The Journal of Turkish Spinal Surgery 2005; 16 (4): 27-46

KONGRE ÖZETLERİ / *XXIII. SICOT/SIROT TRANNIAL WORLD CONGRESS, 2005**

COMPARISON OF ANTERIOR PLATE VS. ROD SYSTEMS IN TREATMENT OF TUBERCULOSIS SPONDYLITIS

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Anterior debridement, strut grafting and instrumentation have an increasing popularity in the treatment of tuberculosis of spine. Anterior fixation can be done either by a plate or a rod system.

In this study, 73 patients with active tuberculosis operated for either one of the deformity, instability or neurological compromise having more than two years of follow-up was included. Surgical treatment included anterior radical debridement followed by grafting with tricortical auto graft and anterior instrumentation at levels just above and below the diseased segments with either plate (Z plate, Group A: 26 patients) or rod (CDH, Group B: 46 patients) systems. The average age of the patients was 46.8±13.4 years and average follow-up was 65.8±17.9 months. All patients had similar anti tuberculosis chemotherapy.

The two groups were similar ($p<0.05$ for all parameters). Deformities were corrected to 4.9°±5.5° degrees in group A and 5.0°±6.4° degrees in group B with no significant difference. At the time of the latest follow-up there were 1.4°±1.9° degrees correction loss in-group A and 1.3°±1.8° degrees in-group B with no significant difference in between two groups ($p<0.05$). There was no apparent pseudoarthrosis and implant failures in both groups and all patients demonstrated clinical improvement in tuberculosis infection without recurrences and reactivation. Anterior instrumentation after debridement and reconstruction of vertebral body was effective in the treatment of tuberculosis spondylitis. There were no significant differences between the two instrumentation systems in terms of sagittal alignment reconstruction and fusion rate.

* *XXIII. SICOT/SIROT TRANNIAL WORLD CONGRESS, 2005 kongresinde omurga oturumlarında sunulan bildiri özetleri, SICOT Genel Sekreterinin izniyle JTSS dergisinde basılmıştır. Gerekli iznin alınmasında katkısı olan SICOT Türkiye Delegesi Prof. Dr. Erdal Cila'ya teşekkürü bir borç biliriz. JTSS Yayın Kurulu.*

ORAL PRESENTATION

ILIO-SACRAL TUMOR RESECTION WITH OR WITHOUT ILIOLUMBAR FUSION

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Ilio-sacral tumor resection with or without iliolumbar fusion. Eleven consecutive cases of sacral-tumor involving at least one of the sacroiliac joint have been done since 1998. The types of tumor include: chordomas, Giant cell tumors, Hemangiopericytoma and metastatic tumors. The surgical approach was single posterior. The rectal wall was identified and protected by packing guaze through the space created by coccygeal resection. The upper border of the tumor was marked by laminectomy at the L5/S1 junction. At least one si de of the S1 and S2 roots could be preserved. The iliac side was seperated through the burring procedure. Estimated blood loss ranged from 1000-10,000 ml. Three of the chordomas, all GCT and the hemangiopericytoma were free from the recurrence by 2 years of follow up.

ORAL PRESENTATION

OSTEOID OSTEOMA OF A LUMBAR LAMINA WITH COX-2 EXPRESSION

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Osteoid osteoma is a benign bone tumor manifesting typical symptoms of inflammation, such as nocturnal pain and marked NSAIDs responsiveness, but its true pathogenesis remains unknown. Expression of cyclooxygenase-2 (COX-2), an inducible enzyme of arachidonic acid metabolism was investigated to clarify the mechanism of the radiculopathy without nerve root compression in osteoid osteoma of a lumbar vertebral arch.

The patient was a 17-year-old male, with osteoid osteoma of the 5th lumbar vertebral arch associated with radiculopathy. The patient showed mild weakness of muscles predominantly innervated by the L5 nerve root, but no compression of the L5 nerve root was detected by computed tomography (CT) or magnetic resonance imaging (MRI). Strong expression of COX-2 by the osteoblasts in the nidus was detected by immunohistochemistry and the reverse transcription-polymerase reaction (RT-PCR). Immunohistochemistry showed diffuse and intense immunoreactivity for COX-2 in nearly all of the short-spindled or polygonal osteoblasts within the nidus. The RT-PCR showed that COX-2 mRNA expression in the nidus was about ten times stronger than in the surrounding bone or control bone, according to the numerical data for DNA bands on agarose gels. Radiculopathy without nerve root compression may be followed by the spreads of the inftammatory reaction due to COX-2 expression in the nidus.

ORAL PRESENTATION

FEATURES OF SPINAL OSTEOCHONDROMAS

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Purpose: Spinal osteochondromas are a rare condition. They are often described in case reports. In the present study, features of spinal osteochondromas were reviewed in a large number of the authors' cases and cases reported in the literatures.

Materials and Methods: A total of 77 spinal osteochondromas including 8 cases treated by the authors and 69 cases reported in the literatures was examined focusing on clinical features, and locations based on CT images and surgical records.

Results: The average age was 31 years (range; 5-69). There were 49 males and 28 females. 88 % of the patients had neurological problems (myelopathy: 75 %, radiculopathy: 13 %), 8 %, local swelling, and 4 %, local pain. 69 % of tumors were solitary. 59 % of tumors arose from the cervical spine. 33 % arose from the thoracic spine and 8 %, from the lumbar spine. One tumor was located anterior to the dura in the spinal canal. 62 % of tumors were located laterally containing anterolateral and posterolateral to the dura. 3 % were located in the foramen, 9 %, both in and outside the spinal canal, 13 %, posterior to the dura in the spinal canal, and 12 %, outside the spine. Corpectomies were performed in 4%, laminectomies or hemilaminectomies with/without facetectomies were performed in 84 %. Excisions without laminotomies were performed in 12 %. Recurrence was not observed even in the cases that were carried out piecemeal removal of the tumors.

ORAL PRESENTATION

THE "NO- TOUCH" TECHNIQUE CAN LIMIT INFECTION IN INSTRUMENTED POSTERIOR SPINAL FUSION

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Introduction: Infection rates following instrumented posterior spinal fusion range between 1 and 10%. While factors such as long surgery time, use of metalwork and poor general health have been cited as reasons, hardly anyone considers the role of the operative technique. We believe technique matters and this retrospective study looks at the role of the "No-Touch" technique in limiting infections following posterior spinal fusion.

Materials & Methods: Between 1984 and 1997, 879 paediatric and adult patients underwent instrumented posterior spinal fusion with bone grafting at our 2 centres. Degenerative disease was the main indication among adults and congenital and neurological disease among the children. The 'No-Touch' technique, which forbids the handling of the operative field without instruments, was followed each time. The minimum follow-up was one year. Patient risk factors, the type of intervention and the post-operative events were noted in each case and analysed.

Results: 15 infections were noted, 11 of them deep. There was no significant correlation between the infection risk and the age or premorbid condition of the patient. The duration and extent of the exposure were more predictive since 8 deep infections occurred when surgery time exceeded 6 hours and 7 infections followed long fusions down to the sacrum. Onlyone infection was complicated by pseudarthrosis.

