Surgical versus nonsurgical treatment of thoracolumbar burst fractures in neurologically intact patients: a cost-utility analysis

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Alexander Joeris, MSc MD[1]; Cumhur F. Öner, MD PhD[2]; Charlotte Dandurand, MD MSc FRCSC[3]; Klaus J. Schnake, MD[4]; Richard J Bransford, MD[5]; Greg D. Schroeder, MD Associate Professor[6]; Nicolas Dea, MD MSc FRCSC[7]; Mark Phillips, BSc PhD[8]; Mohammed El-Sharkawi, MD PhD[9]; Shanmuganathan Rajasekaran, MD PhD[10]; Lorin M. Benneker, MD[11]; Jin W. Tee, MD BMedSci MBBS FRACS[12]; Eugen Cezar Popescu, MD PhD[13]; Jérôme Paquet, MD[14]; John C. France, MD[15]; Alexander R. Vaccaro, MD MBA PhD[16]; Marcel F. Dvorak, MD FRCSC MBA[17]

1 AO Foundation, Head of Medical Scientific Affairs, Davos, Switzerland; 2 University Medical Center, Utrecht, Netherlands; 3 University of British Columbia, Department of British Columbia, Vancouver, BC, Canada; 4 Malteser Waldkrankenhaus St. Marien, Center of Spinal Surgery and Scoliosis, Erlangen, Germany; 5 University of Washington School of Medicine, Department of Orthopaedics and Department of Neurological Surgery, Seattle, WA, USA; 6 Thomas Jefferson University, Rothman Institute, Philadelphia, PA, USA; 7 University of British Columbia, Vancouver, BC, Canada; 8 McMaster University, Hamilton, ON, Canada; 9 Assiut University Medical School Assiut, Department of Orthopaedic and Trauma Surgery, Asyut, Egypt; 10 Ganga Hospital, Department of Orthopaedics and Spine Surgery, Coimbatore, Tamil Nadu, India; 11 University of Bern, Spine Unit, Sonnenhof Spital, Bern, Switzerland; 12 National Trauma Research Institute (NTRI), The Alfred Hospital, Department of Neurosurgery, Melbourne, Australia; 13 Prof. Dr. N. Oblu Emergency Hospital, Iasi, Romania; 14 Université Laval, Neurosurgery Unit, Department of Surgery, CHU de Quebec, Quebec City, QC, Canada; 15 West Virginia University, Department of Orthopaedic Surgery, WV, USA; 16 Thomas Jefferson University Hospital, Department of Orthopaedic Surgery, Rothman Institute, Philadelphia, PA, USA; 17 University of British Columbia, Department of Orthopaedics, Vancouver, BC, Canada

Objectives

- ❑ Studies comparing clinical outcomes of patients with neurologically intact thoracolumbar (TL) burst fractures (A3/A4) have produced inconclusive clinical results creating lack of consensus.
- ❑ We performed a cost-utility analysis comparing surgical treatment to nonsurgical treatment for those fractures to generate additional evidence for decision-making.

Methods

- ❑ Cost-utility analysis from a societal perspective.
- ❑ Patient demographics, all clinical and outcome data were taken from an observational, prospective multicenter cohort study comparing surgical versus non-surgical treatment of A3/A4 TL burst fractures in neurological intact patients (currently submitted for publication).

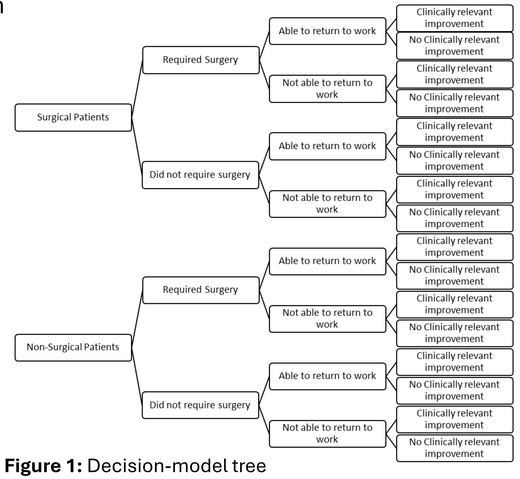


Figure 1: Decision-model tree

- ❑ Health care utilization and costs were taken from the clinical study, patient diaries including productivity loss and care giver support documentation, current scientific literature, as well as national and international healthcare costing guidelines and databases.
- ❑ Unit costs were converted into USD 2019 values using the CCEMG – EPPI – Centre Cost Converter v1.6.
- ❑ The Incremental Cost Effectiveness Ratio (ICER) was calculated for three different time-horizons (one year, two years, working-live).
- ❑ Treatment was considered cost-effective at in ICER of 100'000 USD/QALY or less.
- ❑ Probabilistic sensitivity analysis (PSA) using Monte Carlo simulation of 100'00 runs was performed to test robustness of our model.

