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(eds.)*

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and Joint*

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Foreword

The editors of this work, M. Bard, head of the Department of Bone and Joint Radiology of the Lariboisière Hospital, and his assistant, J.-D. Laredo, had the excellent idea of assembling in a single volume different topics concerning techniques of interventional radiology in bone and joint diseases. This includes all diagnostic and therapeutic procedures performed in departments of radiology which may be substituted for open surgery. These techniques have a number of advantages when compared with open surgery. They are more easily performed, less invasive, and less stressful for the patient. They require little or no hospitalization and are more cost-effective.

J.-D. Laredo, M. Bard, C. Cywiner-Golenzer, and J. Chretien (Hôpital Lariboisière, Paris, France) have extensive experience of percutaneous biopsy of the spinal column using a special trephine needle which J.-D. Laredo and M. Bard have designed for this purpose. Vertebral bodies and intervertebral discs from T 3 to L 5 can be biopsied under fluoroscopic control and local anesthesia. Percutaneous biopsy is especially useful in spinal infection. Histological and bacteriological examination of material obtained can be used to differentiate spinal osteomyelitis from other conditions which sometimes have a similar appearance, such as degenerative disc disease. In almost all cases of tuberculous spondylitis a definite diagnosis can be obtained by percutaneous biopsy (by the recognition of mycobacterium tuberculosis or typical tubercles). The technique can also be used to identify cases of pyogenic spinal osteomyelitis where the microorganism can be identified only in approximately 50% of cases. At the Viggo Petersen Rheumatology Center of the Lariboisière Hospital, percutaneous needle biopsy of the spine has been carried out almost routinely for several years in cases of spinal infection located from T 3 to L 5-S 1, resulting in the almost total absence of any need for open biopsy for diagnostic purposes, which is afar from benign procedure. Percutaneous spinal biopsy can also be used to detect metastases as well as other much rarer malignant vertebral lesions such as lymphoma, Ewing's sarcoma, solitary plasmacytoma, etc. A trephine needle similar to that designed for percutaneous vertebral biopsy can be used with fluoroscopic control to biopsy the sacroiliac joint when there is a suspicion of infection. Certain lesions of the limbs and girdles can also be biopsied after discussion with orthopedic surgeons. Recently the use of CT scan in pre-operative assessment and biopsy guidance has proved to be especially useful in percutaneous biopsy of small deep osteolytic lesions and soft tissue tumors.

Percutaneous biopsy of the synovial membrane of the knee is commonly carried out without the aid of radiology. The same does not apply to other joints where fluoroscopic guidance is always useful and often necessary (J.-D. Laredo and M. Bard, Hôpital Lariboisière, Paris, France).

Provided certain contra-indications are kept in mind, chemonucleolysis

is an alternative to surgery in sciatica due to a herniated disc and resistant to conservative treatment as described in this volume by J. Roucoules, J.-D. Laredo, M. Bard and D. Kuntz (Hôpital Lariboisière, Paris, France). It is carried out under local anesthesia and requires only two to five days of hospitalization. Despite the rare anaphylactic reactions, papain remains the most widely used nucleolytic substance, though others are available or currently being evaluated. Due to the possibility of anaphylactic shock, chemonucleolysis requires the presence of an anesthesiologist fully prepared to deal with allergic reactions, as discussed by M.-C. des Essarts (Hôpital Lariboisière, Paris, France). Nucleolysis technique is relatively easy in the hands of experienced operators and is detailed by J.-D. Laredo, J. Busson, M. Bard (Hôpital Lariboisière, Paris, France), and M. Wybier (Hôpital Cochin, Paris, France). Under fluoroscopic guidance, the needle penetrates the disc laterally and its intradiscal position is confirmed by discography before injection of the nucleolytic substance. Several tens of thousands of chymopapain chemonucleolysis procedures for sciatic pain have been carried out throughout the world. Indications are the same as those for surgical treatment of sciatica due to a herniated disc. Results are considered to be excellent or good in 60–80% of cases. However, we feel that the precise evaluation in comparison with those obtained by surgery would justify even more extensive analysis than currently available.

Chemonucleolysis is not the only alternative to surgery for sciatic pain due to a herniated disc. Percutaneous discectomy using special instruments has also been carried out. Because of the topical nature of the subject and the interest which it arouses, several authors using different techniques have described their experience. P. Kambin (Graduate Hospital, Philadelphia, PA, U.S.A.) and G. Onik (Allegheny-Singer Research Institute, Pittsburgh, PA, U.S.A.) report satisfactory results with two different techniques of percutaneous discectomy through a lateral approach while W. A. Friedman and S. L. Kanter (University of Florida, Gainesville, FL, U.S.A.) had an unsatisfactory experience of percutaneous discectomy through a true lateral approach.

