Effect of Iliac Venous Compression (May-Thurner Syndrome) in the Setting of Scoliosis

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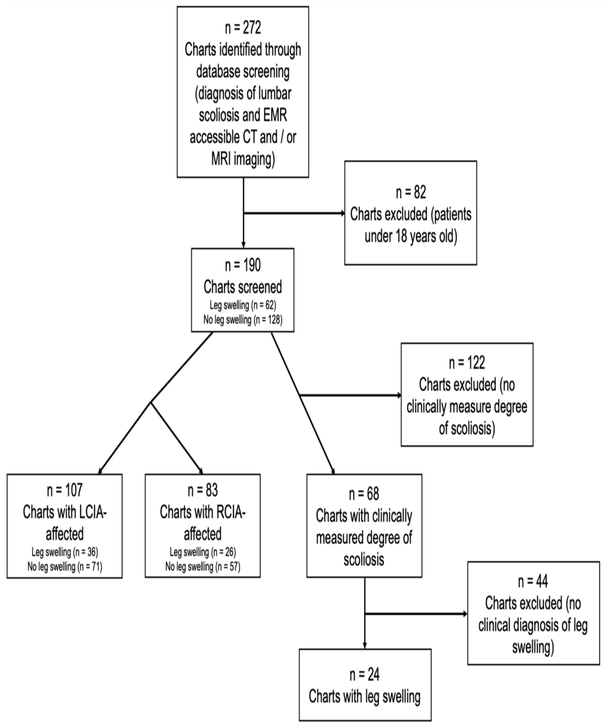
ABSTRACT

First defined in 1957, MTS was initially thought to be rare but is now believed to be underdiagnosed due to improved imaging technology [2]. Anatomy of the spine is crucial to the development of MTS [3]. The right common iliac artery crosses over the common iliac veins anterior to the lumbar vertebrae and thus MTS is most commonly caused by RCIA compression of the LCIV [4]. Scoliosis refers to abnormal curvature of the spine and thus compromises the anatomy around the common iliac vessels. This lead to **our hypothesis that lumbar scoliosis is a risk factor for developing MTS**. This study aims to characterize this relationship to better inform clinical care for patients with lumbar scoliosis.

METHODS



All charts from MUSC scoliosis patients were screened and degree of lumbar scoliosis was recorded. Clinical leg swelling was used as an indicator of MTS. Artery-spine (A-S) distance was used as an indicator of venous compression [5]. A Mann-Whitney U test was used for comparisons between groups and a Pearson correlation coefficient was used for analyses between scoliosis degree and A-S distance.

RESULTS

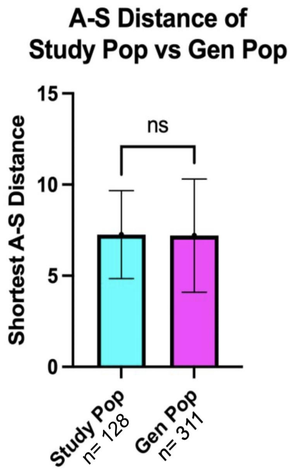


Fig 2. Study Population A-S Distance Compared to General Population. When comparing the shortest A-S distance of all adults in the study population without leg swelling to previously published general population statistics (Lopes et al.. 2023), there was not a significant difference. This validates the generalizability of the study population as well as that lumbar scoliosis does not inherently lead to common iliac venous compression.

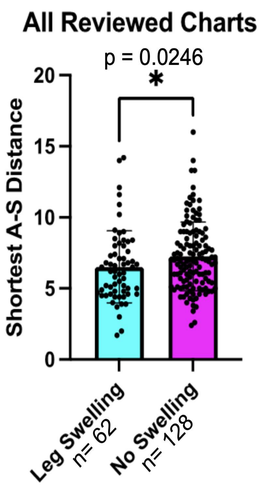


Fig 3. Comparison of A-S Distance with Leg Swelling in Sample Population. When comparing all adult patients in the study population with the clinical diagnosis of leg swelling (indicator for MTS) to those without. Patients with leg swelling had a significantly decreased A-S distance validating leg swelling as an indicator for venous compression and thus potentially MTS.

