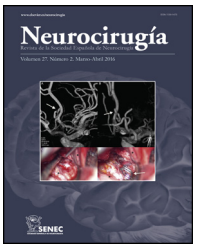
NEUROCIRUGIA. 2018;xxx(xx):xxx–xxx

NEUROCIRUGÍA

www.elsevier.es/neurocirugia



Clinical Research

Radiological outcomes of unstable thoraco-lumbar fractures without neurological deficit treated through percutaneous surgery☆

Rafael Lorente[a], *Alejandro Lorente*[b,*], *Bárbara Rosa*[c], *Pablo Palacios*[d], *Carlos Barrios*[e]

[a] *Servicio de Traumatología y Cirugía Ortopédica, Hospital Universitario Infanta Cristina, Badajoz, Spain*
[b] *Servicio de Traumatología y Cirugía Ortopédica, Hospital Universitario Ramón y Cajal, Madrid, Spain*
[c] *Servicio de Traumatología y Cirugía Ortopédica, Hospital de Vila Franca de Xira, Vila Franca de Xira, Portugal*
[d] *Servicio de Traumatología y Cirugía Ortopédica, Hospital Universitario Madrid Norte Sanchinarro, Madrid, Spain*
[e] *Instituto Universitario de Investigación en Enfermedades Músculo-Esqueléticas, Valencia, Spain*

ARTICLE INFO

Article history:
Received 29 May 2017
Accepted 23 September 2017
Available online xxx

Keywords:
Percutaneous surgery
Thoracic and lumbar spine
Kyphosis
Instrumentation

ABSTRACT

Objective: To analyse the radiological outcomes in the long term of unstable thoracic and lumbar fractures treated through percutaneous surgery.

Material and methods: Retrospective review of a series of patients with unstable thoracic and lumbar fractures treated with percutaneous minimally invasive surgery between 2010 and 2015 in three different hospital centres. Six radiological parameters were measured annually during a 2-year period: Fracture angle, kyphotic deformity, sagittal index, percentage of compression, degree of displacement and deformation angle.

Results: A total of 37 patients were included with a median age of 41.3 years and a median follow-up period of 2.2 years. Fracture angle rose from 14.8 to 17.1 (increase of 15.54%), kyphotic deformity from 15.9 to 17.7 (increase of 11.32%), sagittal index from 10.1 to 12.3 (increase of 21.78%), percentage of compression from 32.7% to 36.8% (increase of 12.53%), degree of displacement from 3.0 mm to 4.4 mm (increase of 50%) and deformation angle from 20.7 to 22.9 (increase of 10.62%).

Conclusions: All the radiological parameters studied lost correction throughout the 24 months of follow-up; the degree of displacement and the sagittal index were the most marked. Nevertheless, the greatest loss of correction occurred in the first postoperative year, the parameters then stabilised over the 24 months of follow up. We routinely recommend the measurement of all previous parameters for the follow up of unstable thoracic and lumbar fractures treated through percutaneous surgery.

DOI of original article: https://doi.org/10.1016/j.neucir.2017.09.009.

☆ Please cite this article as: Lorente R, Lorente A, Rosa B, Palacios P, Barrios C. Evolución radiológica de las fracturas inestables toracolumbares sin clínica neurológica tratadas mediante cirugía percutánea. Neurocirugía. 2017. https://doi.org/10.1016/j.neucir.2017.09.009

* *Corresponding author.*
E-mail address: alejandro.lorentegomez@gmail.com (A. Lorente).

Evolución radiológica de las fracturas inestables toracolumbares sin clínica neurológica tratadas mediante cirugía percutánea

Palabras clave:
Cirugía percutánea
Columna torácica y lumbar
Cifosis
Instrumentación

RESUMEN

Objetivo: Analizar la evolución radiológica a largo plazo de las fracturas inestables torácicas y lumbares tratadas mediante cirugía percutánea.

