COMMENTARY

The Importance of Being Earnest—About Disk Nomenclature

Calling a disk abnormality a herniation or a bulge seems a minor concern when compared with the exact location of Broca's area on preoperative functional brain MR imaging, but disk terminology may be the more critical topic for the daily practice of neuroradiology. Most MR imaging studies performed involve some part of the spinal axis because back pain is much more common than brain tumors (thankfully). The problem, however, is that no one can agree on intervertebral disk terminology. It is not uncommon for different observers to use different terms for the same observed anatomic disk abnormality. Can we not all just agree to some kind of standard disk nomenclature?

The first serious attempt to bring some order out of this chaos was in 1994 with an article in the *New England Journal of Medicine*.[1] From the vantage point of history, it is clear that the authors published the first peer-reviewed proposal of a new and more specific imaging terminology for intervertebral disk pathology. "Bulges," "protrusions," and "extrusions" were to give us a more precise description of the disk margin than the nonspecific term "herniation."

Despite this attempt at delineation, most disk abnormalities were still referred to in imaging reports as herniations. Perhaps this was a result of the considerable inertia inherent in medical science or because formal criteria to define these terms had not yet been developed, or probably a little of both. Regardless, nobody noticed or followed up on the 1994 proposal for several years.

The persistent absence of accepted criteria led to the Nomenclature Project (NP) of the American Society of Spine Radiology (ASSR), begun just before the turn of the century. ASSR Presidents Jeff Ross and Alan Williams worked with Pierre Millette in a Herculean (and maybe a little Sisyphysian) effort to define disk pathology. This endeavor was not for the faint-hearted, as it consumed several years, created angst, and hastened Dr. Millette's retirement from active practice. A group of like-minded scholars (names available on the Website) sought a broad range of opinions and ultimately received full agreement on terminology from all of the other major medical specialties involved in diagnosing and treating spinal disorders. The results were then posted for everyone, including the lay public and any lawyer, to view on the ASSR Website. The 50+ pages of this historic document are an impressive example of what can be done with diligence and commitment, representing a fine example of interspecialty cooperation. (For lawyers who have found this editorial, and I know they will, the NP has written an "authoritative text," one of the first to exist primarily in cyberspace.)

A quick overview of the NP's findings may be helpful. For the full text, go to www.asnr.org/spine_nomenclature/ and enjoy! To wade through the entire text is instructive but time-consuming, so herewith follows a CliffsNotes version. Briefly, lumbar disk margins as viewed in the axial plane can be described as a normal disk, a bulge, a protrusion, or an extrusion. We know from the literature and from daily experience that only about half of all lumbar disks seen on MR imaging studies can be called "normal," so forget about them. Bulges are rigidly defined as deformities of 180° or more of the circumference of the entire disk viewed in the axial plane, where the disk margin extends more than 3 mm beyond the outer edge of the adjacent vertebral body endplate. Protrusions are deformities of less than 180° of the circumference (diffuse protrusions) and can be subcategorized if they are less than 30° of the circumference (focal protrusions). Extrusions are focal abnormalities that consist of nuclear material that has been forced through a full-thickness annular tear, and they may be separated or sequestered. In a bow to tradition, protrusions and extrusions are permitted to be called herniations, but bulges cannot. Implied, although not formally stated in the NP document, is the concept that bulges are usually degenerative and extrusions are usually the result of some traumatic event, no matter how mild. Protrusions are said go either way. Disk abnormalities of any variety will invariably become increasingly spondylytic over a period of time, which can vary widely due in part to endogenous individual patient characteristics and possible exogenous factors.

Unfortunately, because of the extensive detail required, the NP so far has been limited strictly to the lumbar intervertebral disks. That's right; that is, the text thus far includes nearly a phonebook-size stack of pages (if printed out) that applies only to disks in the lumbar region. This illustrates the supreme complexity of the overall task and the difficulty that the investigators had while trying to cover all combinations and permutations of the pathophysiologic possibilities of just the lumbar disks (not to mention the difficulty of getting all other specialties to agree and sign on to the final definitions). The depleted committee quite sensibly took a long and necessary hiatus after the lumbar NP was completed, and that is pretty much where the project languishes today.

