

# Intranasal Salmon Calcitonin in Acute Osteoporotic Fractures

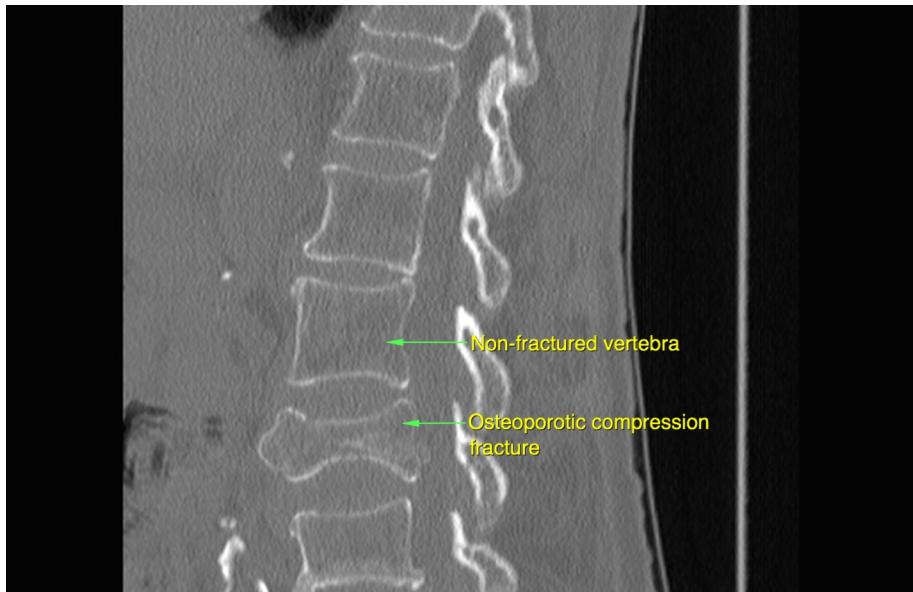
Eric W. Robbins

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# Presentation

- History
  - 80-year-old woman with a history of hypothyroidism and osteoporosis presents with acute-onset lower back pain after a fall.
- Functional status
  - Previously independent in all ADLs and IADLs, although she did occasionally use a cane.
- Exam
  - Severely tender to palpation of lower back; neuro exam normal.

# Imaging



# Attending Recommendation

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# Research Question

<b>Population</b>	adults $\geq 65$
<b>Intervention</b>	intranasal salmon calcitonin
<b>Comparison</b>	placebo
<b>Outcome</b>	perceived pain at 1 week post-fracture

# Risk and Incidence

- in USA, 50-year-old woman has a 40% lifetime chance of having a vertebral compression fracture<sup>1</sup>
- risk factors
  - low bone density
  - age
  - personal or family history of fracture, smoking, heavy drinking
  - administration of steroids
  - rheumatoid arthritis

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<sup>1</sup>Takayuki Tsuda. "Epidemiology of fragility fractures and fall prevention in the elderly: a systematic review of the literature". In: *Current Orthopaedic Practice* 28.6 (Nov. 2017), pp. 580–585. ISSN: 1940-7041. DOI: 10.1097/BCO.0000000000000563. URL: <https://journals.lww.com/01337441-201711000-00014>

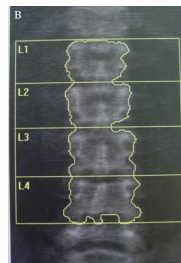
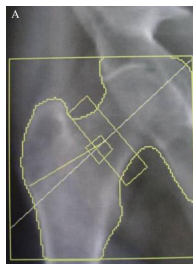


# Definition

- Osteoporosis
  - T-score  $\leq -2.5$
- Vertebral compression fracture
  - a loss of  $\geq 4$  mm or 20% of vertebral height

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## Lyritis et al. 2007

- Several recent systemic reviews or meta-analyses show decreased pain at 1 and 4 weeks<sup>23</sup>.
- Most heavily rely on trials by Lyritis et al.