Results

- ❑ 213 patients from 11 sites from different regions (North America, Europe, Middle east, and Asia) were included.
- ❑ No differences in the groups for sex, age, BMI, Charlson Comorbidity Index or smoking status.
- ❑ More severe fracture types (A4) in the surgical group ($p<0.001$) and differences in nationalities ($p<0.001$, reflecting the regional treatment-preferences).
- ❑ 61.0 % (n=130) were treated surgically and 39% (n=83) non-surgically.

Treatment	Cost in $US Mean	Total QALYs Mean	Difference in QALY Mean	Difference in Costs Mean	ICER $US/QALY
Surgical treatment	$33,026.18	0.88	0.02	$3,832.96	**$191,648.00**
Non-surgical treatment	$29,193.22	0.86			

Table 1: Cost-utility analysis (ICER) for the one-year time horizon. Surgical treatment was not cost-effective.

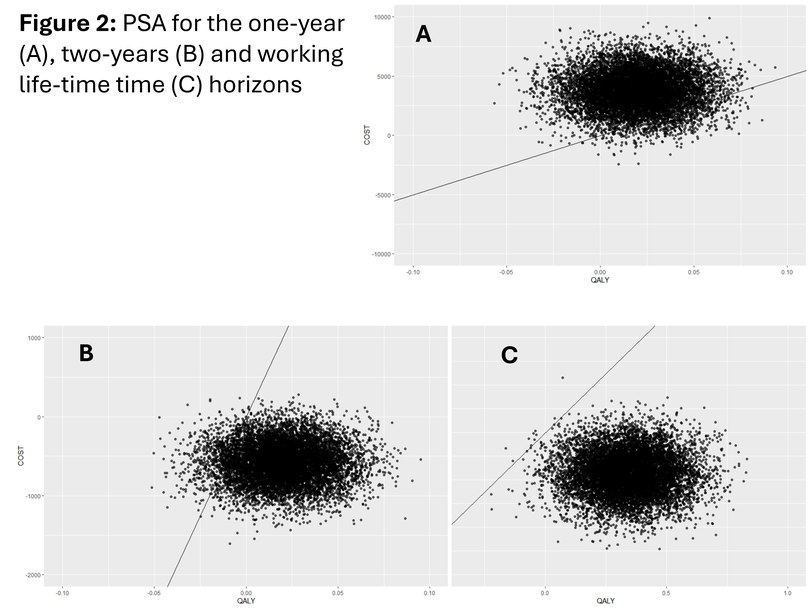
Treatment	Cost in $US Mean	Total QALYs Mean	Difference in QALY Mean	Difference in Costs Mean	ICER $US/QALY
Surgical treatment	$36,476.62	1.79	0.02	-$579.57	**-$28,978.50 (dominant)**
Non-surgical treatment	$37,056.19	1.77			

Table 2: Cost-utility analysis (ICER) for the two-years time horizon. Surgical treatment was the dominant strategy, mainly due to a higher rate of average working days lost and caregiver time in the non-surgical group.

A)Treatment	Cost in $US Mean	Total QALYs Mean	Difference in QALY Mean	Difference in Costs Mean	ICER $US/QALY
Surgical treatment	$112,497.50	15.85	0.34	-$8,680.26	**-$25,530.18 (dominant)**
Non-surgical treatment	$121,177.76	15.51			

Table 3: Cost-utility analysis (ICER) for the working-life time horizon. Surgical treatment remained to be the dominant strategy.

Figure 2: PSA for the one-year (A), two-years (B) and working life-time time (C) horizons



Conclusions

- ❑ Our cost-utility analysis showed surgical management to be cost-effective from two years onwards from a societal perspective.
- ❑ This finding was maintained through the working-lifetime horizon.
- ❑ Surgical treatment was mainly cost-effective due to productivity gains and lower caregiver utilization.
- ❑ This investigation highlights the viability for surgical management of TL burst fractures to provide societal benefit especially when productivity is valued.

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Contact: alexander.joeris@aofoundation.org