

Exploring the Relationship of Early MRI Testing for Work-related Acute LBP with Surgery and Disability Outcomes

Barbara Webster, Manuel Cifuentes, Glenn Pransky

Boston International Forum X,
Primary Care Research on Low Back Pain
June 17, 2009

Background

- No evidence that MRI findings alter initial treatment, nor improve outcomes (Gilbert et al., 2004; Modic et al., 2005)
- Poor guideline compliance in Workers Compensation (Dilorio et al., 2000; Webster et al., 2005)
- Rate of spinal MRIs increased 75% from 1993 – 1999 (Maitino et al., 2003)
- Potential risks with ordering MRIs prematurely or without indications

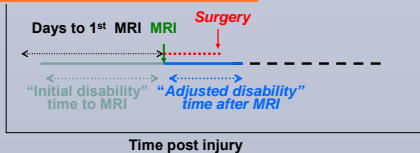
Study Hypothesis

- Early use of MRI testing in WC population for acute LBP is associated with iatrogenic increases in:
 - ◆ surgery
 - ◆ time on disability

Methods

- Sample:
 - ◆ New onset LBP claims
 - ◆ No claim in prior year
 - ◆ Received payment for lost time from work
 - ◆ No concurrent conditions (N = 3272)
- Exposure: time from onset to receipt of MRI
 - ◆ "Early": ≤28 days
 - ◆ "Acceptable": in 2nd and 3rd months
- Outcomes:
 - ◆ Time to surgery post-MRI
 - ◆ Time on disability post-MRI
- Analysis: Cox proportional model

Methods



Covariates

Demographics: age, gender, job tenure
Severity

Severity Measure

- Early opioid use (yes/no first 15 days and amount)
- Maximum severity within 1st fifteen days and before MRI
- Average weekly medical costs pre-MRI
- Time on disability pre-MRI

Results

Table 1. Exposure Group Demographic Characteristics

Cohort Characteristics	Total (n= 3272)	No MRI (n= 1861)	Early MRI (n= 709)	Acceptable MRI (n= 533)
Age (years)	41.4	40.9	42.2	41.7
Early opioid (%)	27.9	22.3	38.1	34.9
High severity 15 days post-onset (%)	26.7	15.2	56.8	27.8
Days disabled pre-MRI	46	.	12	46

Results

Table 2. MRI Groups

MRI	N (%)
No MRI	1,861 (56.9)
Early MRI (≤ 28 days)	709 (21.7)
Acceptable (2-3 mo)	533 (16.3)
> 3 mo	167 (5.1)
Total	3,270 (100.0)

Results

Table 3. Outcomes by Exposure Group

Cohort Characteristics	Total	No MRI	Early MRI	Acceptable MRI
Surgery (%)(N = 3,270)	8.0	0.8	22.0	13.0
Days to surgery post-MRI (n=262)	162	146*	147	232
Adjusted disability duration [†] (n=2,927)	79	32	145	183

*calculated from date of onset

[†]calculated from post-MRI to end of study period

Results

Table 4. Hazard Ratios for Surgery Post-MRI (fully controlled*)

MRI Group	P value	Hazard Ratio	Lower, Upper Limit
No MRI	0.0003	0.18	0.07, 0.46
Early MRI		1.00	
MRI in Second Month	0.0028	0.60	0.43, 0.84
MRI in Third Month	0.0484	0.58	0.34, 0.99

*Controlled for: age, gender, job tenure, pre-MRI costs and disability, days to 1st MRI, early opioid use and dose, maximum severity pre-MRI and within 1st 15 days, average weekly medical costs pre-MRI

Results

Table 5. Hazard Ratios for Time of First Disability Post-MRI (fully controlled*)

MRI Group	P value	Hazard Ratio	Lower, Upper Limit
No MRI	<.0001	2.97	2.06, 4.30
Early MRI		1.00	
MRI in Second Month	0.1686	0.90	0.77, 1.05
MRI in Third Month	0.1962	0.83	0.63, 1.10

*Adjusted for age, gender, job tenure, pre-MRI costs and disability, days to 1st MRI, early opioid use and dose, maximum severity pre-MRI and within 1st 15 days, average weekly medical costs pre-MRI