Conclusion: We attribute our low infection rate of 1.7% to the "No-Touch" technique. This technique takes time to master but once mastered can translate into fewer infections and readmissions thus lowering the overall costs of spinal surgery.

ORAL PRESENTATION

A LONGITUDINAL STUDY OF THE PROGRESS OF DEFORMITY IN CHILDREN WITH SPINAL TUBERCULOSIS

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Objective: To study the natural history of the evolution of post-tubercular kyphotic deformity in children.

Materials and Methods: The progression of post-tubercular kyphosis in 61 children who received ambulatory chemotherapy was studied prospectively. The angles of deformity and kyphosis were measured at serial intervals for 15 years. Some children developed radiological signs of instability. These were dislocation of the facets, posterior retropulsion of the diseased fragments, lateral translation of the vertebrae in the anteroposterior view and toppling of the superior vertebra. Each sign was allocated one point to create a spinal instability score.

Results: The mean angle of deformity at the start of treatment was 35° and increased to 41° at 15 years. Progression occurred during the active and healed phase of the disease. Type-I progression showed an increase in deformity until growth had ceased and could occur either continuously (type IA) or after a lag period (type IB). Type-II progression showed decrease in deformity with growth immediately after the active phase (type IIA) or after a lag period (type IIB). Type-III progression showed minimal change during either the active or healed phases and was seen only in those with limited disease. Multiple regression analysis showed that a spinal instability score of more than 2 was a reliable predictor of progression.

Conclusion: Signs of radiological instability appear early in the disease and can be reliably used to identify children at risk for late progressive collapse. Surgery is advised for these patients.

ORAL PRESENTATION

CANDIDA ALBICANS OSTEOMYELITIS OF THE SPINE

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Study Design: Retrospective study of three cases and review of literature.

Objectives: To outline the difficulty in diagnosis and the surgical management in symptomatic vertebral osteomyelitis due to Candida albicans infection at cervical, thoracic and lumbar spinal levels.

Summary of background data: Candida vertebral osteomyelitis is rare. Few cases of surgically treated spinal osteomyelitis have been described in the literature. Recommendations for surgical debridement followed by spinal reconstruction of the segmental defect have been reported discreetly.

Methods: The literature was exhaustively reviewed. We present the three cases who were not immunocompromised but had a delay in the diagnosis of approximately three months. We report the clinical pattern of presentation of cervical, thoracic and lumbar vertebral disease. We also describe the surgical management with a long follow-up of at least two years.

Results: All patients responded to combination surgical debridement and intravenous antifungal (fluconazole) medication. The segmental spinal defect had been reconstructed with no further complications.

Conclusion: Candida spinal osteomyelitis can occur without any predisposing risk factors. Diagnosis may be delayed leading to deterioration in symptoms. Once vertebral collapse and spinal cord compression occurs, surgical debridement, spinal fusion and stabilization should be carried out with instrumentation. Medical therapy should be initiated at diagnosis. The delay in the diagnosis and further avoidance of surgery by the patient allowed us to look at the natural course of the disease. Without treatment the disease is progressive and leads to destruction of the affected vertebral segment with cord compromise.

ORAL PRESENTATION

INSTRUMENTED FUSION FOR SPINAL COLUMN INSTABILITY AFTER LAMINECTOMY FOR INTRASPINAL TUMOURS: CASE REPORT.

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Introduction: The occurrence of kyphosis followed by spinal instability is more common in the cervical spine than in the lumbar of thoracolumbar spine.

Study design: Retrospective study.

Material & Methods: We reviewed the postoperative outcome in five patients who required thoracolumbar or lumbar laminectomy followed by spinal instrumentation following removal of intradural tumours. At surgery, the length of laminectomy and the need for partial or total facetectomy or removal of the pars interarticularis was agreed on by the surgeons. Though intradural lesions are approached best from the posterior or posterolateral aspect, sometimes it may be necessary to perform a combined procedure for a large tumor. In two cases, combined anterior and posterior surgery was performed for an adequate excision of the tumor. Thus, warranting instrumented fusion to stabilize the unstable segment.

Results: Posterior bone grafting and instrumentation usually are difficult in these patients because of the smail amount of bone surface posteriorly after wide or multilevel laminectomy. All the patients in our series are pain free at a minimum follow-up of two years. There is no radiological evidence of pseudoarthrosis in any of these patients. Three patients had no residual neurological deficit. Two patients had abnormal reflexes. One of these had sphincter weakness one had evidence of muscle weakness had paraesthesia. None required any re-operation for recurrence of tumour.

Conclusion: To avoid progressive post-laminectomy deformity and spinal instability associated with pain in patients with intradural tumours, it is necessary to surgically fuse the segments rendered unstable at surgery.

ORAL PRESENTATION

TUBERCULOUS PARAPLEGIA - CORRELATION OF CLINICAL COURSE WITH CORD CHANGES ON MRI

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70 clinicoradiologically diagnosed patients, aged 4-81 yrs of either sex, of TB spine with para quadriplegia were treated by middle path regimen. They were divided in 3 groups. A) Response group (n= 30) - Patients of paraplegia of early onset, recovered neurologically on conservative treatment (n=14), after surgery (n=16). B) Non-response group (n=20) - Patients of paraplegia of early onset showed no neurological recovery after adequate surgical decompression. c) (n=20) pts of Tb spine with paraplegia of late onset.

Observations: group A - 60% cases had predominantly fluid collection which resolved on drugs. S cord showed preserved size, regular outline and features of edema myelitis. On follow up edema has subsided with mild reduction in cord volume. Group B- most had mixed type of extradural compression strangulating the cord. The cord had smaller size, irregular outline and features of myelomalacia. Group c) - reactivation of the lesion in 2 cases. Severe cord atrophy in all with associated myelomalacia (6) and syringomyelia (3).

Conclusion: Tuberculous lesion was found to be more exertive than plain x-ray. The pts with wet lesions, relatively preserved cord size and edemajmyelitis improved neurologically on treatment. Myelomalacia of the cord is a poor prognosticator for neural recovery. The cord atrophy did not always correlate with neural deficit. The neural recovery is not expected if cord atrophy is associated with myelomalacia or syringomyelia. MRI provides a reliable guide for prognostication of the outcome of therapeutic measures.

ORAL PRESENTATION

PERCUTANEOUS DISCECTOMY AND DRAINAGE IN PYOGENIC SPONDYLODISCITIS ALEXANDER HADJIPAVLOU, MICHAEL TZERMIADIANOS, PAVLOS KATONIS,

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Percutaneous transpedicular discectomy (PTD) can obtain culture and histopathology specimens, permit drainage and antibiotic irrigation, and provide a channel for granulation tissue to invade the infected space.

The purpose of this study is to assess the role of PTD in this context. Between 1999 and 2002, 36 patients were treated. Adequate tissue samples for microbiologic and histologic examination were successfully retrieved in all cases.

