Michel Benoist

The Michel Benoist and Robert Mulholland yearly European Spine Journal Review

A survey of the “medical” articles in the European Spine Journal, 2005

Received: 16 December 2005
Accepted: 16 December 2005
Published online: 13 January 2006
© Springer-Verlag 2006

Keywords Disc degeneration · Whiplash injury · Adult scoliosis · Inflammatory spondyloarthropathies · Complications of surgery · Cost of illness · Tumors · Lumbar fusion

M. Benoist
Hôpital Beaujon,
Département de Rhumatologie,
Service de Chirurgie Orthopédique,
100 Boulevard Général Leclerc,
92118 Clichy, France
E-mail: deuxmice@aol.com
Tel.: +33-1-45533712
Fax: +33-1-47275861

Introduction

Many high-quality papers were published in the European Spine Journal in 2005. It has been challenging once again to select the ones to be reviewed in a necessarily brief presentation. Our task, as defined by the Editors, is to provide a “readers’ digest” in order to select not only the best papers, but also those which raise controversy, discussion and present new information indicating fresh ideas and new fields of research. The majority of the articles this year is surgically oriented and will be selected and revisited by my surgical counterpart and friend, Robert Mulholland. I have selected the so-called “medical” papers, which may interest the whole community of practitioners involved in the multidisciplinary care of patients with spinal problems or diseases.

Basics

A few basic articles were published in the Journal in 2005. The article by Roberts et al. [17] is a perfect example of a biological basic paper, opening a new pathway for further investigations. In line with previous studies indicating the major role of TNF Alpha in the irritation and inflammation of the nerve roots by herniated disc tissue, the authors have investigated the presence of two new molecules: TSG-6 and its binding protein inter alpha inhibitor (I alpha I) in 58 herniated and 15 nonherniated discs. TNF Alpha-stimulated gene 6 (TSG6) is a protein produced by mesenchymal cells when stimulated by pro-inflammatory mediators, principally by TNF Alpha, which indicates its role in inflammation. Immunostaining of the discs detected the presence of TSG6 in 98% of the discs, especially in the

herniated discs. Its binding protein I alpha I was detected in all of them. In addition to its association with an inflammatory cascade, the complex TGS6-I Alpha I could have an inhibiting influence on metalloproteinases activity, thereby playing a role in the matrix turnover and degradation.

Another basic article was published in the same issue of the Journal, indicating again the complexity of the control of the matrix turnover and remodeling of the disc. Nerlich et al. [12] have investigated the distribution of fibronectin and TGF Beta 1 in intervertebral disc tissues by immunostaining and in situ hybridization. Specimens of different ages and various degrees of degeneration were studied. Fibronectin is a protein considered as a marker for active reparative process; TGF Beta is a cytokine which enhances and stimulates matrix production. Interestingly, this study has shown an association between enhanced TGF Beta expression and disc degeneration, and a positive correlation with fibronectin expression. The concomitant localization of the cells producing TGF Beta and fibronectin suggests a stimulation of the local cells by the cytokine, with an ensuing production of matrix proteins including fibronectin. This study provides another possible pathway for disc remodeling.

Complications of surgery

Microdiscectomy for a lumbar disc herniation is a "routine" operation for most spinal surgeons and favorable outcomes can be expected. Patients, however, very often ask about the risk of their condition worsening after surgery. Indeed, prospective studies focusing on postoperative deterioration of functional status are lacking. This prompted Solberg et al. [20] to study the risk of worsening after lumbar microdiscectomy. They prospectively studied 180 patients operated by microdiscectomy for lumbar disc herniation, with a follow-up time of 1 year. The outcome measures were the Oswestry Disability Index employment status and a V.A.S. for back and leg pain. Interestingly, 4% of the patients had a worsening of their functional status and health-related quality of life. Risk factors were a long duration of sick leave and a low ODI score before operation.

In the September issue, the paper by Yue et al. [22] reviews the risk of persistent swallowing and voice problems after anterior cervical discectomy and fusion with allograft and plating. This is a retrospective review of 74 operated patients with a long follow-up period (average 7.2 years). The index surgery was a standard Smith-Robinson technique. Subjective criteria were used to evaluate postoperative dysphagia and dysphonia as well as their severity. Persistent dysphagia was present at follow-up in 35% of the patients; it was moderate or severe in 17%. Dysphonia persisted in 19%, and was

moderate or severe in 12%. Problems with singing were present in 16% at final review. Techniques of anterior cervical fusion introduced in the 1950s by Robinson and Cloward are now widely used for surgical treatment of cervical radiculopathies and myelopathies not responding to conservative therapy. This paper which contains a comprehensive review of the literature should be of interest to clinicians who advise surgery and to surgeons who perform surgery, as the risk of these complications has probably been underestimated.

