

Pelvic Fracture Treatment

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ACS-COT Verification Level Affects Trauma Center Management of Pelvic Ring Injuries and Patient Mortality

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 @BonezNQuality

Co-authors/Disclosures

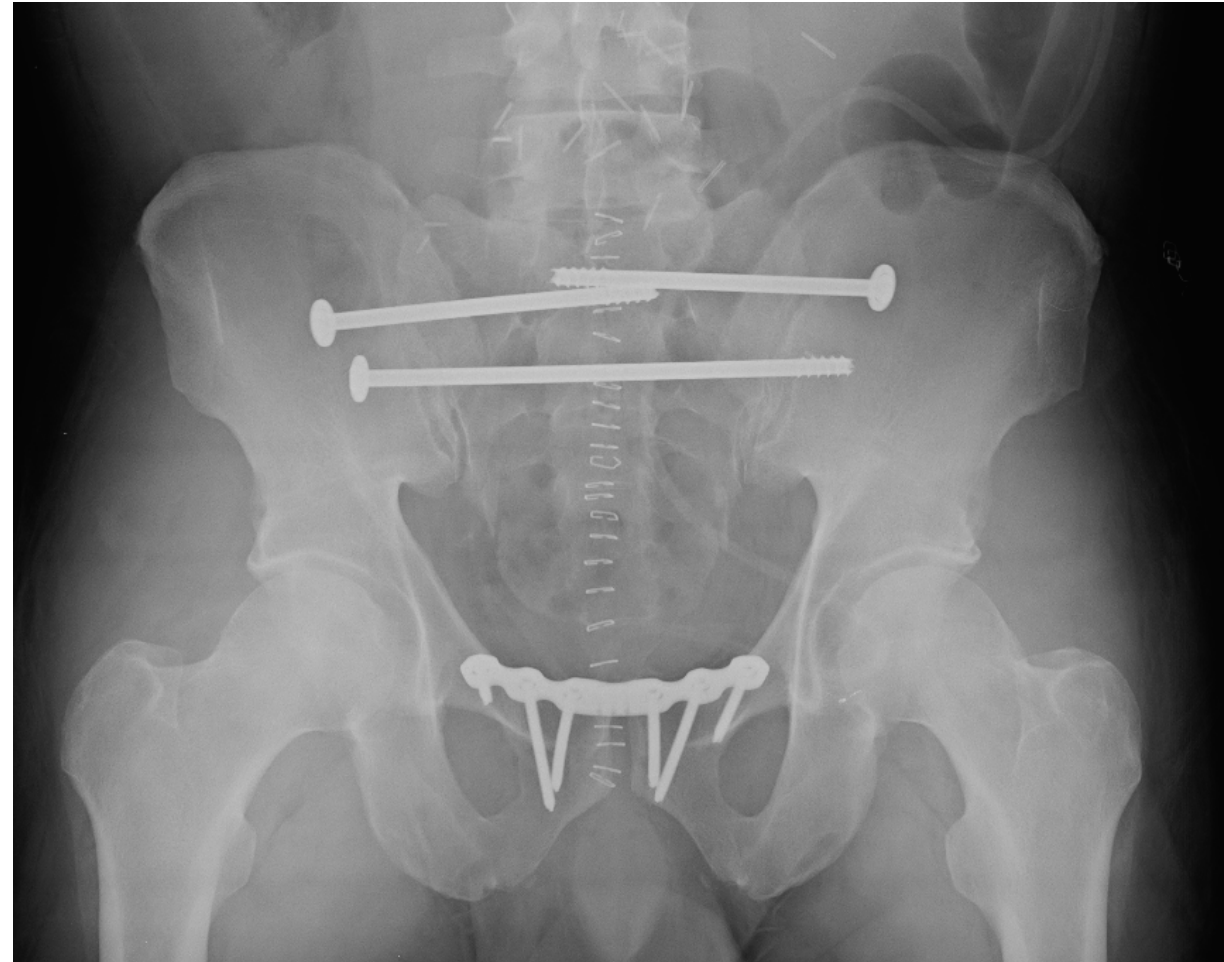
- Bryant W. Oliphant, MD, MBA, MSc – None
- Christopher J. Tignanelli, MD – None
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Pelvic Ring Injuries