The immediate success rate after surgery was 80% and in long-term follow-up, the success rate was 75%. In the first 28 patients, failure was attributed to: extensive bone destruction with kyphosis in 2 patients, neurocompression caused by large epidural inflammation in 2 patients, infected disc herniation in 1 patient, and foraminal stenosis in 1 patient. Excluding such cases in the last 8 patients (7 with primary hematogenous spondylodiscitis and 1 with secondary postlaminectomy-discectomy spondylodiscitis), improved the efficacy of the technique. All patients (7/7) with primary hematogenous spondylodiskitis experienced immediate relief of pain that remained in 11-24 months follow-up. However, the procedure was not effective in the patient with the postlaminectomy infection. This lack of response was attributed to postlaminectomy-discitis instability.

Early debridement of haematogenous spondylodiscitis by percutaneous transpedicular discectomy (PTD) can establish bacteriological diagnosis and accelerate natural healing thus preventing progression to bone destruction and deformity. it is safe and effective when applied in the early stages of uncomplicated hematogenous spondylodiscitis, but it is contraindicated in the presence of instability, bone destruction with kyphosis, and neurocompression due to epidural abscess, granulation tissue or foraminal stenosis.

ORAL PRESENTATION

A NEW MINIMAL ACCESS TECHNIQUE FOR LUMBAR INTERBODY FUSION

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Introduction: We developed a new access technique through the unilateral intermuscular approach that consists of transfacet lumbar interbody fusion with pedicle screw and translaminar facet screw fixation (TLIF). The purpose of this study was to evaluate if this technique is less invasive.

Patients and Methods: From March 2004, two patients with failed back surgery and five patients with degenerative spondylolisthesis were treated with TLIF. There were 5 males and two female. Mean age at the surgery was 57 years. A minimum follow-up period was 6 months. Operative data including blood loss and operation time was reviewed. Visual analog scale and SF-36 were measured. Fusion was evaluated 6 months after surgery. These data were compared with 8 patients treated with PLF in the same period.

Results: Blood loss and operation time in the TLIF group were less and shorter than those in the PLF group, respectively. There were no differences in preoperative VAS of low back pain between both groups. However, low back pain in the TLIF group was improved at follow-up, compared with that in the PLF group (VAS 2 vs. 4.1). There were no differences in VAS of the leg pain and SF-36 between both groups. Solid fusion was observed in all patients of the TLIF group, but not in 2 patients of the PLF groups.

Discussion and Conclusion: In the TLIF group, a faster recovery is most likely related to the decreased trauma to the posterior musculature. This minimum access technique might attest to the decreased pain and to quicker rehabilitatlon.

ORAL PRESENTATION

ENDOSCOPIC PERCUTANEOUS TRANSPEDICULAR VERTEBROPLASTY FOR FRESH FRACTURES (INJECTION OF CALCIUM PHOSPHATE BONE CEMENT INTO VERTEBRAL BODY)

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Introduction: For the treatment of osteoporotic vertebral compression factures, percutaneous transpedicular injection of calcium phosphate bone cement (CPC) into the vertebral body has been performed, but wedge-shaped deformation of vertebral body progressed after operation. Therefore, after observing the inside of vertebral body and securing a space by insertion of an endoscope percutaneously, then we inject cpc. These modifications resulted in more favorable deformation rates.

Materials: We treated 46 patients (mean age, 76.8 years) with 48 acute vertebral compression fractures. Treatment with hydroxyapatite (HA) plus CPC under endoscope was 28 vertebral bodies (Group 1). Infusion of CPC alone without HA was 20 (Group 2). The arthroscope is inserted from pedicle. The fibrous tissues within the vertebral body are removed. The vertebral body is filled with HA to reinforce the anterior wall. In the end, CPC is infused (Group 1). Now, viscous CPC is infused alone (Group 2). The mean follow-up period was 8.1 months.

Result: The time until disappearance of pain on bed rest was 2.3 days in Group 1 and 2.1 days in Group 2 after surgery. The time until resumption of walking was 7.2 days in Group 1 and 7 days in Group 2. The final wedge-shaped rate was 65% in Group 1 and 75% in Group 2. When the preoperative condition on X-ray was compared with the condition at the final evaluation, Group 1 showed 7.3% improvement and Group 2 had 11.7% improvement.

Conclusion: The wedge-shaped deformation rate improved after this surgery. This procedure was proven to be effective for acute osteoporotic compression fractures.

ORAL PRESENTATION

EFFECTIVENESS OF A LESS INVASIVE APPROACH TECHNIQUE IN COMPARISON TO THE MICROSURGICAL TECHNIQUE IN OPERATIVE TREATMENT OF LUMBAR DISC HERNIATION

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To reduce the muscular trauma of the approach further we developed the technique: "microscopically assisted percutaneous nucleotomy" (MAPN). The study presented here aimed for evaluating the effectiveness of MAPN in comparison with the microsurgical technique (MC).

Material and methods: This is a prospective randomized study including fifty patients. Twenty five by twenty five patients were operated in the aforementioned both techniques. Parameters for comparison were intraoperative data like surgical time, time for the approach, time for closure, blood loss and complications as well as early postaperative results such as Visual Analogue Scale (VAS) differentiated for leg and back pain and analgesics consumption.

Results: The overall surgical time was 46 minutes, in MAPN-technique 33.5 and in MC-technique 57 minutes ($p<0.001$). The mean blood loss in MAPN amounts 21ml, in MC 59ml ($p<0.001$). There were one dural tear in MC and two in MAPN without further consequences. No other complication was recorded. In each group the pain parameters (VAS leg and back pain) improved significantly ($p<0.001$l) when the postoperative situation was compared to the preoperative one. There was no significant difference between both groups. However we found a significant ($p<0.001$) distinction in analgesics consumption at the early postoperative time (first 48 hours after surgery). The mean morphine equivalent dosage in MAPN was 1.28mg and in MC 5.4mg.

Conclusion: Analysing these results we believe that the MAPN-technique may be a proper alternative to the commonly used MC-technique in lumbar disc surgery.

ORAL PRESENTATION

COMPUTER ASSISTED SPINE SURGERY

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Introduction: The purpose of this study was to evaluate the accuracy and reliability of a new Computer Assisted System, for pedicle screw insertion. Very few studies were done yet, to try to evaluate the accuracy and reliability of this new system, with also ergonomics and efficiency aspects.

Material and Method: Between January Ist and December 31st 2003, 8 patients were instrumented for different pathologies. There were inserted 28 pedicle screws, on different vertebral levels, from T12 to L5. The CT- based navigation system was used for every patient (28 pedicle screws). The screw placement was evaluated on plain X rays and on postoperative CT scans, by an independent observer. In order to increase ergonomics and efficiency of Computer-Assisted Spine Surgery, new devices and technologies have been developed.

Results: In literature are reported results ranging from 15 to 40 % misplaced pedicle screws, for the conventional technique, varying by pathology, type of postoperative evaluation (CT or X rayonly) and, authors. The screws were considered misplaced, when the cortical penetration (on CT) was superior or equal to two (2) mm. Only one screw was not exactly placed into the pedicle (L3). There were no neurological complications following surgery.