These two papers are extremely useful for advising patients preoperatively.

Whiplash associated disorders

An interesting study has attempted to identify the risk factors which may predispose to chronicity after whiplash injury. Osti et al. [13] have compared two groups of 600 randomly selected claimants: 300 of them had settled within 9 months after injury; the other 300 had settled 24 months after the accident. A series of univariate analysis evaluated the relationship between late settlement (over 2 years) and potential variables, including age, sex, occupation, type of collision, compensation, prior neck disability, cost of vehicle repair, cost of treatment, and whether a solicitor was consulted. Variables identified as predictors of late whiplash syndrome were front-end collisions, workers' compensation, prior neck disability, physiotherapy or chiropractic treatment. However, by far the strongest association was consultation with a solicitor. These findings reinforce the earlier well-demonstrated notion that psychological disorders secondary to the injury are important determinants of outcome. Settlement of legal issues takes time and is a factor of prolonged disability and of secondary psychosocial disorders. This is in keeping with earlier therapeutic recommendations: early physical activity and mobilization in the acute phase, physical therapy and cognitive intervention in chronic patients, and an early legal settlement and time of closure of the claim.

Pregnancy

Back pain during pregnancy has been assessed in several studies, but very few have investigated evolution of back pain after delivery. The paper by Padua et al. [14] which appeared in the March issue of the Journal is an interesting follow-up of women who experienced LBP during pregnancy and were assessed 1 year after delivery. The same group of authors had earlier performed a multi-center study to assess back pain during the final period of pregnancy (eighth and ninth months). The women suffering from LBP during this period were assessed 1 year after delivery. Of the 76, 57 initially enrolled

women who were reevaluated at 1 year, using the Roland–Morris disability questionnaire. At follow-up, 47% of the reevaluated women still had low-back pain but the severity of the symptoms was lower than during pregnancy. However the authors have not differentiated between posterior pelvic pain and nonspecific LBP. Interestingly, the strongest predictive factor of persistent LBP was the absence of pain before pregnancy and its appearance during pregnancy. The conclusions of this paper are in contradiction with a prior study published in ESJ in 2004 [21] where prior back pain was found to be a risk factor for postpartum pain. More studies are needed to clarify this point.

Vertebroplasty and kyphoplasty

Vertebroplasty or kyphoplasty are now widely used to treat painful vertebral compression fractures and it is now established that relief of pain is usually remarkable. Considering the expense of the device, the use of balloon kyphoplasty instead of vertebroplasty is still under discussion.

The paper by Gaitanis et al. [5] has assessed the results of kyphoplasty in 27 patients with osteoporotic vertebral fractures and in 5 patients with osteolytic vertebral tumors. Pain relief, evaluated by VAS, ODI, and pain drawing was rapidly obtained in most patients, thus confirming the remarkable action of the technique with a follow-up of at least 1 year for all patients. Correction of deformities was lower, with a mean correction of 7.6 of kyphosis in the OVF group, and a mean increment of anterior wall height of 4.3 mm. Interestingly, this correction of deformity was obtained in patients operated less than 9 months after the fracture and when a high intensity signal was observed on the STIR sequence on the preoperative MRI. Leakage of cement was observed in 10% of the OVF and three patients were subsequently and successfully operated for a degenerative stenosis.

This paper also reviews previous articles of the literature with a stimulating discussion. Obviously correction of deformity is not the purpose of methacrylate injection in patients with malignant vertebral tumors; the use of the balloon technique remains questionable in the OVF group. However, this paper brings some new information concerning the safety and the effectiveness of the technique. Careful reading of the reviewer's comment is strongly recommended [16]. It contains a good discussion of the prognostic value of the imaging findings, of associated stenosis, and efficacy of biopsy during vertebroplasty.

The risk of cement leakage during vertebroplasty is emphasized in the study by Schmidt et al. [19]. Cement extrusion is usually asymptomatic, but can be the source

of postoperative pain and neurological complications. This radiology paper has compared the value of intraoperative fluoroscopy, plain X-rays, and CT scans in detecting cement leakage. Although limited by the small number of patients, the authors conclude that detection of leaks by fluoroscopy and X-rays has limitations, and that postoperative CT scan is the method of choice, especially in case of postoperative clinical symptoms.

