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Chemonucleolysis

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Summary

In this thesis the findings and results are reported of three studies on the anatomical, radiological and clinical aspects of chemonucleolysis for the treatment of lumbar intervertebral disc herniation.

The objectives of these studies are described in Chapter 1.

Many experimental studies on the pharmacology, toxicology and biomechanical effects of intra-discal chymopapain administration have elucidated part of its (possible) mode of action, but many questions relevant to clinical practice still remain.

Some of the complications related to chemonucleolysis have been attributed to an incorrect needle placement technique during lumbar disc puncture, which leads to the intrathecal administration of the drug and subarachnoid haemorrhage. Also damage to nerve roots may occur during lumbar disc puncture, especially in percutaneous discectomy.

In Chapter 2, the needle track position in the lateral approach to lumbar disc puncture is described in relation to the nerve roots, lumbar plexus and intervertebral foramen. With the aid of microplaning techniques and by replacing the needles by small catheters, an undistorted anatomical dissection was obtained and meticulous observation was possible. Damage to the lumbar plexus or nerve root, as well as penetration of the foramen, is more likely to occur when the needle is inserted further away from the midline.

CT scans taken in the plane of the disc will facilitate the planning of safer needle insertion, by allowing measurement and plotting of the site of insertion and the angle of approach.

From this study, it can be concluded that the safest method to avoid puncturing the nerve root or lumbar plexus is to direct the needle just lateral of the facet and to enter the disc from a low point. In this way the facet will also protect against erroneous needle penetration of the intervertebral foramen.

The fate of the herniated disc after chymopapain injection is described and discussed in Chapter 3.

In a prospective study, 30 patients with the herniated lumbar disc syndrome were examined by Computed Tomography before chemonucleolysis and at 3 and 12 months follow-up. Careful inspection and measurements of the CT scans were performed by an experienced neuroradiologist who was unaware of the clinical response to the treatment.

At three months follow-up, the degree of compression of the dural sac and/or nerve root was reduced in 74% of the patients and was found to correlate

with the clinical result. At that time, a focal abnormality still existed in 50% of the patients. However, the reduction in compression of the dural sac and/or the nerve root, proved to be a better guideline to judge the effect of chemonucleolysis than the prolonged existence of a focal abnormality.

An increase in diffuse annular bulging, as judged on CT scans, was noted in 80% of the patients. Chemonucleolysis is certainly not indicated for the treatment of dural sac or nerve root compression due to annular bulging alone, because it would only increase the amount of bulging.

After chemonucleolysis, no evidence of epidural fibrosis was seen on the CT scans of these patients.

The effect of chemonucleolysis treatment and the situation or condition ratings in the short-term and long-term are described in Chapter 4. The study was performed on a consecutive group of 200 patients, who were followed-up for at least 5.5 years.

None of the patients were lost to follow-up!

Data on socio-demographic variables, history, physical examination and supplementary radiologic examinations are presented in Chapter 4 section 2.

The early results are presented in Chapter 4 section 3.

Thirty-four per cent of the patients had an uneventful, straight forward recovery following the chymopapain injection. In some cases, recovery often took many months; 39% of the patients had a (temporary) relapse of symptoms some weeks or months after an initial period of improvement.

The treatment effect (with correction if the patient underwent disc surgery within three years) was satisfactory in 70% of the patients. A distinct difference was noted between the sexes: the effect of the treatment was satisfactory in 75% of the males and in 60% of the females.

Reports have shown that disc surgery in adolescents with a herniated disc is often very successful; chemonucleolysis treatment in all 11 adolescent patients in our group was satisfactory too.

The follow-up findings in the short-term (1984) and long-term (1988) are reported in Chapter 4 sections 4 and 5.

The condition rating of 75% of the patients was considered to be satisfactory over the years.

In agreement with the literature, a better treatment effect and better short-term and long-term condition ratings were seen in patients with the 'classic' radicular symptoms. Unsatisfactory short-term and long-term results were encountered in patients receiving a disability pension. Patients who underwent surgery because of persistent symptoms after chemonucleolysis had poor results.

No correlation was found between the clinical short-term and long-term condition ratings and the degree of disc height reduction or the number of disc levels injected.

In the long-term, the frequency of persistent back and/or leg pain, the need for physiotherapy, disability pensions and the frequency of secondary procedures, appears to be very similar for the various treatment modalities for lumbar disc herniation. The long-term follow-up findings have shown that a large proportion of patients still suffer from the sequelae of their degenerative disc disease for many years, irrespective of whether the treatment for their disc herniation was conservative, operative or chemonucleolysis.

Surgery as well as chemonucleolysis will accelerate the degenerative process and eliminate or modify the pain a little sooner than nature does.