Discussion, Conclusions: The authors demonstrated the importance of ergonomics and efficiency with the new generation of CAS systems. The registration step between the preoperative and intraoperative data is no longer than the conventional procedure, because the computer is equipped with a faster data collection process.

ORAL PRESENTATION

COMPUTER-ASSISTED SURGICAL NAVIGATION USING FLUOROSCOPY

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CHU A. michallon

Mobile fluoroscopic devices are an integral part of the standard equipment used in orthopaedic surgery to provide visual feedback of bone and surgical tool positions.

CLINICAL RELEVANCE: This paper describes a computer-assisted surgieal navigation system based on fluoroscopic X-ray image calibration and 3D optical localizers (Fluologics system, Praxim, France). This system allows real-time navigation in several X-ray projections simultaneously, with the fluoroscope turned off and removed from the operating field.

MATERIALS and METHODS: A three-dimensional optical localizer (Polaris system, Northern Digital, Waterloo, Ontario, Canada) is used to track the position and orientation of surgical tools, patient reference, and C-arm image intensifier, within the region of the operating table. Passive reflecting devices embedded into these components allow tracking by the three-dimensional optical localizer. Position and orientation data are transferred to a Surgetics computer workstation.

RESULTS: The accuracy of the system was verified in vivo on three patients upon pedicle screw insertion in thoraco lumbar region (T11 - L5). The position and orientation of the implanted screws were assessed postoperatively on CT seans. All the screws (16) were perfectly inserted. No complications were observed with these patients.

DISCUSSION/CONCLUSION: A fluoroscopy-based computer system can be seen as a complement to a CT-based computer system (CT seans provide full 3D image data, not fluoroscopic image). As compared to standard fluoroscopy, the fluoroscopy-based computer system al/ows real-time navigation in several X-ray projections simultaneously and reduces significantly radiation exposure of both patient and surgieal staff.

ORAL PRESENTATION

ENDOSCOPIC MICROSURGERY IN THORACIC DISC HERNIATION

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Different approaches have been used to treat this pathology. The posterior approach by laminectomy is not indicated. Many open approaches have been used in the past as well as the costotransversectomy, the transpedicular, the anterolateral and the very popular anterior transthoracic approach. In the last years the transthoracic endoscopic approach has become very common. To avoid complications concerning the described approaches, we performed this operation by an endoscopic parapedicular and transforaminal approach. This microsurgical way allows us to easily reach and remove the herniated part. This study was carried out from January 1991 to December 2002. One hundred and three patients should have undergone to traditional surgery for one hundred and nineteen herniated thoracic discs. They were treated by using endoscopic microsurgical technique with transforaminal way. Thirty-four herniations were calcified, forty-seven herniations were soft with osteophytes and spondylotic process, in thirty-eight cases there was only soft material. We had few complications as well as transitory neurologieal deficits, transitory radicular pain and, in very few eases, transitory and slight dyspnoea. Almost of the patients were discharged from the hospital forty-eight hours after surgery. There were two cases of relapse during the fol/ow-up period of these patients. The improvement or disappearance of symptoms (myelopathy, thoracic pain, thoracic radiculopathy and lumbar pseudo-radicular syndrome) was present in about the 96% of these cases. The goal of this surgical technique consists in the direct and effective anatomical decompression of the spinal cord and the nerve roots in thoracic area.

ORAL PRESENTATION

SCREWING BONE GRAFT ON TO THE BASE OF TRANSVERSE PROCESS

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This study involves results of a new technique, with an average 2.4 (1-4) years of follow up, applied on 27 patients for the treatment of adult isthmic spondylolisthesis with a slippage of up to 50 %.

Technique: Lytic area is reached via the posterolateral, intermuscular approach with a double incision. 1/3 superior of the superior facet of the caudal vertebra is removed. Bone tips on the lisis line and the fibro cartilaginous tissue are widely cleaned with kerrison rongeur. Hence, the pressure on the radix at the foraminal level is removed. Spondilolisthesis reduction screws are placed onto these vertebrae, sticking out 1 cm. Two oval holes, of which the distance is equal to that of the screws, are made on the unicortical block graft of appropriate size, obtained from the iliac bone. The graft is attached to the screws through these holes and placed on the decorticated bones. The connector and the rod are placed on the screws. The same procedure is applied to the other side as well. First, the screws on the caudal are tightened to the connectors, and then the screws on both slipped vertebrae are tightened simultaneously. Thus, the reduction is achieved and the grafts are placed onto the base of the transverse process, which is the most sufficient area for fusion with a wider surface contact. According to Lenke and Bridwell's radiographic grading classification, 20 patients were categorised as grade A; 6 were of grade B, and 1 was of grade C.

ORAL PRESENTATION

SEGMENTAL PEDICLE SCREWING FOR IDIOPATHIC SCOLIOSIS USING COMPUTER-ASSISTED SURGERY

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Introduction: Since 2003, authors began to use the navigation system for pedicle screwing. The purpose of this study was to compare the surgical results with those of previous procedure without navigation system.

Materials and Methods: Between 2001 and 2003, 10 patients operated for the treatment of idiopathic scoliosis with averaged 17.1 years (group A), and since 2003, 10 patients operated using navigation system with averaged 18.5 years (group B) were recruited. Rotated vertebrae with more than 10 degree in axial view were included for evaluation. Vertebral rotation and insertion angle of screws(medial=+, lateral=-) were measured. According to Rao, the evaluation of screw malposition was classified as Grade 0 (no violation of pedicle wall), Grade 1 (<2mm), Grade 2 (>2mm), Grade 3 (>4mm), and Grade 2&3 were determined perforation. Single registration was performed as possible, and correlation between registered vertebrae and perforation were investigated.

Results: Averaged vertebral rotation was 15.5 in group A and 16.2 in group B. Perforation was observed in 29.4% of groupA and 11.7% of group B ($p<0.05$). Perforation side in axial view(medial /lateral) was 8/21 in groupA and 5/12 in groupB, and in sagital view(convex/concave) was 18/11 in groupA and 10/6 in groupB. Insertion angle in perforated vertebrae(convex/concave) were 18.1/-2.2 in groupA and 24.9/ -5.7 in groupB. No perforation at registered vertebrae were seen in groupB, and separated from 1,2,3 vertebra were 4,5,8 screws, respectively.

Discussion: Navigation surgery provided precise installation of screws for rotated vertebrae, however, the tendency of lateral perforation at concave side and medial perforation at convex side happened, similar to conventional method. Separate registration is recommended for rotated vertebrae as possible.

ORAL PRESENTATION

THE COSMETIC ASPECT OF SCOLIOSIS DEVEOPMENT OF A TRUNK ASYMMETRY SCORE

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Introduction: The severity of body deformity in adolescent idiopathic scoliosis generally corresponds to the Cobb angle. However, there is a subset of patients that have a Cobb angle of less than 35 degrees, and yet have marked trunk asymmetry.

