Preface

Neuroimaging Anatomy, Part 2: Head, Neck, and Spine

Two wonderful quotations capture the intended essence and objective for compiling this and the previous issue of Neuroimaging Clinics on the subject of neuroimaging anatomy: “Anatomy should rightly be regarded as the firm foundation of the whole art of medicine and its essential preliminary” (Andreas Vesalius, De humani corporis fabrica [1543]), and “At least half of learning neuroradiology is understanding neuroanatomy” (Dr Anne G. Osborn).

This issue of Neuroimaging Clinics on neuroimaging anatomy of the head, neck, and spine appears after an unusually long interval since some aspects of this topic were last reviewed in a single issue of this series (8:1, Feb 1998, guest editor Lindell Gentry). This was in part dictated by the need to await the steady evolution of neuroimaging techniques we have witnessed over the last two decades that would help us better depict the stunning head, neck, and spine anatomy we encounter in our daily neuroradiologic practice. We believe this Neuroimaging Clinics issue covering head, neck, and spine anatomy will help clinical neuroradiologists and specialists in allied fields appreciate the exquisitely detailed anatomy that underlies neuroimaging. We aim to update the reader about the role of current and new advances in imaging techniques that help us visualize and understand this complex anatomy. As such, this issue is not intended to be a formal or exhaustive treatise on anatomy (classical textbooks and atlases are intended for that purpose), but it aims to give an updated anatomic background that would assist clinical practitioners in the diagnosis and treatment of disorders of the head, neck, and spine.

The importance of anatomy in imaging cannot be overstated. As radiologists, we are exceedingly privileged to be able to indirectly see the internal anatomy of our patients. There are many reasons brain neuroanatomy along with head, neck, and spine anatomy are the underpinning of our neuroradiology practice. This is not only because we noninvasively review intricate anatomic structures on images, but also, in practice, we clinically and educationally disseminate the anatomic knowledge we have gained to others. The reasons for the importance of neuroimaging anatomy include the fact that its knowledge is highly relevant to...
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the daily work of neuroradiologists in distinguishing normal and variant anatomy from pathologic signs of disease. Thus, to correlate structural and functional neuroimaging findings with the clinical information of patients, to issue radiologic reports, and to communicate meaningfully and on par with referring physicians all require a deep understanding of head, neck, and spine anatomy and the language used to describe it. The central role of these neuroimaging interpretations rooted in knowledge of anatomy has never been stronger for clinical decision making within contemporary clinical care.

As neuroradiology becomes ever more fundamental to clinical pathways and as a hub for decision making in the clinical neurosciences and clinical disciplines pertinent to the head, neck, and spine, an understanding of neuroimaging anatomy is essential to the neuroradiologists of tomorrow. The aim of including anatomy in radiology curricula for residents and fellows in training is not to produce anatomists, but rather, to produce radiologists who will be able to apply anatomic scientific principles, methods, and knowledge to the clinical practice of radiology. I often tell radiology trainees that “radiologists are but applied anatomists.” As neuroradiology educators, we must convey to our trainees a sound core knowledge of neuroimaging anatomy. This will form a cornerstone of their future practice and will instill confidence during training by lessening the occurrence of anatomic misinterpretations, defined as errors in identifying the correct anatomic locations of head, neck, and spine pathologic conditions.

The symbiosis of anatomy and radiology is vital to the practice of medicine, and it is also an important element of doctors as scholars and scientists. We therefore also hope that the fine collection of up-to-date reviews contained within this issue will represent a useful foundation of knowledge for neuroradiologists as scientists and physician-investigators aiming to effectively contribute to advancements in the clinical neurosciences as well as clinical disciplines pertinent to the head, neck, and spine. This may entail performance of “reverse translational” neuroimaging anatomy research where clinical problems can be identified and addressed with studies of anatomy and morphometry as depicted on neuroimages. For example, in a manner that answers hypothesis-driven questions, anatomy pertinent to improving safety and efficacy of head, neck, and spine surgical and interventional procedures can be studied using morphometric measurements and statistical analyses of anatomic information seen on MR and CT images, all to the ultimate benefit of our patients.

Until now, no succinct book has been available as a comprehensive updated source of information and knowledge on neuroimaging anatomy of the head, neck, and spine. While the actual anatomy has not changed since the previous Neuroimaging Clinics issue on this subject, more recent advances in neuroradiology have enabled new imaging techniques for diagnostic neuroimaging and therapeutic neurointerventions that have rendered some of the older techniques obsolete. These changes as well as advances in clinical neuroscientific knowledge and practice have required revision of all previous articles, with the addition of several new ones and many more illustrations of modern, more informative structural ways to visualize head, neck, and spine anatomy using neuroimaging.

This issue of Neuroimaging Clinics consists of 13 articles providing reference material on the latest methods to visualize head, neck, and spine anatomy. This issue is organized to provide a broad core knowledge related to imaging anatomy of the viscerocranium, soft tissues, and organs of the face and neck, and the spine. The contents of this issue are presented as separate review articles, any one of which is complete in itself. Each article is beautifully illustrated with many high-resolution images that present the relevant anatomy in multiple planes.

Of note, we have tried to conform as much as possible to standard anatomic English terminology shown in the Terminologia Anatomica (the international standard for human anatomic terminology developed by the International Federation of Associations of Anatomists [IFAA]), with sporadic Latin usage. In the future, neuroradiologists will inevitably need to adhere to the recommendations of this international standard to uniformly adopt more accurate terminology for head, neck, and spine anatomy. As for eponyms, we have for now continued the use of standard, well-known eponyms. However, the use of eponyms is counter to the recommendation of the IFAA to omit all eponyms in the description of anatomic structures. The slow replacement of eponyms in our neuroimaging anatomic language will be uncomfortable for older generations of neuroradiologists, but for future generations, it will be a relief. On the other hand, we did not shy away from presenting common neuroimaging anatomic variants. These may be defined as slight deviations from the accepted standard human anatomy without causing a demonstrable impairment in function. However, an in-depth description of anatomic variations is a vast topic in its own right and beyond the scope of this issue, as there exists an extremely wide range of “normal” in the body.
Finally, this issue has been compiled with the goal of presenting anatomic facts of practical value to clinical neuroradiologists, other clinical neuroscientists, head and neck and spine specialists, and their trainees. We are immensely grateful to each one of the team of expert contributors to this issue who have provided readers with the most up-to-date knowledge on neuroimaging anatomy of the head, neck, and spine. The success of this issue is largely a result of their time, effort, and expertise in preparing their articles.

It has been a privilege and pleasure for me to guest edit this issue. I wish to express my sincere thanks to Dr Suresh Mukherji, Consulting Editor, for his invitation, and to Elsevier for their excellent support throughout the process leading to completion of this issue.

Tarik F. Massoud, MD, PhD, FRCR
Division of Neuroimaging and Neurointervention
Department of Radiology
Stanford University School of Medicine
Stanford Health Care
Stanford Initiative for Multimodality Neuro Imaging in Translational Anatomy Research (SIMITAR)
Center for Academic Medicine
Radiology MC: 5659
453 Quarry Road
Palo Alto, CA 94304, USA

E-mail address: tmassoud@stanford.edu