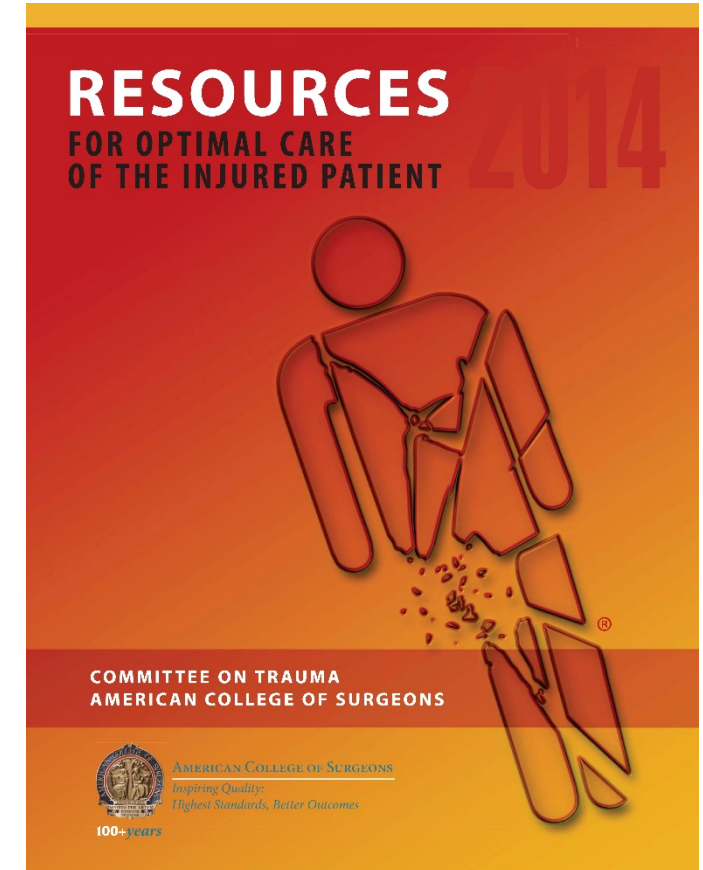
Significant morbidity/mortality

Complex injury

- Systems approach
- Multidisciplinary team
- Specific resources



“The standards for the provision of clinical care to injured patients for Level I and Level II trauma centers are identical.”

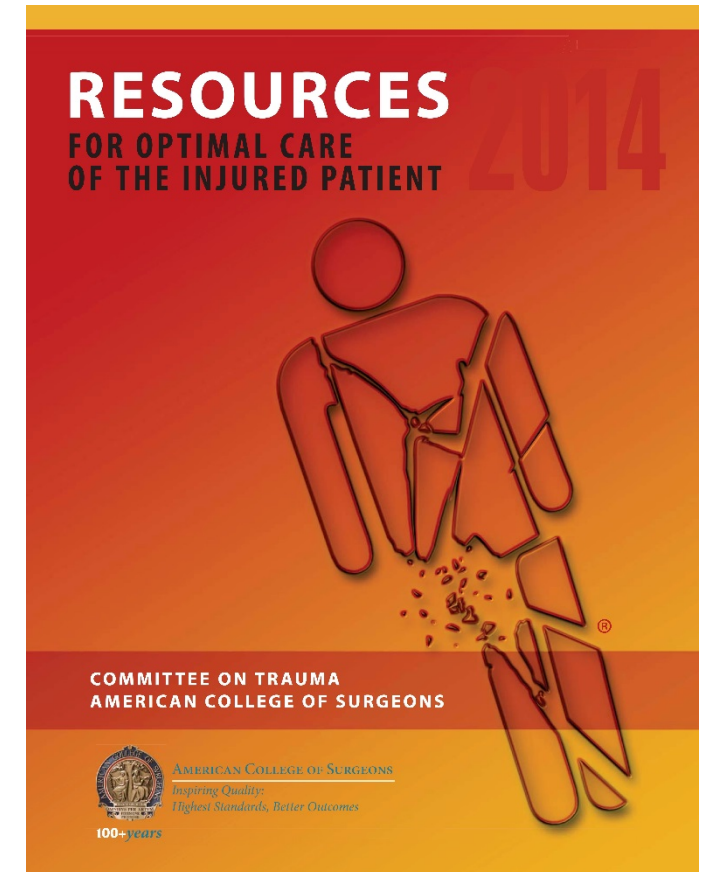


Level I

“the orthopaedic care ***must be*** overseen by an individual who has ***completed a fellowship in orthopaedic traumatology***”

