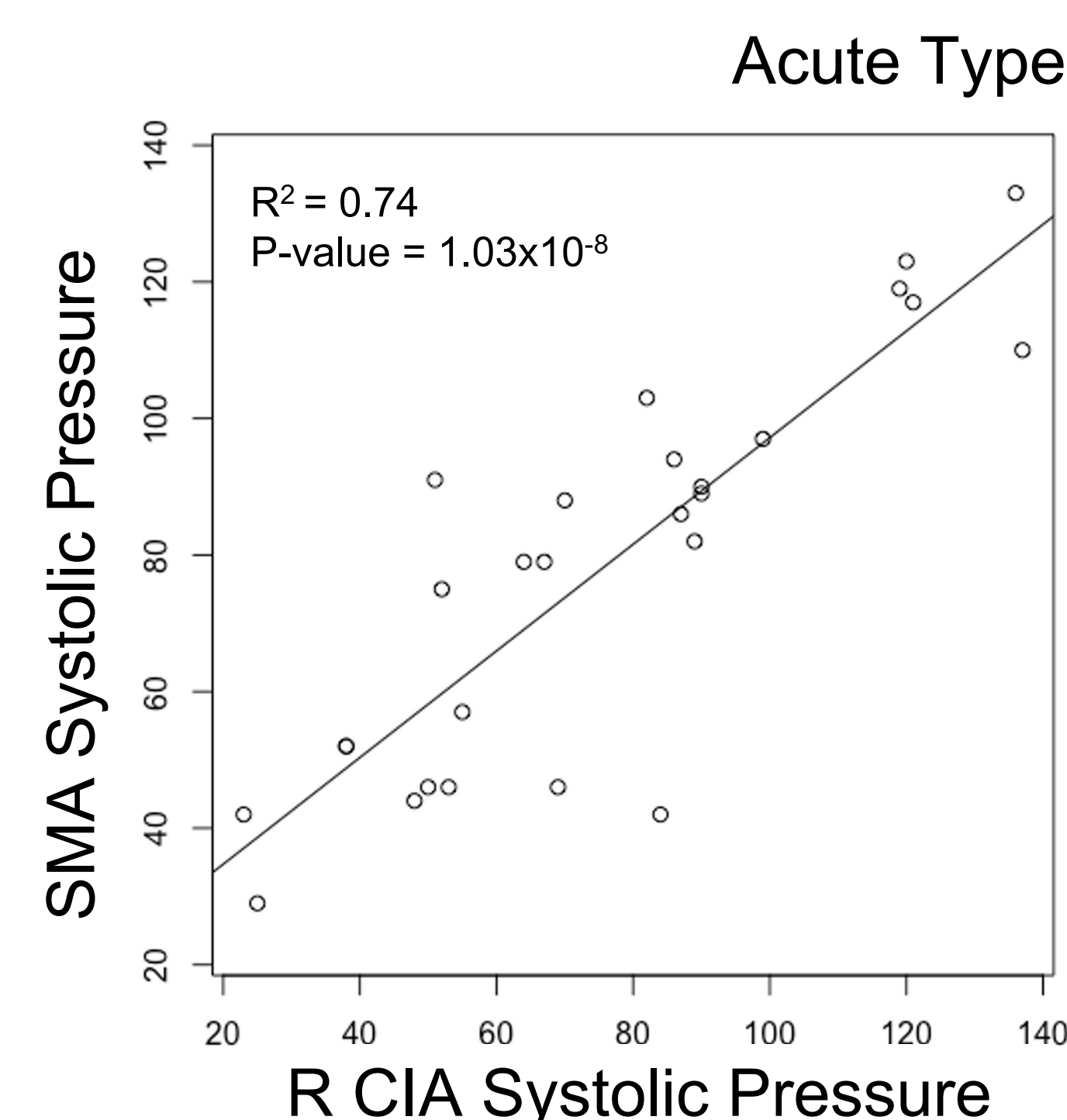


- Patients were also excluded if there was branch artery true lumen thrombosis as a result of dynamic obstruction of the vessel or if re-entry tear into the inframesenteric aortic true lumen was present, as determined by cross-sectional imaging or procedural intravascular ultrasound.
- Linear regression and significance analysis were performed for each of the CIA-SMA subgroups in RStudio [version 2022.07.2].

## Results

Acute Type A							
Proximal Vessel	Distal Vessel	n	Slope	R Squared	95% CI Lower Bound	95% CI Upper Bound	P-Value
SMA	RCIA	27	0.78	0.74	0.71	0.93	1.03E-08
SMA	LCIA	22	0.92	0.74	0.69	0.94	2.85E-07

Acute Type B							
Proximal Vessel	Distal Vessel	n	Slope	R Squared	95% CI Lower Bound	95% CI Upper Bound	P-Value
SMA	RCIA	24	0.84	0.85	0.83	0.97	1.59E-10
SMA	LCIA	20	0.82	0.76	0.70	0.95	6.12E-07



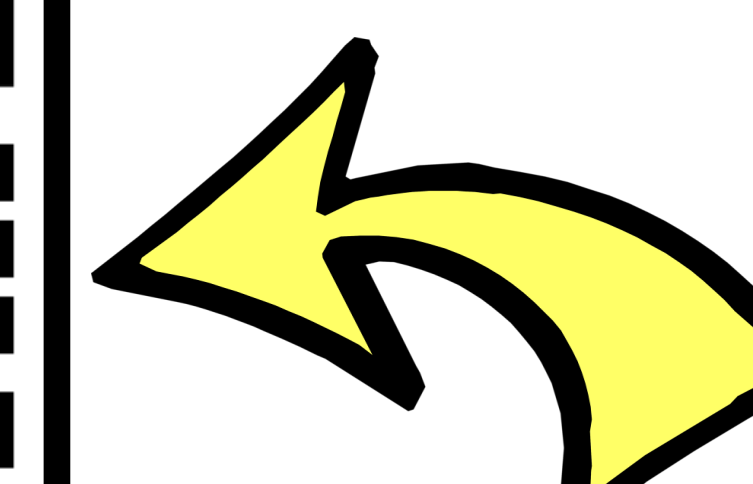
## Conclusions

In patients with acute aortic dissection in whom the SMA and a CIA are supplied exclusively by the true lumen, systolic CIA pressures correlate linearly with systolic SMA pressure. The implications of this finding are that the clinical diminution or loss of the femoral pulse could indicate a concomitant decrease in SMA pressure, raising concern for visceral malperfusion.

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## E-Poster



SCAN ME!

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