Epidemiology

The article by Bejia et al. [2] published in the May issue is an interesting epidemiological study aiming at analyzing the prevalence, severity, and associated factors of LBP in children. A cross-sectional study of 622 children and adolescents with a mean age of 14 years was undertaken in Monastir, Tunisia. All subjects completed a validated self-administered questionnaire of 20 items evaluating characteristics of the back problems, functional limitations, activities, and psychological parameters. In addition, 201 children underwent a spine medical examination with VAS evaluation when LBP was disclosed. Although the physician was not blinded to the study group which may introduce an overestimation, the results of this study confirm data of the literature with a cumulative lifetime prevalence rate of 28%. LBP severity was divided into three subgroups: occasional, frequent, and chronic which lasts over 3 months and occurs more than once a week. According to this definition, 8% of the children suffered from chronic LBP. Factors associated with LBP were failure in school, family history of LBP, football playing, and dissatisfaction with school chairs. Although psychological factors are not introduced in the variables analyzed in the stepwise logistic regression, the authors indicate that psychological consequences were frequent and observed in 75% of the subjects, which is in keeping with the literature. The results of this study are important to take into account the prevention of low-back pain in school children in order to lower school and sports absenteeism.

Cervical spine osteoarthritis

Atlantoaxial osteoarthritis is a rather frequent condition, difficult to treat conservatively. The paper by Schaeren and Jeanneret [18] which appeared in the June issue is particularly interesting. There is a good description of the clinical symptoms based upon five personal cases and a pertinent review of the literature. The authors indicate a prevalence ranging from 5.4% in the sixth decade to 18.2% in the ninth decade of life. After failure of conservative treatment, the five cases described were treated by arthrodesis by transarticular

screw fixation and posterior fusion. Preoperatively, a fluoroscopic-guided facet block had confirmed the origin of the pain. All patients obtained excellent results. Only six similar series have been found in the literature, with similar good results of surgery. This paper will certainly be of great interest to spinal rheumatologists who sometimes hesitate to advise surgery to these patients suffering from severe, intractable suboccipital pain.

Tumors

Haegelen et al. [6] have conducted an interesting review of 33 patients out of 84 operated spinal meningiomas. The selection was based upon the severity of the neurological deficits in order to evaluate the postoperative recovery. Thirteen patients were paraplegic and 20 had a severe paraparesis (20 grade III and 13 grade IV). The long-term follow-up was 70 months. After 1 year all patients had improved: 19 had totally recovered; there were 10 grade I, 3 grade II and 1 grade IV. The favorable outcome of these severely disabled patients is somewhat unexpected considering the duration and the severity of the preoperative neurological deficit. It is generally accepted that this category of patients is expected to have a rather poor outcome. This paper should be of interest to neurosurgeons facing such severe cases.

Lumbar fusion for chronic low-back pain

I strongly advise reading the Letter to the Editor by Peter Fritzell in the June issue [4]. This short paper recalls that several evidence-based facts have been obtained by high-quality RCTs, demonstrating that fusion can be a treatment strategy in a group of well-selected patients. The author correctly points out the questions still to be answered: fusion for which category of chronic LBP patients; when and how? Intensive rehabilitation for which patients, and when?

In the second part of the letter; there is an interesting discussion on the difficulty of obtaining high-quality RCTs which are costly and require a long time to be performed. These difficulties explain the long time needed to judge the validity of a technique, according to the Cochrane Collaboration group. Reaffirming that RCT is the gold standard, the author advises a more pragmatic approach through case-control studies and case series in order to evaluate the fast-moving new solutions and techniques more rapidly.

Economic evaluation

The cost for patients sick-listed for more than 1 month because of low back or neck problems has been evalu-

ated by Hansson and Hansson [7] in a fine, meticulous, and certainly time-consuming piece of work published in the May issue. The aim of the study was to show the total societal cost of this particular group of individuals. Direct costs including examinations and treatments as well as indirect costs were evaluated prospectively on an individual basis using diaries and questionnaires in a cohort of 1,822 sick-listed employed individuals. Medical services represented the lower fraction of the total cost; indirect costs generated by loss of productivity were to a great extent responsible for the total cost. These findings prompted the authors to propose a few ways to reduce costs for long-lasting back and neck problems. For example, shortening the duration of sick-listing could minimize the indirect costs, to the advantage of the patient, as it has been shown that returning to work as quickly as possible improves pain and function. This paper should be of interest not only to doctors but also to financing parties: insurance, social security systems, and governments.