Material y métodos: Serie retrospectiva de una serie de casos con fracturas inestables torácicas y lumbares sin clínica neurológica tratadas mediante cirugía percutánea entre el 2010 y 2015 en 3 hospitales diferentes. Se midieron 6 parámetros radiológicos anualmente durante un período de 2 años: ángulo fractuario, deformidad cifótica, índice sagital, porcentaje de compresión, grado de desplazamiento y ángulo de deformación.

Resultados: Se incluyeron un total de 37 pacientes de 41,3 años de media, con un período de seguimiento medio de 2,2 años. El ángulo fractuario pasó de 14,8 a 17,1° (incremento del 15,54%), la deformidad cifótica de 15,9 a 17,7° (incremento del 11,32%), el índice sagital de 10,1 a 12,3 (incremento del 21,78%), el porcentaje de compresión del 32,7 al 36,8% (incremento del 12,53%), el grado de desplazamiento de 3,0 a 4,5 mm (incremento del 50%) y el ángulo de deformación de 20,7 a 22,9° (incremento del 10,62%).

Conclusiones: Todos los parámetros radiológicos estudiados perdieron corrección a lo largo de los 24 meses de seguimiento, siendo el grado de desplazamiento y el índice sagital los más marcados. Sin embargo, la mayor parte de la pérdida de corrección ocurre en el primer año postoperatorio, estabilizándose los parámetros posteriormente hasta los 24 meses de seguimiento. Recomendamos la medición de todos los parámetros previos de rutina para el seguimiento de las fracturas inestables torácicas y lumbares tratadas mediante cirugía percutánea.

Introduction

Thoracic and lumbar fractures and luxations are complex lesions that frequently occur in the young, generally caused by high-energy trauma such as traffic accidents and falls.[1–3]

Neurological lesions can occur in 15–40% of these fractures[4,5] and more than 30% of the patients may develop chronic pain that involves limitations on activities of daily life and difficulty with reintegration into the workforce,[1,6,7] so that appropriate management of these fractures is essential.

With the appearance of new techniques and apparatus and better surgical skills that are the fruit of experience, surgical treatment of thoracic and lumbar vertebral fractures has become popular in the past few years for reducing hospital stays, increasing stability, achieving adequate reduction and, on many occasions, improving neurological function. Nonetheless, there is controversy about the optimal approach (anterior, posterior or combined) for unstable fractures.[2,8]

We are currently seeing a surge in percutaneous operations in the area of the thoracic and lumbar spinal column, particularly in the field of fractures. The fixation of burst fractures and flexion-distraction fractures by a posterior approach has generally been accompanied by posterolateral or posterior arthrodesis with good results,[9,10] but this is currently controversial.[1] The argument in favour of arthrodesis is that it provides greater stability, avoiding the loss of reduction, failure of the mounting, and pseudarthrosis. Moreover, the consequence of arthrodesis is a permanent loss of segmental movement.[11]

In the majority of the studies conducted to date, radiological follow-up is based on two parameters: kyphotic deformity and percentage of compression.[9–11] In this study, we aim to conduct a more exhaustive radiological follow-up on the clinical course, analysing the radiological course of unstable thoracic and lumbar fractures without clinical neurological symptoms treated by percutaneous surgery (fixation with pedicle screw and bar system) without arthrodesis. Our hypothesis is that there are parameters that have not been studied traditionally that can lose correction over the course of follow-up on these fractures and that could be important when clinical and surgical decisions are being made.

Material and methods

A retrospective multi-centre study was conducted of a series of non-consecutive cases of unstable non-osteoporotic fractures of the thoracic and lumbar spine without associated clinical neurological symptoms. In this retrospective study, unstable thoracic and lumbar fractures treated surgically were reviewed and those that did not present with neurological deficits were selected. Patients with a diagnosis of osteoporosis (previous or by computerised tomography [CT] because of the spinal injury) and those with still-open physes were also excluded. All patients presented with unstable compression fractures (type A); these were considered to be fractures with a decrease of more than 50% in the height of the vertebral body, an increase in interspinous distance, and more than 25°