No significant morbidity has been observed in 100 patients examined and the technique, which takes about the same time as a myelogram, has the advantage of not leaving iodized oil in the theca with its attendant long-term hazards. The examination is only valuable in the elucidation of known disc disease and has no part in the diagnosis of any other lesion of the spine. The technique can replace myelography in localizing the level of known herniation before surgery. It is unique in localizing early degenerative disc disease without herniation, thus allowing spinal fusion to be performed without the necessity of multiple disc exploration.

References


Biochemical Studies of Individual Lumbar Discs. P. Adams and H. Muir (Kennedy Institute of Rheumatology, London)

The quality of articular cartilage proteoglycans is known to change during development (Simunek and Muir, 1972a) and in pathological conditions (Simunek and Muir, 1972b; McDevitt and Muir, 1974), but analogous studies on individual intervertebral discs have not been previously reported. In the present study lumbar spines were obtained at autopsy from 4 individuals between the ages of 8 and 66 years, and each disc was analysed separately. The nucleus pulposus and annulus fibrosus were dissected from each disc and the chemical composition of each determined separately. Proteoglycans were extracted by a step-wise procedure using iso-osmotic sodium acetate, 3 mol/l magnesium chloride and 4 mol/l guanidinium chloride. The proteoglycan content of each extract and of the residue was measured; the molar ratio of glucosamine/galactosamine in the purified extracted proteoglycans was determined, and their hydrodynamic size assessed by gel chromatography on Sepharose 2B.

Significant differences in the overall composition and in the proteoglycans of different discs of the same spine were found. Progressive changes down the spine were evident in the collagen content and the extractability of the proteoglycans of older tissues (Table) and in the keratan sulphate content of total proteoglycan in young discs. The differences were generally most marked between the L5/S1 disc and those above. With increasing age there was a marked general change in the quality of the proteoglycans of both nucleus and annulus in all discs. Both the proportion of inextractable proteoglycan and the amount present in the sodium acetate extract was much higher in older tissues than in juvenile specimens. The proteoglycans extracted by sodium acetate from old nucleus and annulus were of much smaller hydrodynamic size and contained less keratan sulphate than proteoglycans extracted by solutions of higher ionic strength. In young tissues these differences between the proteoglycans in each extract were less marked.

The differences in composition of individual discs and the general changes with age that we have found may both be important in the pathology of the tissue.

References


Intervertebral Disc Collagen in Degenerative Disc Disease. C. M. Herbert, K. A. Lindberg, M. I. V. Jayson, and A. J. Bailey (Department of Medicine, Bristol Royal Infirmary, and Agricultural Research Council, Meat Research Institute, Langford, Bristol)

Degenerative disc disease and disc prolapse are important causes of low back pain. We have, therefore, initiated an investigation into the nature of the collagen in intervertebral discs and some of the changes occurring during ageing, disc prolapse, and degenerative disc disease. Normal intervertebral discs covering the age range 0–70 years were obtained from cadavers within 24 hours of death. Although long referred to as fibrocartilage, we have now shown that the nucleus pulposus contains cartilage type collagen (type II) (Miller, 1972), while the annulus fibrosus contains both type II and the skin, tendon type collagen (type I) (Traub and Piez, 1971). Analysis of the nature of the stabilizing crosslinks established that they were similar to cartilage collagen (Robins and others, 1973), that the proportion present varied down the spine, and that the normal (Robins and others, 1973) age-related pattern of changes in these crosslinks occurred. Lumbar spines classified as degenerative by radiological and gross examination were also obtained from cadavers. Although the collagen remaining in the degenerate disc revealed a normal adult crosslink pattern a high proportion of reducible crosslinks were found to be present in the disc above. This clearly indicates the synthesis of new collagen, presumably to compensate for the defective disc below. Based on the type of crosslink present it appears that the new collagen synthesized in both the nucleus and annulus of subjects with degenerative disc disease is type I rather than type II. The proliferation of type I collagen, particularly in the nucleus, could lead to a decrease in the mechanical and biochemical efficiency of the intervertebral disc.

References

MILLER, E. J. (1972) Biochemistry


TRAUB, W., AND PIEZ, K. A. (1971) Advan. in Protein Chem., 25, 243

Table

<table>
<thead>
<tr>
<th>Disc</th>
<th>Inextractable proteoglycan (% of total uronic acid)</th>
<th>Collagen content as % of dry weight of tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inner annulus</td>
<td>Middle annulus</td>
</tr>
<tr>
<td>T12/L1</td>
<td>29-8</td>
<td>14-7</td>
</tr>
<tr>
<td>L1/L2</td>
<td>23-6</td>
<td>15-0</td>
</tr>
<tr>
<td>L2/L3</td>
<td>25-6</td>
<td>19-0</td>
</tr>
<tr>
<td>L3/L4</td>
<td>36-8</td>
<td>20-0</td>
</tr>
<tr>
<td>L4/L5</td>
<td>34-7</td>
<td>30-0</td>
</tr>
<tr>
<td>L5/S1</td>
<td>36-0</td>
<td>32-0</td>
</tr>
</tbody>
</table>
Proceedings: Intervertebral disc collagen in degenerative disc disease.
C M Herbert, K A Lindberg, M I Jayson and A J Bailey

Ann Rheum Dis 1975 34: 467
doi: 10.1136/ard.34.5.467-b

Updated information and services can be found at:
http://ard.bmj.com/content/34/5/467.2.citation

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/