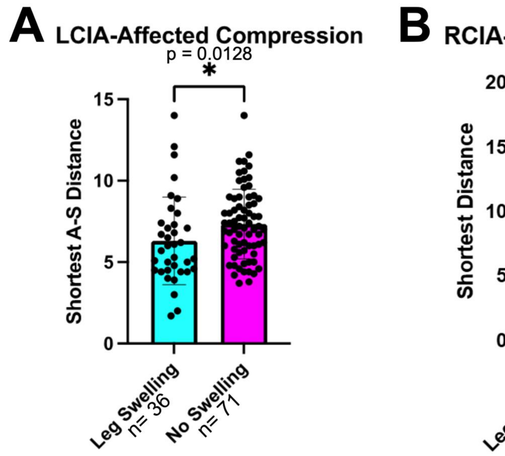


Fig 4. Comparison of A-S Distance with Leg Swelling in Sample Population. The study population was separated into those in which the LCIA caused venous compression (**A**) and those in which the RCIA caused venous compression (**B**). Only patients in which the LCIA caused venous compression had statistically decreased A-S distances with leg swelling. These findings demonstrate the previously held belief MTS is most often caused by RCIA compressing the LCIV is not applicable in the context of lumbar scoliosis.

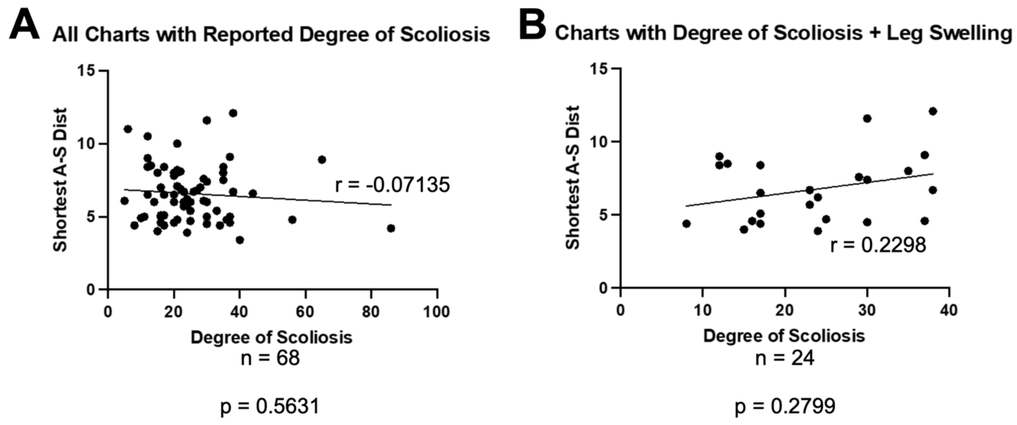


Fig 5. Correlation between Degree of Scoliosis and Venous Compression. The correlation between A-S distance and degree of lumbar scoliosis was analyzed via the Pearson correlation coefficient and was found to be not significant (**A**), indicating presence of scoliosis does not inherently alter venous compression. Even when restricted to those with leg swelling, there was no significant correlation (**B**). Thus, the presence of leg swelling in the context of lumbar scoliosis is enough to indicate distortion of iliac vasculature.

CONCLUSIONS

- Scoliosis patients with clinical leg swelling have increased venous compression (decreased A-S distance), suggesting potential for intervention.
- The significant difference in A-S distance for LCIA-affected patients with leg swelling vs without, but not RCIA-affected patients, indicates that altered spine anatomy in scoliosis may influence the pathophysiology of May-Thurner syndrome.
- The presence of leg swelling in the context of lumbar scoliosis, regardless of severity, is enough to indicate distortion of iliac vasculature.
- These findings challenge the previously held idea that MTS is most often caused by RCIA compressing the left common iliac vein in the context of lumbar scoliosis.

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