Materials: Data on 352 consecutive patients with adolescent idiopathic scoliosis were reviewed. New measurements were developed to quantify the deformity. The rib cage tilt is defined as the angle of the thoracic wall to the horizontal. Thoracic shift measures the lateral displacement of the thorax relative to the pelvis. Thoracic containment is determined by whether a projection of the thoracic wall lines remains contained within the pelvis. Axial inclination (rib hump angle), hump height, left-right shoulder height difference, and trapezium prominence were measured. These parameters were weighed and summed to obtain a trunk asymmetry score.

Results: 23 patients (6.5%) were identified as having a high asymmetry score despite having a Cobb angle under 35 degrees. A rib cage tilt of over 10 degrees, thoracic shift of over 15%, loss of thoracic containment, shoulder height difference of more than 2 cm, and an asymmetrical trapezium all cause a noticeable loss of symmetry and poor patient self-image. Balance was lost because the spine failed to develop a compensatory curve.

Conclusion: Adolescent idiopathic scoliosis is more a cosmetic than a pathological problem. In some cases, cosmetic criteria such as our trunk asymmetry score mav be more relevant to the patient's concerns than the Cobb angle, and should be considered in surgical decision making.

ORAL PRESENTATION

THE EFFECT OF PINEALECTOMY ON SCOLIOSIS DEVELOPMENT IN YOUNG NON-HUMAN PRIMATES

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Introduction: Pinealectomy in newborn chickens consistently resulted in scoliosis development. Published data suggest that the surgical removal of the pineal, loss of melatonin secretion and a bipedal posture are important elements in the development of scoliosis in lower animal models. This study aims to evaluate whether pinealectomy in a bipedal non-human primate model would result in the development of scoliosis.

Method: 18 rhesus monkeys between 8 to 11 months old underwent pineal excision. All monkeys were kept in a 12 hour light:dark cycle. Scoliosis was assessed by monthly radiographs. Completeness of pineal excision was assessed by measurement of urinary 6-sulphatoxymelatonin using an ELISA assay.

Results: The mean follow-up was for 28 months (range 10 to 41 months). At the time of the latest follow-up or death, none of the monkeys have developed scoliosis. Urinary 6-sulphatoxymelatonin measurements revealed 3 patterns. Group 1 (n=10) showed definite evidence of complete pineal excision. Group 2 (n = 2) was an uncertain group in which the nighttime melatonin level is slightly high. Group 3 (n=6) had incomplete pineal excision or ectopic melatonin production.

Conclusion: This is the first report of pinealectomy in non-human primates. Ten of the 18 monkeys had loss of melatonin secretion for a mean of 29 months after surgery. As none developed scoliosis, this study strongly suggests that the possible etiological factors producing idiopathic scoliosis in lower animals are different from primates, and findings in lower animals cannot necessarily be extrapolated to human beings.

ORAL PRESENTATION

MINITHORACOTOMY PROVIDES SATISFACTORY ACCESS FOR ANTERIOR RELEASE FOR SPINAL DEFORMITY CORRECTION AND FUSION

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Objective: To assess if mini thoracotomy provides sufficient access to undertake satisfactory anterior release and fusion of the thoracic spine. Mini thoracotomy is defined as a thoracotomy through an incision of less than 7cm.

Patients and Methods: A prospective collection of data from 10 patients, nine with adolescent idiopathic scoliosis (AIS) and one with congenital thoracolumbar kyphosis who underwent anterior release and fusion through a minithoracotomy. The female to male ratio was 3:2 with an average age at the time of surgery of 13.5 years (10-15years) in the scoliosis group. The patient with congenital kyphosis was operated on at 24 years of age. The mean standing pre-operative Cobb angle in the AIS group was 78.4° (60°-110°), and this was reduced to a mean of 64° (45°-85°) on bending films. The pre-operative kyphosis angle in the congenital kyphosis patient was 60°.

Results: All anterior surgery was satisfactorily achieved through a minithoracotomy with mean incision length of 6.5 cm (5.5-7cms) with the aid of a table mounted self-retaining retractor system. The average time taken for thoracotomy procedure was 99 minutes (40-120 minutes) with an estimated blood loss of 116 ml (50-250 ml). Satisfactory correction was achieved in all patients with the mean improvement in the post-operative Cobb angle of 34° (18°-52°) and kyphosis angle of 45°.

Conclusion: Minithoracotomy is an alternative technique to open thoracotomy and Video Assisted Thoracic Surgery (VATS), and provides satisfactory access to achieve anterior release as demonstrated by satisfactory correction achieved with improved cosmesis, acceptable operation time and blood loss.

ORAL PRESENTATION

AUGMENTATION OF THIRD GENERATION INSTRUMENTATION WITH SUBLAMINAR TITANIUM WIRING IN LATE ONSET IDIOPATHIC SCOLIOSIS

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In recent years, 3rd generation instrumentation systems, which achieve correction by maneuvers like derotation and translation, have been widely used in the treatment of idiopathic scoliosis. To increase correction, additional procedures that increase stability, such as screw application for every segment, have been used. In this study, the effects of augmentation, by using titanium double crimp Songer cable applied on apical region, on trunk balance, sagittal and frontal planes have been examined in 45 idiopathic scoliosis patients having minimum two years follow-up. Mean age was 14.5±1.7 years and female/male ratio was 30/15. Sagittal and frontal Cobb angles have been measured in preoperative, postoperative and recent radiographic examinations. Trunk balance has been examined both clinically and radiographically. Also, secondary curves have been measured in every examination for decompensation findings. In overall frontal plane measurements, postoperative correction was 79.9±13.5 %, loss of correction 2.9°±3.2° degrees and final correction 74.3 %±14.3 %. In postoperative measurements, normal physiological contours have been achieved in 97.8 % of the patients for the thoracic region (30°-50° degrees) and 80.7 % of the patients for the lumbar region (40°-60° degrees). In postoperative and last follow up examinations, balanced and totally balanced vertebral column has been achieved in every patient of the study group. Solid fusion mass has been observed in every patient. No postoperative complications have been observed. Given these findings, we conclude that derotation-translation combined maneuver performed with 3rd generation instrumentation reinforced sublaminar wires is a good choice in the treatment of the late-onset idiopathic scoliosis.

ORAL PRESENTATION

SHORT POSTEROLATERAL FUSION WITH UNILATERAL CYLINDRICAL THREADED INTERBODY FUSION CAGE IMPROVED DEGENERATIVE LUMBAR SCOLIOSIS: A STUDY WITH MINIMUM THREE-YEAR FOLLOW-UP

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Introduction: The purpose of this study is to analyze the outcomes of a consecutive series of 54 patients suffering degenerative lumbar scoliosis (DLS) or more underwent short-segmental posterolateral fusion using threaded interbody fusion cages (TIFCs) with pedicle screw instrumentation from 1998 with minimum three-year follow-up. Different from standard methods, only one TIFC was inserted to each segment on the concave side.

Materials & Methods: Average age at the surgery was 66.7 years. All patients had neurogenic claudication of less than 500m. The fusion was eliminated to the segments with neurological involvement, and 2.1 segments on average. The average follow-up was 48 months.

