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Intervertebral Disc Pathology: Its Relevance in Forensic Medicine

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This paper begins where another one that I wrote last year left off.[1] In that paper, I discussed our current model of disc pain from a physiological point of view, but did not comment on the incidence or prevalence of disc disease in the population and, in particular, the asymptomatic population. The question of prevalence of disc pathology, however, has been an ongoing source of confusion among both physicians and lawyers, and has often been used by some to leverage medicolegal proceedings. Let's take a look at the historical development of this state of affairs.

In the early 1980s, when CT technology was still fairly new to most practitioners, Sam Weisel and colleagues performed CT scans on the lumbar spines of 52 asymptomatic subjects and six with confirmed spinal disease.[2] These were read by three blinded neuroradiologists. They reported that, "In the over 40 year age group, there was an average of 50% abnormal findings, with diagnoses of herniated disc, facet degeneration, and stenosis occurring most frequently." In other words, when you task radiologists who are blinded to the patient's actual condition with reading CT scans of the lumbar spine and reporting all abnormalities, they find them in about 50% of individuals older than age 40. In some cases, HNP was found. Subsequently, largely through the fallible facility of story retelling, this became transmogrified into an altogether different "fact": 50% of all asymptomatic individuals have a herniated nucleus pulposus (HNP). The spin-off from this has been that when one finds any HNP in the spine, there is a good chance it is not likely to be associated with clinical symptoms. (Adding to the confusion in this literature is the additional terminology, which includes the more benign bulge, the protrusion, and the most severe or complete lesion: the extrusion.) Careful reading of this paper, however, reveals that in the under-40 group, HNP was found in only about 19.5% of asymptomatic patients.

Four years later, Boden, et al., conducted a similar study using the newer MRI technology.[3] (Notice that some of the authors from the first paper were on board for the second study.) Of 67 asymptomatic subjects in this study, the authors reported that 20% had HNP. In subjects 60 years or older, the findings were abnormal in about 57% of the scans: 36% of the subjects had an HNP and 21% had spinal stenosis. Thus, an abnormal finding is likely to be more predictive of a correlative pathology in younger versus older individuals. These findings generally are in agreement with the older CT-based study of Weisel, et al.[1]

Some time after these two studies were published, another appeared in the *The New England Journal of Medicine*.[4] The authors of this paper reported that 36% of the 98 asymptomatic subjects in their study had normal lumbar discs at all levels. With the results of two readings averaged, 52% of the subjects had a bulge at one level or more, 27% had a protrusion, and 1% had an extrusion. The researchers found that the prevalence of bulges, but not of protrusions, increased with age. The most common nonintervertebral disc abnormalities were Schmorl's nodes, found in 19% of the subjects, annular defects in 14%, and facet arthropathy in 8%. The findings were similar in men and women.

The differences between the findings of the two papers (20% and 27% for HNP and protrusions, respectively) may be partially a reflection of random selection of subjects and partially one of nuances in terminology and definitions. HNP and protrusion both define relatively similar (if not the same) lesions, although the authors must decide beforehand on precise definitions and how to categorize the lesions they find. Most importantly, however, none of the three studies mentioned appears to support the notion that 50% of all asymptomatic individuals have an HNP. Thus, the deconstruction of another urban legend.

So far, all of these studies have looked only at the lumbar spine. Can the results of these three lumbar studies be extrapolated to the cervical spine? This urban legend does not discriminate, in my experience, particularly in the courtroom. Boden, et al., undertook a cervical spine study shortly after their lumbar study, using the same methodology of blinded readings by multiple radiologists.[5] In this study, they evaluated the cervical MRI studies of 63 asymptomatic, atraumatic subjects. The scans were interpreted as demonstrating an abnormality in 19% of the asymptomatic subjects - 14% of those younger than age 40, and 28% of those older than age 40. Of the subjects who were less than 40 years old, only 10% had an HNP and 4% had foraminal stenosis. Of the subjects who were more than 40 years old, only 5% had an HNP; 3% bulging of the disc; and 20% foraminal stenosis. The disc was degenerated or narrowed at one level or more in 25% of subjects younger than age 40, and in almost 60% of those older than age 40.

These results, of course, differ markedly from those of the lumbar spine. Thus, the meaning of HNP and other lesions in the cervical spine are not comparable to those found in the lumbar spine, and extrapolation between these anatomically and biomechanically distinct regions is not permissible. These findings may also shed some light on another common medicolegal urban legend: that any sign of preexisting disc degeneration casts doubt on a person's claim that he or she did not have any neck symptoms prior to an alleged injury. These results make it clear that disc space degeneration and narrowing are normal consequences of the aging process and are found commonly in asymptomatic individuals.

So, how does one determine whether a younger patient with low back pain and a protrusion or HNP showing on MRI belongs to the 19.5% group as described, making the disc pathology merely something of an incidental finding; a red herring? This paper provides the substrate for debunking the urban legend. Beyond that, clinical correlation and diagnostic acumen must play the dominant role. And, as I discussed in my previous article, this may be begging the question in any case, since a disc can be symptomatic even if not herniated.[1]

It is also important to remember that while studies such as these four on the prevalence of HNP in the asymptotic population are important, particularly in providing some caution for overzealous surgical intervention, they do not answer the question of, "How many people who are symptomatic have HNP?" After all, individuals who are symptomatic and those who are asymptomatic come from two distinct populations. And just as it is risky to extrapolate from lumbar to cervical regions, it is also risky to compare the results of measures taken from two disparate populations.

References

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