Risk of Fracture in Type 2 Diabetes Mellitus Patients: Meta-analysis of Observational Studies

Chirag Shah, Romil Shah, Garima Kinra, Murthy VSN, Amit Dang
MarkMan Healthcare Solutions LLP (HEOR and RWE Consulting), Navi Mumbai, India S.J.M. College of Pharmacy, Chitradurga, India

INTRODUCTION

- Diabetes mellitus (DM) affects almost one third of people aged 65 and above, and thus is a major public health problem.
- Various studies done in patients with type 1 DM and type 2 DM have shown that this population is at an increased risk of developing fractures.
- The risk of fractures is significantly greater in patients with T1DM when compared to the general population.
- Similarly, even in T2DM, some studies suggest an increased fracture risk.
- However, there is inconsistent association between T2DM and increased fracture risk.
- Some studies suggest that the fracture risk in patients with T2DM is lower than, or is similar to that in the general population.
- To clarify this confusion, we performed this systematic review of observational studies.

OBJECTIVE

- To assess the association between T2DM and fracture risk.

MATERIALS AND METHODS

- A systematic literature search was performed in Medline and EMBASE databases.
- Abstracts from annual scientific meeting of various diabetes and bone and mineral societies were also searched to identify relevant studies.
- Studies reporting fracture risk in subjects with T2DM in comparison with subjects without diabetes were included.
- Summary relative risk (RR) estimates and 95% confidence intervals (CIs) were calculated using random-effects model.

RESULTS

We analyzed 10 studies covering 25,848 fracture events among 6,12,748 subjects without diabetes (4.2%) and 8570 fracture events among 2,12,011 subjects with T2DM (4.0%).

The pooled relative risk (RR) of any fracture in subjects with T2DM was 0.91 (95% CI 0.73–1.11, p=0.375).

RESULTS: FRACTURE-T2DM ASSOCIATION IN MEN

The pooled RR for any fractures in men with T2DM was 0.93 (95% CI 0.88 to 0.98, four studies) compared to subjects without diabetes, demonstrating significant reduction (7%) of fracture risk in men with T2DM.

Sensitivity analysis demonstrated stability of result after removing outliers.

No publication bias was observed on visual analysis of funnel plot.

DISCUSSION

- Patients with T2DM have an increased Bone mineral density (BMD) even after adjustment for obesity.
- Despite this increased BMD, patients with T2DM (specially those with longer duration of disease) are not protected from fractures.
- Patients with T1DM have a decreased BMD.
- However, impaired bone quality rather than impaired bone density appears to be the main contributor to the increased fracture risk seen in diabetes.
- Other factors contributing to increased fracture risks in diabetic patients are peripheral and autonomic neuropathy, recurrent hypoglycemic events, vitamin D deficiency, and thiazolidinedione therapy.
- Longer disease duration, the presence of diabetic complications, inadequate glycemic control, insulin use and increased risk for falls are all reported to increase fracture risk.
- Despite these factors, the association between T2DM and fractures is inconsistent.
- Our study found that men with T2DM were protected from risk of any type of fracture compared to non-diabetic men.

CONCLUSIONS

- Our meta-analysis suggests that patients of T2DM are not at increased risk of incidence of fractures as compared to non diabetic subjects.
- Male patients with T2DM are mildly protected from incidence of fracture compare to non diabetic male subjects.

REFERENCE


Poster presented at ISPOR 18th Annual European Congress, 7-11 November, 2015, MiCo-Milano Congress, Milan, Italy