Conclusions

- Not ordering MRI associated with much lower surgery utilization and time on disability
- Ordering an early MRI increased surgery utilization but not disability duration
- However, because very few patients were likely to have indications for early MRI, their disability was longer than it would have been had no MRI been taken
- Findings support the hypothesis of the iatrogenic effects associated with ordering MRI
- Limitations: administrative data and no MRI results

www.libertymutualgroup.com/researchinstitute

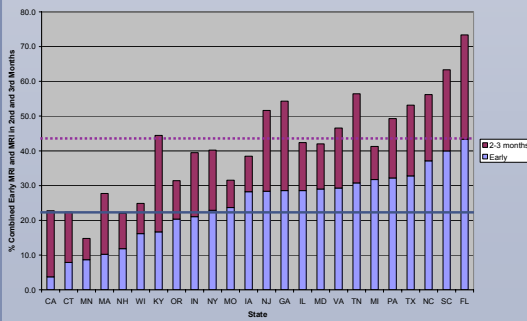


Generating knowledge to help people live safer, more secure lives.

from Research to Reality™

Results

Combined Early MRI and MRI in 2nd and 3rd Months



Results

Table 1. Exposure Group Demographic Characteristics

Cohort Characteristics	Total (n= 3272)	No MRI (n= 1861)	Early MRI (n= 709)	MRI in 2 nd and 3 rd mo. (n= 533)
Age (years)*	41.4 41.0 (41.0, 41.8)	40.9 41.0 (40.4, 41.5)	42.2 42.0 (41.5, 43.0)	41.7 42.0 (40.8, 42.6)
Female (%)	30.3	31.3	22.9	35.5
Tenure (years)*	7.3 4.0 (7.0, 7.6)	7.0 4.0 (6.7, 7.4)	8.0 5.0 (7.4, 8.6)	7.4 5.0 (6.7, 8.1)
Early opioid (%)	27.9	22.3	38.1	34.9
MEA first 15 days	113 0 (102, 124)	76 0 (64, 88)	201 0 (166, 237)	123 0 (102, 144)
High severity 15 days post onset (%)	26.7	15.2	56.8	27.8
High severe pre-MRI (%)	50.0	21.7 [†]	88.4	85.6
Average weekly medical cost pre-MRI (US\$)	85 58 (78, 93)	80 64 (77, 83) [†]	134 67 (100, 167)	56 50 (52, 59)
Days disabled pre-MRI	46 25 (42, 49)		12 12 (11, 13)	46 42 (45, 47)

* median, mean, (confidence limit of the mean)

[†] measured within 1st mo. post onset

Results

Table 2. Days to MRI from Pain Onset

MRI	N (%)	Mean	Median	95% CI
No MRI	1,861 (56.9)	.	.	.
≤ 28 days	709 (21.7)	14.4	15.0	(13.9, 15.0)
2-3 mo	533 (16.3)	48.6	44.0	(47.3, 49.3)
> 3 mo	167 (5.1)	190.3	138.0	(171.7, 208.9)
Total	3,270 (100.0)			

Results

Table 3. Outcomes by Exposure Group

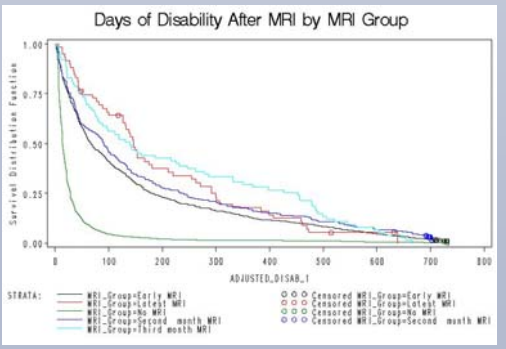
Cohort Characteristics	Total	No MRI	Early MRI	MRI in 2 nd and 3 rd mo.
Surgery (%) [‡]	8.0	0.8	22.0	13.0
Days to surgery post-MRI* (n=262)	162 132 (145, 181)	146 144 (87, 204)	147 105 (127, 167)	232 209 (192, 273)
Adjusted disability duration**† (n=2,927)	79 21 (74, 84)	32 14 (29, 36)	145 66 (131, 159)	183 97 (162, 204)
Repeat MRI (%) [‡]	16.7	--	18.2	15.2

* median, mean, (confidence limit of the mean)

[†] calculated from post-MRI to end of study period

[‡] calculated from entire sample (N = 3,270)

Results



Study Strengths and Limitations

- Large sample represents diagnostic ordering practices in a variety of clinical settings, and complete capture of medical services received
- Do not know:
 - ◆ if severity measures based on administrative data are accurate
 - ◆ what MRI findings were
 - ◆ what patients are told about the MRI findings and their clinical significance