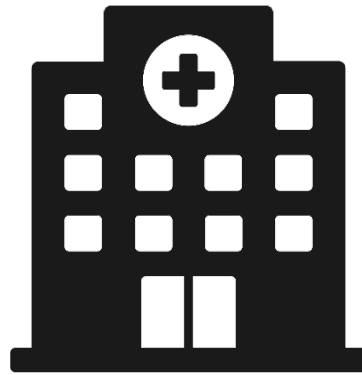
Level II

“the care of musculoskeletal trauma patients ***should be*** overseen by an orthopaedic surgeon who is ***highly experienced and devoted*** to the orthopaedic care of injured patients”



Variability in management of blunt liver trauma and contribution of level of American College of Surgeons Committee on Trauma verification status on mortality

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Level 2

- Higher mortality
- Lower use of angiography
- Less ICU admissions

Are there differences in treatments and outcomes between level 1 and level 2 trauma centers in patients with pelvic ring injuries?



Vs.



Level 1



Level 2

Michigan Trauma Quality Improvement Program

- 29 Level 1 and 2 Trauma Centers in Michigan
- Voluntary participation
- Supported by BCBS of Michigan
- Trauma registry – National Trauma Data Standard (NTDS)
- Data validation
- Regular meetings
- Feedback reports
- Quality improvement projects



Methods

Age \geq 16 years

Injury severity score (ISS) \geq 5

January 1, 2011 and August 31, 2017

Excluded

- No signs of life at initial evaluation

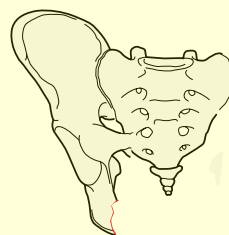
Pelvic ring injuries – Abbreviated Injury Scale 2005 codes (AIS2005)