Spinal stenosis

Due to the increasing aging of the general population, lumbar spinal stenosis is now encountered more frequently and operative treatment is often necessary. When surgery is considered, patients are concerned not only about the expected outcome of treatment but also about the risk of a reoperation. The paper by Janson et al. [8] published in the September issue reports the rate of reoperation for spinal stenosis in Sweden at 10 years. This is a longitudinal study based on the National Data Register during the years 1987–1999. The risk of being reoperated is 11% at 10 years. During the study period, the reoperation rate decreased, because of better surgical techniques and improvement of imaging. A good review of the literature is provided in the discussion. These data are useful; however, the authors are certainly right to point out that the reoperation rates found in this study must be put into perspective when dealing with an individual.

Lumbar artery occlusion and sciatica

In the 1990s, Kaupilla et al. [10] showed that advanced atherosclerotic lesions are associated with discal degeneration and that sclerotic changes of lumbar arteries acting negatively in the nutrition of the disc are associated with LBP. The study by Karppinen et al. [9] published in the September issue aimed at investigating the combined effect of various risk factors including chronic C pneumoniae infection on lumbar arteries occlusion in a population of sciatica patients. Magnetic resonance angiography was performed in 134 patients (mean age

45 years) who could be rescanned at 3 years. An arterial score was established to evaluate the difference with time. The variables analyzed were: body mass index, age, education, smoking, and presence of chronic *C pneumoniae* infection. Age and body mass index were significantly associated with arterial stenosis. Chronic *C pneumoniae* infection was found to be an independent determinant, increasing the risk to eightfold. These findings prompted the authors to recommend weight reduction as well as blood tests to detect and eventually treat a chronic infection by *Clamydiapneumoniae* in patients with lumbar disease. This paper could initiate further studies including a prospective long-term study of younger adults as well as the effect of treatment of the infection.

Inflammatory spondyloarthropathies

Spinal fractures in the ankylosed and often osteoporotic spine of ankylosing spondylitis can occur even after minor trauma. The lower cervical spine is a frequent site. Early recognition and appropriate treatment are crucial in order to avoid a high risk of mortality and permanent neurological deficit. The case report of such a case by Mountney et al. [11] in the September issue provides a useful reminder of this pathology. This paper describes the case of a man with an ankylosed cervical spine who developed myelopathic symptoms many months after a fall in the stairs. The important point of this case is that immediately after the fall the patient experienced no pain, but a paradoxical greater movement. The difficulty in diagnosing such patients as well as recommended therapeutic procedures are highlighted in this paper which should be read by clinicians and surgeons involved in the care of patients with inflammatory spinal conditions.

The article by Court et al. [3] is particularly interesting as the case reported here raises the difficulty of diagnosis in a nonexceptional situation: discovery of sclerosis of a vertebral body, focal or multifocal without involvement of the discs or of the end plates. When these imaging findings are associated with skin lesions, such as acne or pustulosis, the diagnosis of SAPHO (synovitis, acne, pustulosis, hyperostosis, osteitis) is now rather easy to establish. However; the skin lesions may appear a long

time after the spinal lesions, which may remain isolated without any other characteristic skeletal lesions. This paper should interest radiologists as it presents a difficult diagnosis of imaging. Clinicians should also be interested as the diagnosis procedures and differential diagnosis are perfectly described in the discussion. The authors also discuss the inclusion of the SAPHO syndrome in the group of inflammatory spondyloarthropathies.

Medical treatment

Papadokostakis et al. [15] have investigated the influence of raloxifene treatment on back pain on postmenopausal women. The rationale of this study was based on the fact that prevalence of back pain and other musculo-skeletal pains was higher in women using oestrogen replacement therapy than in nontreated women. Raloxifene, a selective estrogen receptor modulator, has oestrogen-like effects on bone, and is therefore widely used for prevention and treatment of osteoporosis. The purpose of the authors was to determine whether raloxifene has the same effects on pain and back problems as oestrogen therapy. One-hundred and twenty postmenopausal women with osteoporosis and back pain were randomized to either raloxifene plus calcium and vitamin D, or calcium and vitamin D alone. The results regarding back pain based on appropriate outcome measures indicate that unlike oestrogen therapy, raloxifene has no influence on back pain. This is good news for clinicians involved in the treatment of osteoporosis.

Conclusions

Obviously, more papers are of interest to nonsurgeons. Some of them are devoted to certain sub-specialties. For example, there are a few papers concerning scoliosis which will be analyzed in the second and more surgically oriented part of our combined review. I especially call the attention of the readers to a review article on adult scoliosis by Aebi [1]. The nonspecialist in scoliosis will learn a great deal about classification, pathomechanism, clinical presentation, and therapy of the difficult problems of adult scoliosis.

