



Clinical Study

Operative management of complex lumbosacral dissociations in combat injuries

Peter M. Formby, MD^a, Scott C. Wagner, MD^a, Daniel G. Kang, MD^{b,*},
Gregory S. Van Blarcum, MD^a, Ronald A. Lehman, Jr., MD^c

^aDepartment of Orthopaedics, Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD 20889, USA

^bDepartment of Orthopedic Surgery, Madigan Army Medical Center, 9040 Jackson Ave, Tacoma, WA 98433, USA

^cDepartment of Orthopedic Surgery, Columbia University Medical Center—The Spine Hospital, 5141 Broadway, 3 Field West, New York, NY 10034, USA

Received 21 December 2015; revised 1 May 2016; accepted 21 June 2016

Abstract

BACKGROUND CONTEXT: As war injury patterns have changed throughout Operations Iraqi and Enduring Freedom (OIF and OEF), a relative increase in the incidence of complex lumbosacral dissociation (LSD) injuries has been noted. Lumbosacral dissociation injuries are an anatomical separation of the spinal column from the pelvis, and represent a manifestation of severe, high-energy trauma.

PURPOSE: This study aimed to assess the clinical outcomes of combat-related LSD injuries at a mean of 7 years following operative treatment.

STUDY DESIGN: This is a retrospective review.

PATIENT SAMPLE: We identified 20 patients with operatively managed LSDs.

OUTCOME MEASURES: Time from injury to arrival in the United States, operative details, fixation methods, postoperative complications, time to retirement from military service, disability, and ambulatory status at latest follow-up.

METHODS: We performed a retrospective review of outcomes of all patients with operatively managed combat-related LSD from January 1, 2003 to December 31, 2011.

RESULTS: Twenty patients met inclusion criteria and were treated as follows: posterior spinal fusion (12, 60%), sacroiliac screw fixation (7, 35%), and combined anterior-posterior fusion for associated L3 burst fracture (1, 5%). The mean age was 28.2±6.4 years old. The most common mechanism of injury was mounted improvised explosive device (IED, 55%). On average, 2.2 spinal regions were injured per patient. Neurologic dysfunction was present in 15 patients. Three patients underwent operative stabilization of their injuries before evacuation to the United States. Four patients had a postoperative wound infection and two patients underwent reoperation. Mean follow-up was 85.9 months (range: 39.7–140.8 months). At most recent follow-up, seventeen patients were no longer on active duty military service. Eight patients had persistent bowel dysfunction and nine patients had persistent bladder dysfunction. Fifteen patients reported chronic low back pain. Seventeen were ambulating and five had documentation of running following surgery.

FDA device/drug status: Not applicable.

Author disclosures: **PMF:** Nothing to disclose. **SCW:** Nothing to disclose. **DGK:** Nothing to disclose. **GSVB:** Nothing to disclose. **RAL:** Consulting: Medtronic (E, Paid directly to the author); Speaking and/or Teaching Arrangements: Medtronic (Honorarium, Paid directly to the author), Stryker (Honorarium, Paid directly to the author), DePuy Spine (Honorarium, Paid directly to the author), various universities for visiting professorships (Honorarium, Paid directly to the author), Broadwater (Honorarium, Paid directly to the author); Trips/Travel: Medtronic (Reimbursement, Paid directly to the author), DePuy Spine (Reimbursement, Paid directly to the author), Stryker (Reimbursement, Paid directly to the author), Broadwater (Reimbursement, Paid directly to the author); Grants: Department of Defense (I, Paid directly to the institution/employer), Centinel Spine (I, Paid directly to the institution/employer), outside the submitted work.

Investigation was performed at the Walter Reed National Military Medical Center, Bethesda, MD.

The views expressed in this manuscript are those of the authors and do not reflect the official policy of the Department of Army, the Department of Navy, the Department of Defense, or the U.S. Government. Four (PMF, SCW, DGK, GSVB) authors are employees of the United States government. This work was prepared as part of their official duties and as such, there is no copyright to be transferred.

The manuscript submitted does not contain information about medical device(s) or drug(s). No funds were received in support of this work. Relevant financial activities outside the submitted work: consultancy; grants; payment for lectures; travel, accommodations, meeting expenses.

No reproduced copyrighted materials. Institutional review board approval with publication clearance was obtained for this study.

The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

* Corresponding author. Department of Orthopedic Surgery, Madigan Army Medical Center, 9040 Jackson Ave, Tacoma, WA 98431, USA. Tel.: +1 (253) 968 1790.