- Not ICD9/10

Stable



Partially Stable

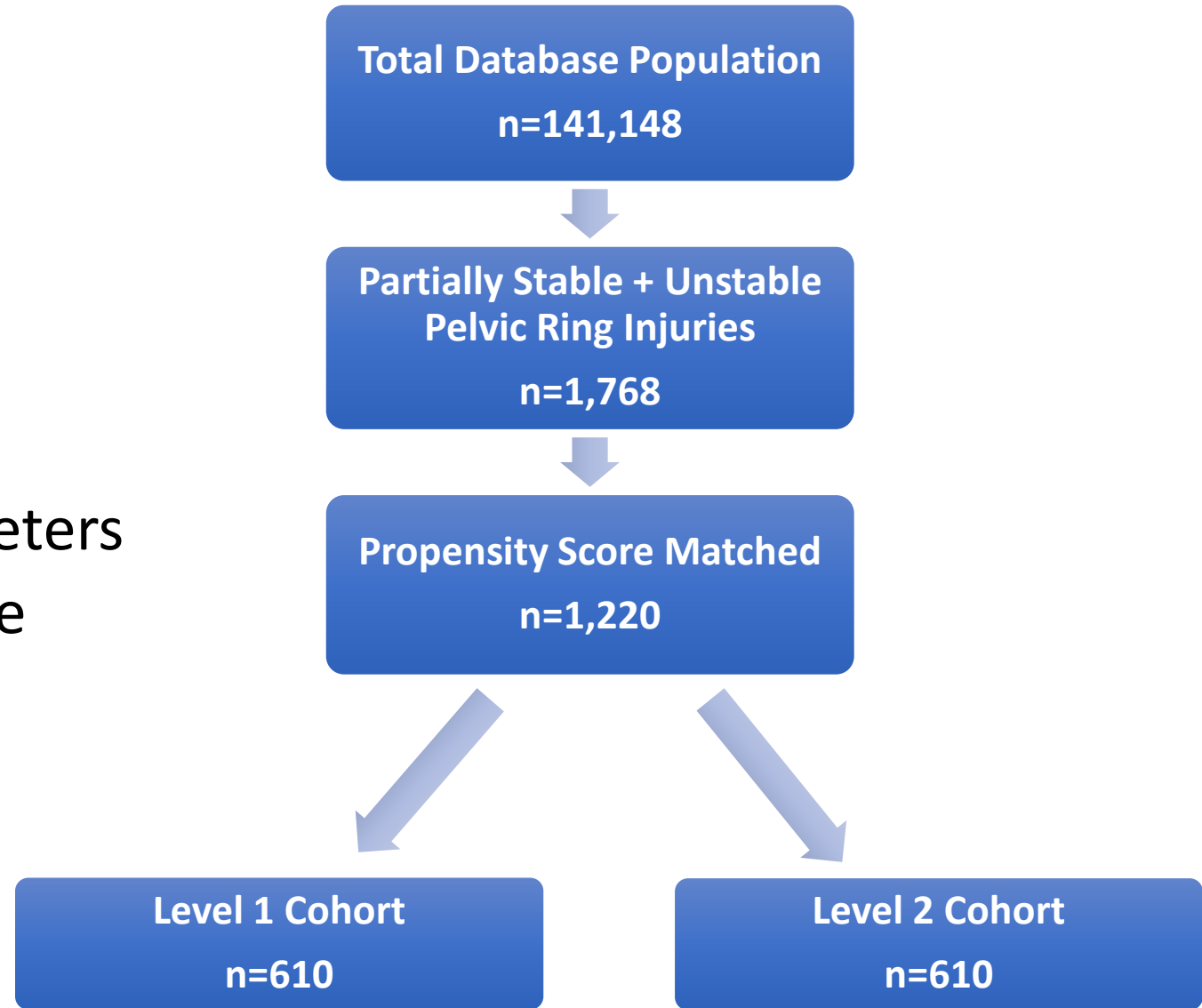


Unstable

Analytic Method

Propensity Score Matched

- Demographics
- Injury severity parameters
- Admission vital sign parameters
- Pre-injury anticoagulant use
- Transfer in status



Measures

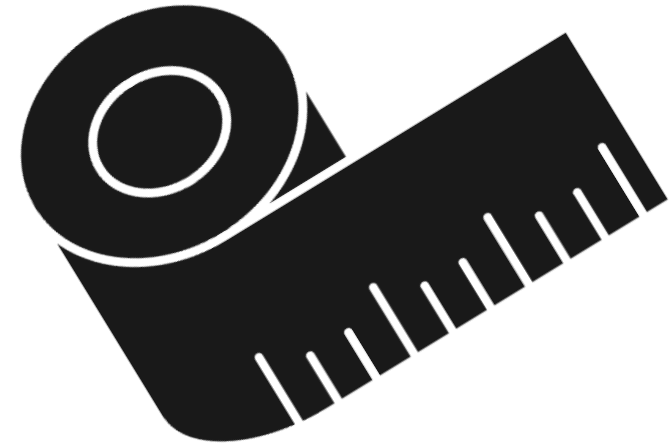
Outcomes

- Hospital mortality
- Length of stay & complications

Processes

- Initial management strategy
- ICU admission status
- Orthopaedic surgical treatment

Univariate analysis



Higher Mortality in Level 2 Centers

48 Hour



3.4% < 6.2%
Level 1 Level 2

p=0.04

Total



7.7% < 11.6%
Level 1 Level 2

p=0.02

	Level 1	Level 2	p value
Hospital Length of Stay (days)	8.1 ± 10.2	7.1 ± 8.5	0.1
ICU Length of Stay (days)	11.4 ± 11.1	10.9 ± 18.4	0.5
Any Complication	22%	25%	0.3
Major Complication	14%	16%	0.6
Failure to Rescue	17%	19%	0.6
Unplanned Intubation	1.6%	3.6%	0.03
ARDS	3.1%	1%	0.009

