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## Clinical Research

# Rationale and complications of the anterior-lateral extrapleural retroperitoneal approach for unstable thoracolumbar fractures: Experience in 86 consecutive patients<sup>☆</sup>



Pedro David Delgado-López<sup>a,\*</sup>, Antonio Rodríguez-Salazar<sup>a</sup>, Vicente Martín-Velasco<sup>a</sup>, Javier Martín-Alonso<sup>a</sup>, José Manuel Castilla-Díez<sup>a</sup>, Ana Galacho-Harriero<sup>a</sup>, Elena Araús-Galdós<sup>b</sup>

<sup>a</sup> Servicio de Neurocirugía, Hospital Universitario de Burgos, Burgos, Spain

<sup>b</sup> Servicio de Neurofisiología Clínica, Hospital Universitario de Burgos, Burgos, Spain

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## ABSTRACT

**Objectives:** To describe the rationale, pros and cons, and complications of the anterior-lateral extrapleural retroperitoneal approach for unstable (TLICS > 4) thoracolumbar fractures.

**Patients and methods:** Clinical and radiological data and outcomes from a cohort treated surgically via said approach were retrospectively reviewed. All patients were operated on exclusively by 5 neurosurgeons trained in spine surgery.

**Results:** Between June 1999 and December 2015, 86 patients underwent surgery (median age 42 years, most common level: L1). Approximately 32.5% presented with a preoperative neurological defect. After surgery (mean duration: 275 min), 75.6% presented with no neurological sequelae and only one-third required blood transfusion. Median postoperative stay was 7 days. Correction of kyphosis was considered adequate and suboptimal but acceptable in 91% and 9% of the patients, respectively. Complications occurred in 36 patients, the majority being transient. We observed failure of the construct in 2 cases (collapse of an expandable cage and extrusion of a locking screw). No infections, vascular or visceral lesions, permanent neurological worsening or mortality occurred during hospitalisation. One patient ultimately needed additional posterior fixation due to persistence of pain. Median follow-up was 252 days (27.9% was lost to follow-up).

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\* Corresponding author.

E-mail address: [pedrodl@yahoo.com](mailto:pedrodl@yahoo.com) (P.D. Delgado-López).

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**Conclusions:** The extrapleural extraperitoneal approach provides solid anterior reconstruction, allows wide decompression of the spinal canal, and permits adequate and long-lasting correction of kyphosis. The rates of infection, construct failure, need for reoperation and vascular or visceral lesions are minimal.

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## Fundamentos y complicaciones del abordaje anterolateral extrapleural-retroperitoneal en fracturas inestables toracolumbares: experiencia en 86 pacientes consecutivos

### R E S U M E N

#### Palabras clave:

Fractura toracolumbar

TLICSS

Abordaje extrapleural

Abordaje anterior

Cifosis

Complicaciones

**Objetivos:** Describir los fundamentos, las ventajas, los inconvenientes y las complicaciones del abordaje anterolateral extrapleural-extraperitoneal en fracturas toracolumbares inestables (TLICSS > 4).

**Pacientes y métodos:** Se evalúan retrospectivamente datos clínicos y radiológicos, resultados y complicaciones de una cohorte intervenida mediante dicho abordaje. Todos los pacientes fueron intervenidos exclusivamente por 5 neurocirujanos entrenados en cirugía de columna.

**Resultados:** Un total de 86 pacientes fueron intervenidos entre junio de 1999 y diciembre de 2015 (mediana de edad 42 años y nivel más frecuente L1). El 32,5% presentaban defecto neurológico preoperatorio. Tras la intervención (duración media: 275 min), el 75,6% quedaron sin secuelas neurológicas y solo un tercio de pacientes precisó transfusión. La estancia media postoperatoria fue de 7 días. La corrección de la cifosis se consideró correcta y subóptima pero aceptable en el 91 y el 9% de los casos, respectivamente. Ocurrieron complicaciones en 36 pacientes, la gran mayoría transitorias. Se constataron 2 fallos de material (colapso de caja expansible y extrusión de tornillo de bloqueo). No ocurrieron infecciones, lesiones vasculares, lesiones viscerales, empeoramiento neurológico permanente ni mortalidad durante el ingreso. Un paciente precisó estabilización posterior tardía por persistencia del dolor. El seguimiento mediano fue de 252 días (27,9% pérdidas).

**Conclusiones:** El abordaje extrapleural-extraperitoneal proporciona una estabilización anterior sólida, permite una amplia descompresión del canal y una corrección adecuada y duradera de la cifosis. Las tasas de infección, fallo del material, necesidad de reoperación y lesiones vasculares o viscerales son mínimas.

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## Introduction

It is estimated that at least 60% of all spinal fractures occur at the thoracolumbar (TL) junction, i.e. at segment T10-L2, probably as a result of this being the area of transition between thoracic kyphosis, which is relatively rigid, and lumbar lordosis, which is considerably more mobile.<sup>1,2</sup> These fractures may be of traumatic or osteoporotic origin, or secondary to other diseases, such as inflammatory, infectious or tumour processes.<sup>3</sup> Burst fractures are the most common form, making up 10–20% of all cases.<sup>4</sup>

Unstable fractures of the TL junction generally occur in the context of high-energy traumas and may be associated with other severe musculoskeletal injuries or potentially fatal visceral lesions.<sup>5</sup> However, they are sometimes the only

manifestation of a traumatic event, especially when they occur after falls from a certain height.<sup>6</sup> These fractures usually manifest as intense dorsolumbar pain, often radiating in a band-like fashion, with or without a radicular pattern, which hinders or impedes movements of the trunk.<sup>4</sup> From a neurological point of view, a range of injuries can occur, from no deficit whatsoever to a complete spinal cord injury with sensory paraplegia and total and permanent sphincter impairment.

As a general rule, treating an unstable TL fracture consists of nerve tissue decompression followed by rigid internal fixation which has traditionally been performed using a posterior (open or percutaneous) approach with pedicle screws and adjacent vertebrae fusion, or via an anterior-lateral route using an extended, thoraco-phreno-laparotomy approach.<sup>3,4,7</sup>

The indication for surgery in TL fractures is determined by the morphology of the fracture, the extent of the associated ligament injury and the presence or absence of neurological

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