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<sup>2</sup>Emily Boucher, Brianna Rosgen, and Eddy Lang. “Efficacy of calcitonin for treating acute pain associated with osteoporotic vertebral compression fracture: an updated systematic review”. In: *CJEM* 22.3 (May 2020), pp. 359–367. ISSN: 1481-8035. DOI: 10.1017/cem.2019.490. URL: [https://www.cambridge.org/core/product/identifier/S1481803519004901/type/journal%7B%5C\\_%7Darticle](https://www.cambridge.org/core/product/identifier/S1481803519004901/type/journal%7B%5C_%7Darticle).

<sup>3</sup>J. A. Knopp-Sihota et al. “Calcitonin for treating acute and chronic pain of recent and remote osteoporotic vertebral compression fractures: a systematic review and meta-analysis”. In: *Osteoporosis International* 23.1 (Jan. 2012), pp. 17–38. ISSN: 0937-941X. DOI: 10.1007/s00198-011-1676-0. URL: <http://link.springer.com/10.1007/s00198-011-1676-0>.

# Study Design

- Population
  - $n = 100$ , 32M & 68F
  - mean age 76 & 71, respectively
- Inclusion Criteria
  - Non-traumatic vertebral fracture w/in 5 days
  - Radiograph-proven fracture
- Intervention
  - intra-nasal salmon calcitonin 200 U, 1 spray QHS
  - intra-nasal NS, 1 spray QHS

# Primary Outcomes

- VAS pain score at 1 & 4 weeks in multiple positions
  - Bedridden
  - Sitting
  - Standing
  - Walking

# Primary Results

Group	Baseline	Week 1	Week 4
bed, calcitonin	9.0	4.9	1.0
bed, placebo	8.8	8.8	5.9
sit, calcitonin	9.8	7.0	1.8
sit, placebo	9.6	9.5	6.8
stand, calcitonin	9.9	7.5	2.2
stand, placebo	9.9	9.9	8.7
walk, calcitonin	10.0	9.1	3.1
walk, placebo	10.0	9.9	9.5

# Secondary Outcomes

## Number of Bedridden Patients

Group	Baseline	Week 1	Week 2	Week 3	Week 4
Calcitonin	50	3	0	0	0
Placebo	50	50	50	38	26
p value	—	<0.0001	<0.0001	<0.0001	<0.0001

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- Bone resorption
  - hydroxyproline / creatinine ratio
  - less bone resorption in calcitonin group



# Limitations

- Small sample ( $n = 100$ )
- Problem of multiple testing
- Demographics and external validity

# Impact

- First recommendation in AAOS guidelines<sup>4</sup>
  - Quality of evidence, level II; strength moderate
- Recommend For
  - ibandronate or strontium ranelate (QOE level I)
  - L2 nerve root block (QOE level II)
  - TLSO brace (inconclusive)
- Recommend Against
  - vertebroplasty or kyphoplasty

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<sup>4</sup>Stephen I Esses et al. "The treatment of symptomatic osteoporotic spinal compression fractures." In: *The Journal of the American Academy of Orthopaedic Surgeons* 19.3 (Mar. 2011), pp. 176–82. ISSN: 1067-151X. DOI: 10.5435/00124635-201103000-00007. URL: <http://www.ncbi.nlm.nih.gov/pubmed/21368099>.

# Conclusions

- INSC viable option for osteoporotic vertebral fractures
- Few reported adverse effects
- Drug availability may limit use
- This patient's result

# References

- [1] Takayuki Tsuda. "Epidemiology of fragility fractures and fall prevention in the elderly: a systematic review of the literature". In: *Current Orthopaedic Practice* 28.6 (Nov. 2017), pp. 580–585. ISSN: 1940-7041. DOI: 10.1097/BCO.0000000000000563. URL: <https://journals.lww.com/01337441-201711000-00014>.
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