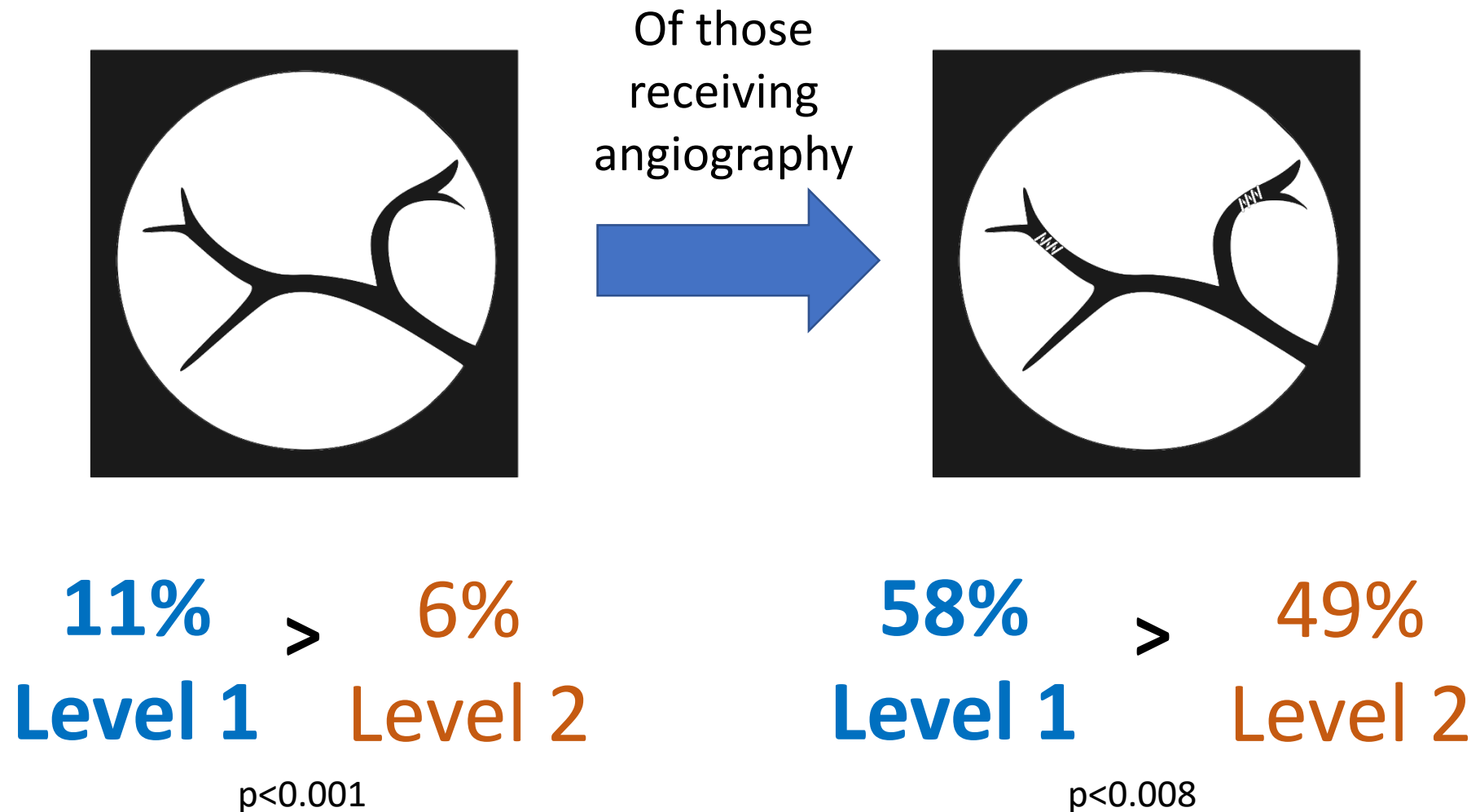
More Angiography in Level 1 Centers



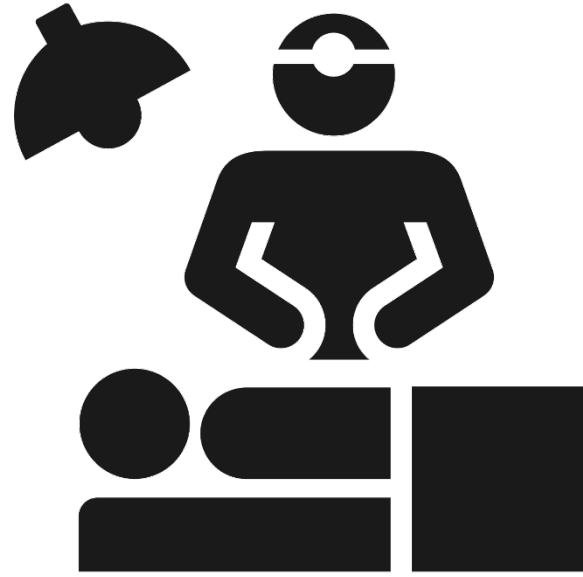
11% > **6%**
Level 1 **Level 2**

$p < 0.001$

More Embolization in Level 1 Centers



More Exploratory Laparotomy in Level 2 Centers



8% < 11%
Level 1 Level 2

$p < 0.001$

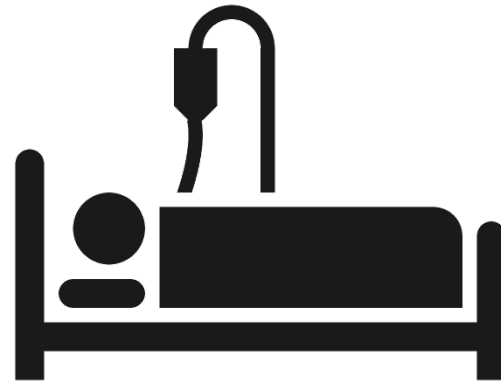
More ICU Admissions in Level 1 Centers



44% > 36%
Level 1 Level 2

$p < 0.001$

More Stepdown Admissions in Level 2 Centers



6% < 15%
Level 1 Level 2

$p < 0.001$

More Non-op and Ex-Fixes in Level 2 Centers



50% < 55%
Level 1 Level 2

p=0.003



10% < 14%
Level 1 Level 2

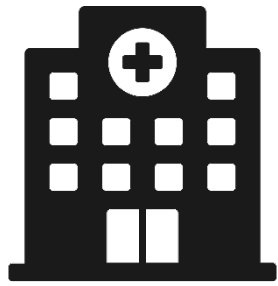
p=0.003

More ORIF/CRPP in Level 1 Centers



48% > **43%**
Level 1 **Level 2**

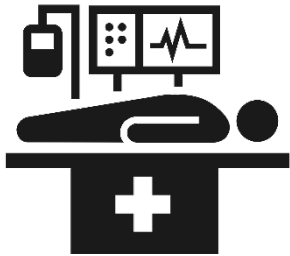
p=0.003



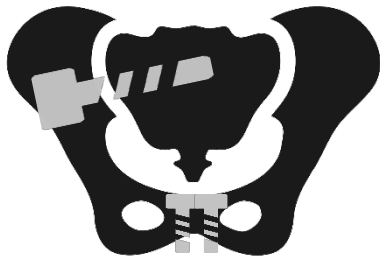
Level 1



Angiography/Embolization



ICU Admission

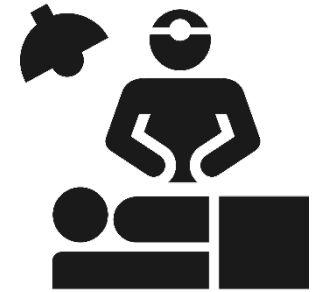


ORIF/CRPP



Level 2

Exploratory Laparotomy



Stepdown Admission



Non-op Treatment
External Fixation



Limitations

Retrospective study

Unmeasured confounding

Granularity of data

- Orthopaedic injury & procedure codes
- Pelvic packing

All Pelvic Ring Injuries

Type of Injury	Number	Percent
Unspecified	1,072	15.87
Stable (Tile A)	3,915	57.96
Partially Stable (Tile B)	1,426	21.11
Unstable (Tile C)	342	5.06
Total	6,755	100

APC2 (Operative)

LC1 (Non-operative)



Pelvic ring fracture (AIS2005):
Incomplete disruption of posterior arch

Conclusion

Level 1 centers have decreased mortality

Level 1 centers utilize more aggressive treatments

Orthopaedic data and staffing needs further examination

Process and system improvement requires an integrated approach

Thank you

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