So what about that other two thirds of the spine? Because of the relatively similar comparative anatomy, the thoracic disks share many of the characteristics of the lumbar ones, and the information from the NP can be fairly readily transposed to the thoracic region. Unfortunately, because of the major comparative anatomic differences in the cervical spine (eg, greater mobility, different function, different facet anatomy, presence of zygoapophyseal joints), the lumbar NP definitions cannot be interpolated to this region. So, guess what? We still do not have a standard nomenclature for the cervical spine, and we could really, really use one. A team of ASSR members is now trembling in their boots, they are so eager to get started.

Has this massive compilation of accepted lumbar disk wisdom solved anything? Not really. The hilltop guru still has trouble answering the question of "herniation versus bulge." Most clinicians and many diagnosticians are not even aware of the NP's existence and persist in calling any and all disk abnormalities herniations. Few people really care. I do not care about it either in a William Safire, *The New York Times Magazine* sort of way, but I do care about it in a Marshall McLuhan, "the medium is the message" sort of way. The word "herniation" is what McLuhan would suggest carries meaning beyond

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its strict definition, and in this case implies pathology. The dilemma, from a Steven Colbert perspective, is that the term is considered more ominous as it is commonly applied, regardless of the exact pathology or circumstances. The term "rupture" sounds more like what we imagine happens when a disk suddenly explodes. Through general and indiscriminate usage over decades, the term now qualifies as a true medical meme (or is that a trope?).

Thus, a herniation is not exactly neutral, and the term is overutilized in that it does not convey details now routinely visible with our best imaging. Before MR imaging, such terminology was sufficient, but with normal and morbid anatomic features now so well demonstrated even on low-field-strength equipment, it is no longer. While the NP indicated that the term remains acceptable as a synonym for a disk extrusion or protrusion, either of which might be the result of some type of trauma, it does not properly describe something that may be of degenerative origin, such as a bulge. The herniation meme is firmly embedded in the collective minds of those who deal with spinal diseases. Eventual acceptance of the ASSR NP definitions is a worthy goal, but diffusion into the workplace has been slow. Discuss the issue among yourselves. I expect that some letters to the editor will be written on this matter.

As it turns out, those who deal with spinal diseases include not just physicians who actually diagnose and treat patients, but also (and you better believe it) lawyers. Embarrassingly, the groups forcing us to come up with improved nomenclature are not our medical colleagues; instead, they are lawyers and the insurance companies, for whom we all work. The practitioners in these 2 interrelated nonmedical fields have the most pressing need to understand the nuances of disk disease and, possibly, to communicate it throughout the legal system, up to and including a jury of lay persons. This task is not easy for anyone, and neuroradiologists can be called upon to educate these groups and to help turn the wheels of justice with respect to the dire results of an auto accident or a slip-and-fall event at the local home improvement store. If for no other reason, we need a language to communicate precisely and objectively with these lay interest groups so that no intervertebral disk goes under- or overdiagnosed.

Contemporary MR imaging with its associated advanced techniques now enables routine objective depiction of detailed normal spinal anatomy and pathology. This improvement complements an increasing need to precisely communicate observations with colleagues and all interested constituents, even members of a jury. Improvement of data transfer via communication of intervertebral disk abnormalities was the original impetus for the NP. Its ultimate completion will address the imaging features of the thoracic disks (not much of a stretch) and then the cervical disks (a major hurdle, being essentially an entirely new project). As neuroradiologists we must recognize the significance of the NP and position ourselves firmly as experts in this important and necessary process, the ultimate goal of which is improved patient care. Go to the NP website, check it out, and maybe try it on for size. Maybe even start up an NP blog somewhere out there in cyberspace—Earnestly!

Reference

1. Jensen MC, Brant-Zawadzki MN, Obuchowski N, et al. **Magnetic resonance imaging of the lumbar spine in people without back pain.** *N Engl J Med* 2004; 331:69–116

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