Low back and sciatic pain is sometimes due to posterior facet joint osteoarthritis without disc herniation. CT scan provides a detailed analysis of degenerative changes within the facet joints revealing, in certain cases, a synovial cyst protruding into the spinal canal. CT also confirms the absence of any lesion of the intravertebral disc. Resistant sciatic pain due to osteoarthritis of the facet joints may justify surgical release of the compressed root. By contrast, surgical treatment is generally not suitable for low back pain. The injection of corticosteroids during facet joint arthrography sometimes relieves sciatic or low back pain due to facet joint degeneration, as described by M. Wybier (Hôpital Cochin, Paris, France) and J.-D. Laredo (Hôpital Lariboisière, Paris, France).

In chronic low back pain there exists the possibility of percutaneous radio frequency denervation of the facet joints. B. Lavignolle, J. Senegas, J.-L. Houton, J. Guerin, and J.-M. Caille (Centre Hospitalo-Universitaire, Tripode, Pellegrin, Bordeaux) reviewed the results obtained in such indications.

Cervico-brachial neuralgia due to disc lesions or osteophytes usually recovers within less than two months but is often extremely painful. It is for this reason that G. Morvan, D. Mompoin, M. Bard, and G. Levi-

Valensin (Hôpital Lariboisière, Paris, France) have attempted to treat it with the intraforaminal injection of corticosteroids under fluoroscopic control, sometimes with good results but most often partial and transient. Certain cases of cervico-brachial neuralgia are sufficiently resistant to justify surgery aimed at removing the disc herniation or the osteophytic process responsible. In the presence of a herniated disc, an alternative to such surgery is cervical disc nucleolysis, experience of which is reported by Y. Lazorthes, J. Richaud, J.-C. Verdié, and A. Bonafe (Centre Hospitalo-Universitaire Rangueil, Toulouse, France).

Vascular radiology, in which there has been considerable progress, is essential in many areas of medicine. In bone and joint pathology it can be used to study the blood supply of some tumors such as angiomas. It is essential in demonstrating the blood supply of the spinal cord before surgery for tumors. However, it has other possibilities. Skilled specialists can embolize tumors with a particularly rich blood supply, e.g. certain vertebral angiomas and certain malignant tumors. It is also possible to obtain hemostasis in bleeding associated with skeletal trauma, as described by D. Reizine, S. Marciano, F. Gelbert, A. Aymard, and J.-J. Merland (Hôpital Lariboisière, Paris, France). S. Wallace, C. H. Carrasco, C. Charnsangavej, W. Richli, N. Jaffe, J. Murray, A. Ayala, A. K. Raymond, S. P. Chawla, and R. S. Benjamin (M. D. Anderson Hospital and Tumor Institute, Houston, TX, U.S.A.) have used intra-arterial treatment in osteosarcomas and inoperable giant cell tumors.

Until recent years, solitary bone cysts were treated by surgical curettage. Good results can now be obtained by the injection of corticosteroids into the lesion under fluoroscopic control, a technique which comes to us from Italy and which is described by M. Campanacci and R. Capanna from the Istituti Ortopedici Rizzoli (Bologna, Italy). A similar technique can be performed in the management of eosinophilic granuloma of bone (S. Wallace, C. H. Carrasco, C. Charnsangavej, M. Cohen).

Tendon calcifications due to hydroxyapatite crystals, often affecting the shoulder and sometimes the hip, wrist or elbow, may cause episodes of acute inflammation as well as chronic pain. The latter is sometimes so troublesome and resistant that it would seem to be legitimate to remove the calcification surgically. However, this is not always possible, even in the shoulder. A much easier therapeutic technique, which can be used in most chronically painful tendon calcifications, is that of puncture-aspiration of the calcification under fluoroscopic control with the *in situ* injection of a corticosteroid (C. Normandin, E. Seban, J.-D. Laredo, D. N'Guyen, D. Kuntz, M. Bard, Hôpital Lariboisière, Paris, France). In the hands of a rheumatologist as experienced as C. Normandin (Centre Viggo-Petersen, Hôpital Lariboisière, Paris, France), this technique offers approximately 60% good results and is worthy of wider use.

Close cooperation between rheumatologists and radiologists has been of enormous value in the management of bone and joint diseases. The honor which Michel Bard and Jean-Denis Laredo have bestowed upon me, as a rheumatologist, to write a foreword to their book is an indication of our long, friendly and fruitful collaboration. Radiologists provide for rheumatologists the images essential for the majority of diagnoses, the accuracy and precision of which have reached an astonishing level of quality with CT scan and magnetic resonance imaging. However, radiologists do

not only offer increasingly refined imaging of bone and joint lesions. They have also conceived and developed diagnostic and therapeutic techniques replacing surgery where it was previously necessary. Radiology has become interventional and of the greatest therapeutic importance in rheumatology, as shown by this book, unique of its type, and which, I hope, will enjoy a fully-deserved success.

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The editors

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