References

1. Aebi M (2005) The adult scoliosis. *Eur Spine J* 14(10):925–948
2. Bejjia I, Nabilia H, BenSalem K, Younes M, Touzi M, Bergaoui N (2005) Low back pain in a cohort of 622 school-children and adolescents: an epidemiological study. *Eur Spine J* 14(4):331–336
3. Court C, Charlez C, Molina V, Clerc D, Miquel A, Nordin JY (2005) Isolated thoracic spine lesion: is this the presentation of a SAPHO syndrome? A case report. *Eur Spine J* 14(5):711–715

4. Fritzell P (2005) Fusion as treatment for chronic low back pain—existing evidence, the scientific frontier and research strategies. *Eur Spine J* 14(5):519–520
5. Gaitanis IN, Hadjipavlou AG, Katonis PG, Tzermiadeanis MN, Pasku DS, Patwardhan AG (2005) Balloon kyphoplasty for the treatment of pathological vertebral compressive fractures. *Eur Spine J* 14(3): 250–260
6. Haegelen C, Morandi X, Riffaud L, Amlashi SFA, Leray E, Brassier G (2005) Results of spinal meningioma surgery in patients with severe preoperative neurological deficits. *Eur Spine J* 14(5):440–444
7. Hansson EK, Hansson TH (2005) The costs for persons sick listed more than one month because of low back or neck problems. A two-year prospective study of Swedish patients. *Eur Spine J* 14(4):337–345
8. Jansson KA, Németh G, Granath F, Blomqvist P (2005) Spinal stenosis reoperation rate in Sweden is 11% at 10 years—a national analysis of 9,664 operations. *Eur Spine J* 14(7):659–663
9. Karppinen J, Kurunlahti M, Taimela S, Haapea M, Vanharanta H, Tervonen O (2005) Determinants of lumbar artery occlusion among patients with sciatica: a three-year follow-up with magnetic resonance angiography. *Eur Spine J* 14(7):664–670
10. Kauppila Li (1995) Can low-back pain be due to lumbar artery disease? *Lancet* 346:888–889
11. Mountney J, Murphy AJ, Fowler JL (2005) Lessons learned from cervical pseudoarthrosis in ankylosing spondylitis. *Eur Spine J* 14(5):689–693
12. Nerlich AG, Bachmeier BE, Boos N (2005) Expression of fibronectin and TGF- β 1 mRNA and protein suggest altered regulation of extracellular matrix in degenerated disc tissue. *Eur Spine J* 14(1):17–26
13. Osti OL, Gun RT, Abrahall G, Pratt NL, Eckerwall G, Nakamura H (2005) Potential risk factors for prolonged recovery following whiplash injury. *Eur Spine J* 14(1):90–94
14. Padua L, Caliandro P, Aprile I, Pazzaglia C, Padua R, Calistri A, Tonali P (2005) Back pain in pregnancy: 1-year follow-up of untreated cases. *Eur Spine J* 14(2):151–154
15. Papadokostakis G, Katoris P, Damilakis J, Hadjipavlou A (2005) Does raloxifene treatment influence back pain and disability among postmenopausal women with osteoporosis? *Eur Spine J* 14(10):977–981
16. Pellisé F (2005) Reviewer's comment on: balloon kyphoplasty for the treatment of pathological vertebral compressive fractures (I.N. Gaitanis et al.). *Eur Spine J* 14(3):261–262
17. Roberts S, Evans H, Menage J, Urban JPG, Bayliss MT, Eisenstein SM, Rugg MS, Milner CM, Griggin S, Day AJ (2005) TNF Alpha-stimulated gene product (TSG-6) and its binding protein, α 1, in the human intervertebral disc: new molecules for the disc. *Eur Spine J* 14(1):36–42
18. Schaerer S, Jeanneret B (2005) Atlantoaxial osteoarthritis: case series and review of the literature. *Eur Spine J* 14(5):501–506
19. Schmidt R, Cakir B, Mattes T, Wegener M, Puhl W, Richter M (2005) Cement leakage during vertebroplasty: an underestimated problem? *Eur Spine J* 14(5):466–473
20. Solberg TK, Nygaard OP, Sjaavik K, Hofoss D, Ingebrigtsen T (2005) The risk of “getting worse” after lumbar microdiscectomy. *Eur Spine J* 14(1):49–55
21. Wu WH, Meijer OG, Vegaki K, Mens JMA, Van Dieën JH, Wuisman P, Ostgaard HC (2004) Pregnancy-related pelvic girdle pain. I Terminology, clinical presentation and prevalence. *Eur Spine J* 13(7):575–589
22. Yue WM, Brodner W, Highland TR (2005) Persistent swallowing and voice problems after anterior cervical discectomy and fusion with allograft and plating: a 5 to 11-year follow-up study. *Eur Spine J* 14(5):677–682