Osteoporosis Identification and Treatment among Previously Undiagnosed Patients with Vertebral Fractures

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Background: Osteoporosis

• Affects 9% of people > 50 y.o. \(^1\)
  • > 200 million women worldwide

• Increases in prevalence with age
  • 40% of women by age 80 \(^2\)

• > 89 million fractures/year \(^3\)
Purpose

• Describe osteoporotic spine fracture (OPSF) prevalence on imaging in a primary cohort of patients with back pain
Purpose (cont’d)

• Find out how often patients with spine fx & no prior OP hx:
  • Get bone densitometry (DEXA) scan
  • Receive initial diagnosis of OP
  • Start OP medication
Materials and Methods

• Data from Lumbar Imaging with Reporting of Epidemiology (LIRE) study
  • Pragmatic cluster randomized trial
  • Primary care pts from 4 integrated HCS
  • PCP-ordered L-spine XR, CT or MRI
  • 3-yr period (10/2013 - 9/2016)
Materials and Methods (cont’d)

• Men ≥ 50 and women ≥ 52 years age
• Used machine learning Natural Language Processing (NLP) to identify patients with OPSF
  • ≥1 vertebral fx on index imaging exam
Methods: NLP

• Computer processes/analyzes large amounts of natural language data
• Rule-based algorithm utilized
• Accuracy measures:
  • Se: 96%, Sp: 99%
  • PPV: 89%, NPV: 99%
Methods: Exclusion Criteria

• Patients with non-OPSF (severe trauma or cancer)
• Pts already identified as having OP
Methods: Exclusion Criteria (cont’d)

• Hx in previous 12 months of:
  • Severe trauma
  • Dx codes for OP, OPSF, or CA
  • DEXA procedure codes
  • Prior Rx for OP meds
Methods: Identify new diagnoses

• Within 12 months after index imaging, had at least one:
  • CPT code for DEXA scan
  • ICD diagnosis code for OP
  • Rx for OP meds
Results

• 238,836 total LIRE patients
• 17,704 pts (7.4%) had spine fx on index imaging
  • 49% of fx pts (n=8718) met inclusion criteria (i.e., presumed OPSF)
OSTEOPOROSIS ANALYSIS
LIRE patients (n = 238,886)

EXCLUSIONS:
No fx on index: n=221,182 (92.6%)
Age M <50, F <52: n=2459 (14%) (3 ngi)
Severe trauma: n=0 (0%)
ICD for OP/OPFX past yr: n=4184 (27%)
ICD indicating CA: n=1490 (13%)
CPT for DEXA past yr: n=111 (1%)
OP med Rx past yr: n=137 (6.5%)
Osteopenia Dx past yr: n=605 (6.5%)

REMAINING PTS: n = 8718
Results (cont’d)

• After 12 months:
  • 19% (n = 1677) had DEXA scan
  • 35% (n = 3075) received OP dx
  • 9% (n = 753) had Rx for OP meds
Results (cont’d)

• 46% (n = 4053) had DEXA scan, OP dx code, or Rx for OP meds

• 54% of pts w/ fx on index imaging (n = 4665) had no indication that OP was recognized or treated
Conclusion

• Only 46% of PCP with fx on spine imaging received *de novo* OP dx, DEXA scans and/or anti-OP Rx within the next year
Conclusion (cont’d)

• A large proportion of patients with potentially identifiable OP remain undiagnosed.
Limitations

• Ascertainment of OP fx
• Definition of fx may vary
• Rx may be filled outside of HCS
• Coding may not be detected
• May be appropriate reason why patient not on OP meds
References