E-mail address: daniel.g.kang@gmail.com (D.G. Kang)

CONCLUSIONS: This is the largest series of operatively managed LSD in patients currently reported. Our series suggests that combat-related LSD injuries frequently result in persistent, long-term neurologic dysfunction, disability, and chronic pain. Operative management carries a high postoperative risk of infection. However, a select group of patients are highly functional at latest follow-up. Published by Elsevier Inc.

Keywords: Combat spine fracture; Lumbopelvic dissociation; Lumbosacral dissociation; Lumbosacral fracture dislocation; Lumbosacral spondyloptosis; Spinopelvic dissociations

Introduction

Lumbosacral dissociation (LSD) injuries are a morbid subgroup of spinal injuries that occur infrequently and typically result from high-energy trauma [1]. This type of fracture dislocation was first described by Roy-Camille et al. [2], and originally termed the “suicidal jumper’s fracture.” Lumbosacral dissociation is associated with a high rate of neurologic injury and long-term disability. Anatomically, it is characterized by a transversely oriented sacral fracture that extends into bilateral vertical sacral fracture components, thereby separating the upper central segment of the sacrum from the pelvic ring [1,3]. Despite being regarded as a rare pattern, LSD injuries have been seen with an increased incidence in combat-related spine fractures resulting from blast mechanisms of injury [3]. Classification and management of LSD injuries have evolved since the original description as the Roy-Camille classification, which was based exclusively on the fracture pattern and provided no prognostic information. The lumbosacral injury classification system (LSICS) is a new classification based on three injury characteristics: injury morphology, neurologic status, and posterior ligamentous complex (PLC) integrity [4], and provides useful information regarding surgical decision-making, as well as elucidates the importance of managing concomitant and soft-tissue injuries to optimize outcomes. However, to date there is no consensus regarding the optimal treatment of these injury patterns. Historically, most cases of LSD have been managed nonoperatively and were associated with a high rate of neurologic compromise and permanent disability [1,3]; recently, there has been growing support for early decompression of the nerve roots, reduction of the sacral fractures, and overall restoration of lumbopelvic stability to optimize the potential for neurologic recovery [1]. The purpose of this study was to evaluate the presentation of operatively managed combat-related LSD injuries during the current conflicts in Iraq and Afghanistan, describe the surgical management options for these injuries, and analyze the long-term clinical outcomes of these patients.

Methods

After institutional review board approval, we retrospectively reviewed all patients surgically managed at our institutions with LSD injuries sustained while deployed in Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn from January 1, 2003 to December 31,

2011. We included all patients with LSD injuries, defined as a transversely oriented sacral fracture with bilateral vertical fracture components, as well as severely comminuted fractures of the sacrum, resulting in instability between the superior endplate of S1 and the ilium, representing a separation of the spinal column from the pelvis. In addition, we classified each patient according to the LSICS, including the fracture morphology, integrity of the PLC, and neurologic status. We reviewed all pertinent Department of Defense electronic medical records. We recorded demographic data as well as the time of initial injury, mechanism of injury, injury morphology, neurologic injury, associated injuries, date of arrival after medical evacuation to the United States, treatment methods, clinical results, and complications. We performed chi-square analysis to evaluate categorical data, Student *t* test for continuous data, with a *p*-value $\leq .05$ signifying statistical significance.

Results

Injury data

Twenty patients met inclusion criteria with a mean age of 28.2 ± 6.4 years old. The most common mechanism of injury was mounted improvised explosive device (IED, 55%). The mean time to arrival in the United States after injury was 6.2 ± 3.9 days. There were a mean 2.2 spinal regions injured per patient. The mean LSICS score was 6.8 ± 2.5 . Fifteen patients had documented neurologic dysfunction at the time of presentation, ranging from paresthesias alone, to lower extremity motor deficits, to complete bowel and bladder dysfunction. Patients had a mean 1.2 ± 1.0 extremities injured with a 45% rate of at least one lower extremity amputation at latest follow-up (one hemipelvectomy and three patients with bilateral lower extremity amputations) (Table 1).

Operative data

The mean time to definitive spine fixation was 19.9 days (range 1–111 days). Three patients underwent operative stabilization of their injuries before evacuation to the United States. Surgical treatment included posterior spinal fusion (60%), sacroiliac (SI) screw fixation (35%), and combined anterior-posterior fusion for an associated L3 burst fracture (5%). Average LSICS neurologic sub-score between the SI screw group and the posterior fusion group was 1.6 versus

Download English Version:

<https://daneshyari.com/en/article/5713207>

Download Persian Version:

<https://daneshyari.com/article/5713207>

[Daneshyari.com](https://daneshyari.com)