The Craniocervical Syndrome and MRI
The Craniocervical Syndrome and MRI

Editors

Francis W. Smith   London
Jay S. Dworkin    Melville, N.Y.

75 figures, 8 in color, 7 tables, and online supplementary material, 2015
Contents

VII Foreword

1 Upright Magnetic Resonance Imaging of the Cranio cervical Junction
Smith, F.W. (London)

9 The Cranial Cervical Syndrome Defined: New Hope for Postwhiplash Migraine Headache Patients – Cervical Digital Motion X-Ray, FONAR Upright® Weight-Bearing Multi-Position™ MRI and Minimally Invasive C1–C2 Transarticular Lag Screw Fixation Fusion
Franck, J.I.; Perrin, P. (Panama City, Fla.)
Online suppl. material, see www.karger.com/doi/10.1159/000365467

22 Concussion Update: Immunoexcitotoxicity, the Common Etiology of Postconcussion Syndrome, Chronic Traumatic Encephalopathy and Posttraumatic Stress Disorder
Maroon, J.C.; Bost, J.; Amos, A.; Winkelmann, R.; Mathyssek, C. (Pittsburgh, Pa.)

33 Cerebrospinal Fluid Physiology and Its Role in Neurologic Disease
Bradley, W.G. (San Diego, Calif.)

48 The Cranio cervical Junction: Observations regarding the Relationship between Misalignment, Obstruction of Cerebrospinal Fluid Flow, Cerebellar Tonsillar Ectopia, and Image-Guided Correction
Rosa, S. (Rock Hill, N.Y.); Baird, J.W. (Markham, Ont.)

67 Positional Venous Magnetic Resonance Angiography
Niggemann, P. (Mannheim); Pieper, C.C.; Hadizadeh, D.R. (Bonn)

74 The Possible Role of Cranio cervical Trauma and Abnormal Cerebrospinal Fluid Hydrodynamics in the Genesis of Multiple Sclerosis and the Cranio cervical Syndrome
Damadian, R.V.; Chu, D. (Melville, N.Y.)
Online suppl. material, see www.karger.com/doi/10.1159/000365473

92 Author Index
93 Subject Index
Rapid advances in diagnostic imaging technology have made us all more dependent on MRI images. It is, however, crucial to remember that we treat the patient and not the image. Frequently, the patient will tell us what is wrong if we ask the right questions. This monograph recognizes these observations as particularly germane when examining the implications of abnormalities and injury to the craniocervical junction.

There is a broad range of symptoms comprising what can rightly be referred to as the craniocervical syndrome. It should come as no surprise that the anatomy in the location of the craniocervical junction plays a pivotal role. There one will find subtle anatomy with the numerous ligaments holding everything together all running into each other. The myodural bridge, atlanto-occipital joint, dura mater holding the brain inside the cranium and the alar ligaments that join the peg to the base of the skull can now be readily identified utilizing the correct MRI equipment and appropriate pulse sequences.

We need to be vigilant and look in more detail at what has been truly damaged in these areas. Subtle details we either oversee or we ignore because we do not fully understand what has happened often go underreported in MRI exams. For instance, if you know what you are looking for, you can appreciate changes in the MRI appearance of the smaller ligaments rather than concentrate on just the larger ligaments, intervertebral discs, fractures and hemorrhage around the longitudinal ligaments. Venous drainage is different in recumbent and upright MRI scans; for instance, when lying down, the jugular vein appears larger because it does not drain as fast as when the patient is upright. Upright MRI also provides the decisive utility of cerebrospinal fluid flow studies around the craniocervical junction that are yielding insight into neurodegenerative diseases such as multiple sclerosis. Increased intracranial pressure can also be evaluated using state-of-art MRI techniques; the cerebrospinal fluid accumulation may play a role in traumatic brain injury, stroke and intracranial hemorrhages. It also has an impact in normal pressure hydrocephalus, the symptoms of which may overlap with those of Alzheimer’s disease.

Evidence that these problems have become ubiquitous can be found in the reported statistics that there are as many as one million whiplash injuries every year. Reported Chiari I abnormalities have increased as sagittal MRI midline slices from routine brain scans now allow for the quantitation of cerebellar tonsillar ectopia. MRI has impacted the threshold for diagnosis. It is not clear how trauma plays a role in the activation of symptoms attributed to Chiari I type malformation – are symptoms coincidental to trauma, awakened by the trauma or possibly caused by the trauma? This is another avenue of exciting research.

We welcome you to this fruitful frontier and hope that collecting the insight of this diverse set of researchers will benefit both your practice and patients in the years to come.

Francis W. Smith, London
Jay S. Dworkin, Melville, N.Y.