Results: In all patients neurogenic claudication improved. Major curve was improved from 19.2° on average to 10.8° and maintained (11.2°). Correction of disc angle per fused segment was 3.7° and loss was 0.1°. Eight patients with more than 15° residual end vertebra inclination had more than 20 mm of lateral shift of the apical vertebra above fusion. Correction of the end vertebra inclination had significant negative rank correlation (Spearman) to the lateral shift of the apical vertebra.

Conclusions: The results indicate that unilateral TIFC insertion for each segment with posterolateral fusion for DLS adequately improves clinical symptoms and the scoliosis. In this short-segmental procedure, adequate correction of the end vertebra within fusion range is important to correct the deformity into well-balanced spine with small lateral shift of apical vertebra above fusion.

ORAL PRESENTATION

TRANSVERSE PROCESS WIRING FOR THORACIC SCOLIOSIS

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We describe a method of reducing neurological risk by avoiding neural elements when performing segmental spinal fixation for scoliosis. This was done by making use of the transverse processes of the thoracic vertebrae 1-11 and wired plates. The wires are prevented from cutting the bone by attaching them to rectangular plates. These wired plates on the two sides of each segment should be firmly fixed to the base of the transverse process by tying them to each other. Maximum correction is obtained by spreading the force applied by stabilizing each thoracic vertebra from both sides. Derotation is attempted when all the wires have been tightened.

Tension forces are spread to all fixated vertebrae simultaneously and the correction should be carried out at all levels at the same time. On the convex side, each wire connects over the rod to the next one above it and, tightened one by one, provides compression. We treated 15 patients having a thoracic curve with this method and followed them for 25-39 months. In 2 eases of congenital scoliosis, a 50 % correction was obtained. In 3 cases of neurofibromatosis scoliosis, a 55 % correction was achieved. In 10 eases of idiopathic scoliosis, the correction was 60 %. When the thoracic sagittal contour was evaluated, thoracic kyphosis, which had been between -20° and +90°, had improved to between +8° and +43° in all cases. No infection or neurological complications occurred.

ORAL PRESENTATION

THE INCIDENCE OF C5-C6 RADICULOPATHY AS A COMPLICATION OF EXTENSIVE CERVICAL DECOMPRESSION

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Objectives: This study aims to discuss and compare our results with those previously mentioned in the literature as regards the C5-6 radiculopathy that occurs after decompression done for cervical spondylotic myelopathy.

Summary of Background data: There are few reports in the literature referring to the incidence of the C5-6 radiculopathy following cervical decompression procedures. Some authors believe that the postoperative cord shift is the most likely cause.

Methods: From January 1994 to November 2002, 121 patients underwent cervical corpectomies for cervical spondylotic myelopathy. The preoperative and the postoperatively discovered paresis have been assessed according to the criteria of the British Medical Council. The Nurick Scale was used to grade the severity of the myelopathic changes.

Results: The follow-up period varied from 4 to 111 months with an average of 50 months. Symptoms of C5 and/or C6 radiculopathy appeared in 10 patients (8.2%) postoperatively. Aggravation of a preoperative C5 and/or C6 radiculopathy was seen in three patients, while seven patients developed a new C5 and/or C6 radiculopathy at the imrnediate postoperative period. These motor deficits resolved completely in seven patients within seven months after the surgery, whereas a residual motor weakness remained in the other three patients,

Conclusions: The postoperative C5 motor deficit is not infrequently associated with partial involvement of the C6 root. The lesions can be either unilateral or bilateral with an statistically average frequency of 8%. The prognosis is generally favorable. Our results did not support the claimed cord shift phenomenon to be a possible aetiology.

ORAL PRESENTATION

ANALYSIS OF REOPERATIONS IN DEGENERATIVE CERVICAL SPINE DISEASE

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Study Design: Retrospective study.

Objective: The present study will to answer the following questions: 1. What is the overall revision rate following an operative treatment of degenerative cervical disorders using common operative techniques? 2. Is there any influence of the fusion length to the revision rate overall and especially to the decompensation ratio of adjacent segments? 3. What is the rate of revisions due to hardware failures? 4. Are there any differences concerning the revision rate between posterior and anterior instrumentation?

Methods: We reviewed 900 patients, who underwent a cervical spine surgery with an internal fixation at our institution between January 1994 and December 2000 (minimally follow up 2.2 years). Five different operative techniques were used. The revisions were analysed. The minimally follow up was 2.2 years (in mean 4,2 years).

Results: In total 121 revisions (13.4%) were recorded. The main indication for revision was hardware failure in 5.4%.

Conclusions: The present study delivers usable data to assess the revision rate concerning case numbers and follow up period. The revision rate overall was 13.4%. The influence of the fusion length to the general revision rate was unexpectedly high. There were no any relation between fusion length an adjacent segment problems. Revisions due to hardware problems constituted 40 % of the who le revision rate. Posterior instrumentations show a significant lower rate of hardware failure compared to anterior instrumentations.

ORAL PRESENTATION

RESULTS OF NON-FUSION METHOD IN THORACOLUMBAR AND LUMBAR FRACTURES

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Posterior fusion for thoracolumbar fractures has been the treatment of choice, however, results in permanent loss of segmental motion. If both proper stability and motion can be achieved, functional result will be improved considerably. Twelve patients with thoracolumbar and lumbar spine fractures under 40 years of age (mean 28.4 years) were managed by posterior fixation without fusion followed by removal of implants at mean 9.2 months later. For metal-fixed segments, sagittal alignment such as angle of kyphosis, height of body, recovered motion range in flexion- extension, right-left bending view were measured radiologically comparing with control group. Clinical aspects such as gross deformity, functional ability were investigated also. Immediately after injury, sagittal angle was average 17.2° kyphosis, which was changed into 2.8° lordotic angle after fixation of fractures. This angle became kyphotic 1.7gafter removal of implants and to 9.8° kyphotic at final follow-up. The height of fractured body was maintained still. The mean segmental motion was 10.5° in sagittal plane, 10.9° in coronal plane. Most patients were satisfied for final gross appearance and functional outcomes. Only one patient showed considerable development of kyphotic angulation but functional outcome was good. The author non-fusion method seemed to be effective in achieving stability and sagittal alignment as well as regaining segmental motion of fixed segments. In managing thoracolumbar fractures especially for young active persons, non-fusion method seemed to be one of the effective methods.

ORAL PRESENTATION

EARLY MANAGEMENT FOLLOWING LESS INVASIVE CERVICAL LAMINOPLASTY

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Study design: A prospective clinical study of early rehabilitation without cervical orthosis following less invasive cervicallaminoplasty.

Objective: To assess the efficacy of early management without cervical orthosis after posterior multilevel decompression surgery.

Background: A preliminary follow-up study of our unique cervical laminopalsty demonstrated better clinical results regarding persisting neck axial symptoms and loss of motion than conventional laminoplasty. it has been reported that early removal of cervical orthosis and early postoperative rehabilitation could reduce these problems.

