A Multidisciplinary Approach to Improving Secondary Fracture Prevention after Vertebroplasty: Implementing a Fracture Liaison Consultation Service

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Background: Osteoporosis - Fragility Fractures

- >250,000 hospitalizations each year for fragility fractures
- $70 billion in annual medical costs from osteoporosis
- Vertebroplasty is an effective treatment when conservative measures fail
- However the risk of a secondary fracture is up to 25% over 10 years.
- This can be reduced by 30-50% with osteoporosis treatment.


An all too common scenario....

75-year-old woman with new back pain 6 months after successful thoracic vertebroplasty → new fracture

If osteoporosis treatment reduces the risk of secondary fracture, why are so few patients being treated?

Prior to intervention, only 17% of vertebroplasty patients at our institution were started on best available osteoporosis therapy within 6 months. 

Objectives:

- Develop a system for referring vertebroplasty patients for secondary fracture prevention treatment

- **Short term**: Evaluate success of the referral system in getting patients seen for osteoporosis care.

- **Long term**: Evaluate whether this leads to fewer secondary fractures
**Methods: The “Fracture Liaison Service” (FLS)**

2009 - American Orthopedic Association launches “Own the Bone” Campaign - Web-Based Initiative designed to reduce Fragility Fractures

2017 - PA-C hired at our institution through the Department of Orthopedic Surgery & Rehabilitation within the Department of Endocrinology

- **Formal Osteoporosis Diagnosis**
  - Imaging - Bone Mineral Densitometry (DEXA)
  - Laboratory/Biochemical Evaluation

- **Counseling: Nutrition, Physical Activity, Lifestyle**

- **Treatment:** Pharmacotherapy, Physical Therapy

- Follows patient for one year → turns over treatment to primary care
Methods: Patient Referral

- Referral program to Fracture Liaison Service (FLS) started 3/1/2017
- 65 consecutive patients evaluated for vertebroplasty for fragility fractures in our musculoskeletal radiology clinic from 3/6/2017 through 10/23/2018
- Outcomes:
  - Demographics
  - % Referred to Fracture Liaison Service (FLS)
  - % Seen in Fracture Liaison Clinic (FLS)
  - % of patients whose therapy was modified
  - Baseline data on secondary fractures

- 65 Patients evaluated for Vertebroplasty
  - 41 Patients eligible for referral to Fracture Liaison Service (FLS)
  - 17 Patients already being treated for osteoporosis at clinic evaluation
  - 7 Patients declined referral to FLS
Results: Patient Demographics

65 patients evaluated for Vertebroplasty for Fragility Fractures in our Musculoskeletal Radiology Clinic from 3/6/2017 through 10/23/2018

Age
Average 71.6 years
Range 54-93

Number of Levels Treated
Average 1.25 levels
Range 0 - 4 levels

38 patients (58.5%)
27 patients (41.5%)

Treatment Level
Thoracic
29 cases (44.6%)

Lumbar
28 cases (43.1%)

Both Thoracic + Lumbar: 7 cases (10.8%)
**Results: Referral Rates to Fracture Liaison Service**

- **March 2017**: 44 patients, **64% referral rate**
- **March 2018**: 21 patients, **85% referral rate**
- **October 2018**

**Opt-in**: Clinic radiologist has to place referral

**Midway evaluation**: Sub-optimal referral rate

**Protocol Change**

**Opt-out**: Nurse places referral unless patient declines or radiologist determines inappropriate
## Results: Patient Referral Patterns to FLS

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<thead>
<tr>
<th></th>
<th>Referred to FLS</th>
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<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Opt-in Pathway</td>
<td>22 (64.7%)</td>
<td>12 (35.3%)</td>
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<tr>
<td>Opt-out Pathway</td>
<td>6 (85.7%)</td>
<td>1 (14.3%)</td>
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**Patient Evaluated in FLS Clinic**

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<tr>
<td>Yes</td>
<td>20 (57.1%)</td>
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<tr>
<td>No</td>
<td>15 (42.9%)</td>
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**Was Osteoporosis Therapy Modified by FLS Provider?**

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<tr>
<td>Yes</td>
<td>18 (81.8%)</td>
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<tr>
<td>No</td>
<td>4 (18.2%)</td>
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**Before FLS Program:**
Only 17% of patients were started on Osteoporosis therapy *within 6 months* of Vertebroplasty clinic evaluation.
### Results: Secondary Fractures, baseline data

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<th>Presence of Secondary Fracture (through period of study)</th>
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<tr>
<td>Yes</td>
<td>9 (13.9%)</td>
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<tr>
<td>No</td>
<td>56 (86.1%)</td>
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<table>
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<tr>
<th>Was Secondary Fracture an Adjacent-Level Fracture?</th>
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<tr>
<td>Yes</td>
<td>8 (88.9%)</td>
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<tr>
<td>No</td>
<td>1 (11.1%)</td>
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**Adjacent-Level Fracture (ALF):**
Secondary fragility fracture that occurs after a vertebroplasty.

- Patients undergoing vertebroplasty are **at a higher risk for secondary fracture**
- It is most likely to occur at an adjacent level

This will provide a foundation for further research looking for decreased incidences of secondary/adjacent level fractures with improved secondary prevention therapy.

Discussion

- At baseline, few vertebroplasty patients are treated with best medical management for osteoporosis for secondary fracture prevention.
- A formal referral system drastically increases the likelihood of patients being treated for osteoporosis after vertebroplasty.
- A default to referral system where clinic staff place an osteoporosis consult unless the patient declines or radiologist defers increases referral rates.
- The majority of patients seen in clinic required modification to their osteoporosis therapy.
- Previous literature suggests this will decrease the rate of secondary fractures\(^1\).
- Appointment compliance was low for referred patients.

Case Example: 54 year old woman after a fall

Evaluated in Orthopedic Surgery clinic for continued pain after a fall from standing, lateral lumbar spine radiograph demonstrates an L3 compression fracture.

Subsequent MRI demonstrates continued edema at L3 on Sagittal STIR and Axial T2 sequences; further evaluates fracture morphology.

Referral to Vertebroplasty clinic confirming concordant symptoms; Vertebroplasty performed.

Referral placed - Patient seen in FLS Clinic.

DEXA confirms diagnosis of osteoporosis, patient initiated on appropriate pharmacotherapy with follow-up.

No further fractures, positive clinical result and pain improvement for the patient.
Conclusions

- The fracture liaison consultation service (FLS) is an easy and important referral-based multidisciplinary clinic to provide patients with the resources to diagnose, treat, and manage osteoporosis to improve bone health & prevent future vertebral body fragility fractures.

- Patients referred to the fracture liaison service (FLS) show improved referral rates, compliance with follow-up, and more appropriate therapy regimens.

- Data is still being collected to determine if this pathway leads to an improved incidence in Secondary and Adjacent-Level Fractures.

Thanks for your attention!

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