Title: Three-dimensional Spinal Canal Morphometric Analysis and Relevant Spinal Cord Occupational Ratios in Congenital Cervical Spinal Stenosis:

A classification algorithm of the stenosis phenotypes and data driven decompression approach.

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Abstract:

Objectives: No standardized MRI parameters have defined the three-dimensional morphoanatomy and relevant spinal cord occupation ratios (occupation of spinal cord dimensions/similar dimensions within the spinal canal) in congenital cervical stenosis CCS.

Methods: A retrospective, comparative analysis was conducted on 200 patients >18 years of age with myelopathy (mean age, 52.4 years) and CCS and 200 age-matched controls with no myelopathy or radiculopathy. The variables assessed from high resolution MRI included sagittal and axial spinal canal dimensions (MRI Torg ratios) from C3-C7. Morphometric dimensions from the sagittal retrodiscal and retrovertebral regions as well as axial MRI dimensions were compared. Sagittal and axial spinal cord occupation ratios were defined and correlated with spinal canal dimensions.

Results: Multivariate analyses indicated reduced sagittal and axial anteroposterior AP spinal canal dimensions and a large reduction in transverse spinal canal dimensions at all spinal levels. There was a small significant correlation between AP sagittal spinal canal dimensions and axial transverse spinal canal dimensions at C3-C5, but not at C5-C6. Small correlations were noted between AP sagittal spinal canal dimensions and AP axial spinal cord and axial cross-sectional area occupation ratios at C3-C6, but there was no correlation with axial mediolateral spinal cord occupation ratios.

Conclusions: The stenosis effect can involve any dimension, including the transverse spinal canal dimension, independent of other dimensions. Owing to the varied observed morphoanatomies', a classification algorithm that defines CCS specific phenotypes was formulated. Objectivizing the stenosis morphoanatomy may allow for data-driven patient-focused decompression approaches in the future.

Biography:

Proffer. Sameer A. Kitab was born on November 1, 1964, in Iraq. He is a professional in orthopedics, married to pharmacist Lamees A. Al-Azzawy, with three children: Samar, Mary, and Tariq. He graduated from Baghdad University with an M.B.Ch.B. in 1988 and earned an F.I.C.M.S. in Orthopedics in 1996. He started as a Staff Orthopedic Surgeon at Ad-Diwaniyah Teaching Hospital (1997-1999) and became a Senior Lecturer at Ad-Diwaniya Medical College in 1998. He then led the Anatomy and Surgery Departments at Ad-Diwaniya Medical College and Teaching Hospital from 1999 to 2003. He became an Assistant Professor and Assistant Scientific Dean in 2000. Since 2004, he has directed the Spine Surgery Specialized Unit and became a Tenured Full Professor at Al-Qadisiyah University in 2014. He founded and supervises the spine fellowship program and the Ad-Diwaniyah Training Spine Center, overseeing postgraduate doctoral training in orthopedic studies. He also reviews for the Journal of the American Academy of Orthopedic Research and PLOS. His career is dedicated to advancing orthopedic education, research, and practice.