Methods: Since 2001, we have performed C4-6 or 7 spinous process splitting laminoplasty and additional C3 laminectomy to prevent the detachment of the semispinalis cervicis muscle on C2. In this study, twenty five cases that received early management without neck immobilization after surgery were compared with twenty patients with received cervical orthosis for two weeks. AII patients were followed more than three months, and Japanese Orthopaedic Association (JOA) scores for neurological recovery, Visual Analogue Scale (VAS) for neck axial pain, and neck functional disability indexes were recorded preoperatively, and at 2 weeks and 3 months postoperatively.

Results: One case without orthosis suffered from C5 paresis for one week after surgery, but recovered full neurological status by 3 months. There was no statistical difference in postoperative neurological recovery with or without orthosis. Moreover, VAS and functional disability indexes also showed no statistical differences during the follow-up period.

Conclusions: This study suggests that no orthosis and early rehabilitation can be accomplished with less invasive cervical laminoplasty.

ORAL PRESENTATION

PERCUTANEOUS DORSAL STABILIZATION OF THORACOLUMBAR SPINE FRACTURES

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The sextant is a percutaneous internal fixator for the treatment of thoracolumbar spinal trauma. The experience of more than 150 cases of percutaneous dorsal instrumentation for trauma within 18 months are presented. The four indications were: 1. B-type fractures as a tension band for the treatment of the injuries of the posterior ligament complex 2. Minimal invasive first day surgery in polytrauma as single definite treatment for first step of combined dorsoventral stabilization 3. Pathological spine fractures with or without additional vertebroplasty 4.A-type fractures. The system allows stabilization of all segments from T9 to S1 with a maximum of 4 percutaneous pedicle screws for each side. Operating time and blood loss are significantly reduced. Due to the characteristics of the polyaxial screw heads the sextant does not enable reduction or distraction, so that its use is restricted to cases, where reduction can be accomplished by closed extension and positioning. Intraoperative complications related to the system were not found in more than 150 consecutive cases. Stabilization and fracture healing could be achieved in all cases.

Conclusion: the sextant is a reliable system for percutaneous dorsal fixation of spine fractures between T9 and S1.

ORAL PRESENTATION

THE EFFICACY OF SHORT SEGMENT POSTERIOR ENSTRUMENTATION IN BURST FRACTURES OF THORACOLUMBAR VERTEBRAE

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Patients and Method: Short segment posterior enstrumentation was performed in 48 patients. Mean age was 39,5±13,5 (18-67) years. Cobb angle was measured on preoperative and latest follow-up lateral graphies. Canal encroachment was measured on preoperative and latest follow-up CT using the method described by Willen et al. At latest follow-up functional results were assessed using pain (DPS) and work (DWS) seales of Denis. Later DPS and DWS were modified and functional results were graded as excellent, good, moderate, poor or very poor.

Results: Mean follow-up time was 21,7±9,2 (12-48) months. When modified functional results (MFR) were assessed, the result was excellent in 33,3%, good in 47,9%, moderate in 14,58% and poor in 4,16% of the patients. Mean intraoperative correction in Cobb angle was 18,2±17.9 degrees (p<0.01). Mean correction loss at latest follow-up was 7.4±17.7 degrees (p<0.01). There was significant correlation between preoperative mean Cobb angle and mean intraoperative correction (r=0.85, p<0.001). There was significant correlation between mean intraoperative correction and correction loss at latest follow-up (r=0,38, p<0,01). There was significant correlation between mean canal encroachment and mean canal remodelization (r=0,30, p<0,05). Considering poor scores in DWS and MFR, the ratio of correction loss was significantly high. (p<0,05). Correction loss at latest follow-up was significantly higher in patients with an intraoperative correction (p<0,05).

Conclusions: Correction loss occurs significantly higher in patients with an intraoperative correction DWS and MFR are significantly worse in patients with a correction loss.

ORAL PRESENTATION

A NOVEL SPACER FOR BILATERAL OPEN-DOOR CERVICAL EXPANSIVE LAMINOPLASTY

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Introduction: We report our unique concept of a new spacer for bilateral open-door cervical laminoplasty. The concept is to restore the entire cervical extensor musculature, not only the C2-attached muscle. The novel shape of our spacer has a spinous process-like portion to reattach the extensor musculature.

Materials and methods: Thirty-three patients underwent cervical expansive laminoplasty using new spacer (average age, 60.9 years) were reviewed. The follow-up period was 26 months. We evaluated the (2-7 angle, the range of motion (ROM), and axial symptoms.

Results: The C2-7 angle was maintained at 94% compared with before surgery. The ROM was preserved to 76% of pre-surgery levels. Six patients had s!ight axial symptoms at final follow up, but they had no restrictions in their activities of daily living.

Discussion: Laminoplasty has been developed to improve the short comings of laminectomy. It is important to re-attach the semispinalis cervicalis to the axis. But post-surgical cervical straightening and kyphosis have stili occurred. Most of the literature mentions that cervical lordosis decreases about 60-70% and that ROM decreases 50-60% after surgery. And there are some cases of newly occurring kyphosis. Anatomically, the semispinalis cervicis and multifidus are integral not only to the axis but also to other cervieal spinous processes. Our new laminoplasty, which uses a novel spacer that maintains the sagittal alignment better than conventional spacers, prevented postoperative kyphosis in all of our patients, which demonstrates that this is a better surgical procedure for regaining good lordotic alignment.

ORAL PRESENTATION

LONG TERM RESULT OF APICAL DEROTATION IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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Study Design: A prospective study of the result of pedicle screw plate system in treatment of idiopathic scoliosis.

Objcetives: To study the efficacy of pedicular screw plate system in idiopathic scoliosis correction and evaluate the feasibility of the technique.

Summary of Background Data: It had been accepted that the results of pedicular screw fixation in the idiopathic scoliotic patient especially on the vertebral derotation and hypokyphosis correction were superior to hook-rod segmental instrumentation. The standard technique of fixation currently utilized the linkage of pedicle screws via rods. Alternatively the technique of apical correction of the deformity by sagitally contoured plates found to be a convenient and effective mean of deformity correction and rigid fıxation.

Methods: Twenty-five patients who was diagnosed as idiopathic scoliosis and underwent posterior spinal fusion and fixation with RSS were prospectively analyzed. The parameters were compared between preoperative and postoperative by pair t-test. These parameters include Cobb angles, body height, shoulder height difference, coronal trunk balance, hump difference and vertebral rotation.

Results: There was statistically significance ($p<0.005$) in difference between pre-operative and post-operative parameters studies.

Conclusion: The instrument can effectively correct the scoliotic of moderate severed deformity in 3 dimensions especially regarding the vertebral derotation and restoration of thoracic kyphosis.

ORAL PRESENTATION

ADULT ONSET TIGHT FILUM TERMINALE

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In 1953, Garceau reported the first cases of filum terminale syndrome associated with neurological symptoms caused by abnormal filum terminale. The symptoms are similar to those of conus syndrome and lumbar nerve root lesion. Adult onset tight filum terminale (TFT) is often difficult to identify on imaging studies and could be also sometimes misdiagnosed as lumbar disc herniation. So far, there is no consensus on the best management strategy of this condition. The aim of this study is that the clinical outcome of surgery for adult onset TFT which caused low back pain and leg pain by tethering of the spinal cord. The diagnosis was followed by Komagata's criteria: 1) low back pain, 2) non-dermatomal leg pain, 3) bladder-bowel dysfunction, 4) spinal stiffness, and 5) positive provocation test. The operation was transaction of the filum terminale internum at SI level in 25 cases. Recent 9 cases out of 19 had also cervico-brachial symptoms. Regarding to the improvement of the clinical findings after the operation, the low back pain or leg pain in 96%, muscle power & sensory disturbance in 68%, bladder-bowel dysfunction in 79% and spinal stiffness in 80%,the cervico-brachial pain in 89%. The VAS scale changed from 10 to 3.3 in average. The pathophysiology of TFT is described as a traction effects on the spinal cord, but the details are stili unclear. TFT should be considered as differential diagnosis in low back pain especially without any abnormality in imaging diagnosis, and some of those cases had also cervico-brachial symptoms.

ORAL PRESENTATION

LUMBAR INTERBODY FUSION USING X-TUBE RETRACTION SYSTEM

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X-tube retraction system has been developped under the concept of the minimal access spinal technologies. This system has made possible the spinal instrumentation and lumbar interbody fusion through the smail skin incision (about 3cm) and minimal damage of paraspinal muscles. X-tube retractor is an expanding retractor which can expand from 26 mm to 39 mm.The diameter of the top end of X-tube is 26 mm and the bottom end is 39 mm. The author has treated 20 patients with lumbar spinal instability by lumbar interbody fusion using X-tube retraction system in last one year. 10 cases were with degenerative spondylolisthesis and 9 cases were with recurrent lumbar disc herniation and one with isthmic spondylolisthesis. In all cases, Telamon interbody cages and CD Horizon (M8) spinal instrumentation systems were used. Posterior lumbar interbody fusion (PLIF) was done in 10 cases and Transforaminal lumbar interbody fusion (TLIF) was done in 10 case. The average operation time was 210 minutes in PLIF and 160 minutes in TLIF. The average blood loss is 120 ml in PLIF and 80 ml in TLIF. The clinical results were satisfaetory and there were no post-operative neurological deterioration. The use of X-tube retraction system is minimally invasive and it reduces the pain after surgery and hospital stay. It can also offer the economical benefit to patients.

ORAL PRESENTATION

DUAL PATHOLOGY AND TREATMENT DILEMMA (HIP ARTHRITIS AND SPINAL STENOSIS)

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Aim: To present the clinical results of management in patients with co-existing hip arthritis and spinal stenosis.

Background: Hip arthritis can be very debilitating and more so, if there is co-existing spinal stenosis. Careful clinical examination and investigations are needed to diagnose the co-existing conditions. if one pathology precedes other, the management is straight forward. However, if both present simultaneously, there will a dilemma regards the sequence of management options.

Materials and Methods: Seven patients who presented with dual pathology were investigated and were managed with total hip replacement. They have been followed up clinically.

Results: There were 5 men. The average was 71 years. Four patients had bilateral hip arthritis. All patients reported improvement in the spinal stenotic symptoms following hip replacement. None developed foot drop following total hip replacement.

Discussion: In advanced hip osteoarthritis, the hip develops a fixed flexion deformity that leads to exaggerated lumbar lordosis. In presence of co-existing spinal stenosis, the exaggerated lumbar lordosis worsens the spinal stenosis. Total hip replacement with correction of fixed flexion deformity improved the exaggerated lumbar lordosis. Thus, these patients had good relief of stenotic symptoms as well as relief of hip pain following a hip replacement. It is important that patients are cautioned about the increased risk of foot drop and sciatic palsy as there is risk of double crush. The hip replacements were performed using modified McFarlane's approach or trochanteric osteotomy. None of these patients requested a spinal decompression after the total hip replacement.

ORAL PRESENTATION

CLINICAL COMPARISON OF CARBON CAGE VERSUS CHIP AUTOGRAFT IN INSTRUMENTED POSTERIOR LUMBAR INTERBODY FUSION FOR DEGENERATIVE SPONDYLOLISTHESIS

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Introduction: In the past decade, interbody cages have been popularized as a fusion technique. The implants are expensive, however, and its (cost) effectiveness versus autologous bone graft has not been established.

Materials: 128 patients with symptomatic monosegment degenerative spondylolisthesis. The procedure was a circumferential fusion via posterior approach using VSP or Isola instrumentation. 86 patients were stabilized anteriorly with autogenous bone chips harvested from the posterior iliac crests and placed via unilateral anulotomy. 42 patients received bilateral Brantigan carbon fiber cage implants. Minimum follow-up interval was 12 months. Clinical outcome was assessed using the Greenough low back outcome scale. Dynamic radiography for fusion result was interpreted by an independent radiologist.

Results: Operative time and blood loss was higher in the autologous graft group, mainly attributable to iliac bone graft harvesting. Transient post-operative radicular pain was more prevalent in the cage group, likely due to more nerve root retraction. There was no significant difference in the Greenough score, neurological function or patient satisfaction. Pain score was higher in the autologous graft group, but chiefly from donor site pain. Radiologically, the post-operative disc height was significantly higher in the cage group, but the interbody fusion mass radiographic density was lower. Fusion rates (based on vertebral motion and screw breakage rates) and lumbar lordosis were similar.

Conclusion: This study did not show major advantages of the cage technique in clinical and radiologic outcome. The cage functions mainly as a spacer, and its benefits mostly derive from avoidance of bone graft harvesting.

SYMPOSIUM

ANTERIOR INSTRUMENTATION OF THORACOLUMBAR FRACTURES

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Thoracolumbar spinal fractures are the largest group in adult vertebral column fractures. In anterior and middle column fractures, anterior decompression is indicated when there is a neuralgic deficit. Though neurological deficit is not correlated with the spinal canal compromise Gebstein et al. think anterior decompression of the spinal canal is necessary if the space is narrowed more than 30 %. Goutallier and Louis emphases the importance of anterior strut grafting and stabilization of anterior column destructed when the local kyphosis angle is more than 20°. Magral classification type A2 and type C1 fractures also need anterior column support in order to prevent posttraumatic kyphosis deformity. Holt, McCormack and Gaines, developed load sharing score due to the result of short segment posterior instrumented patients. According to this scoring system they reported implant failure and progression of the kyphotic deformity if the score is 7 points or higher. For these patients long posterior instrumentation or anterior instrumentation with anterior strut grafting was recommended. Additionally, when the period between the operation time and trauma is longer than 10 days, ligamentotaxis is not effective so the fragments in the spinal canal can only be removed anteriorly. As a result anterior decompression was found to be mandatory for neurologically compromised spinal trauma patients in order to obtain neurological improvement, which defines the future life quality of the patients with anterior strut grafting. Anterior instrumentation has higher success rates with low complication and high fusion rates in correcting and maintaining correction of kyphotic deformities.