

Diabetes and fracture risk: A review

Mark Cooper

Until recently, osteoporosis was not considered a problem in diabetes as the increased weight associated with type 2 diabetes has a generally positive effect on bone health. However, recent studies have highlighted an increased risk of fracture in people with type 1 diabetes and a higher than expected risk in people with type 2 diabetes. The risk of fracture in type 2 diabetes is probably dependent on duration of diabetes and is especially pronounced after the normally protective effect of obesity has been taken into account. This review discusses the reasons why fracture risk is increased in diabetes, ways of estimating the risk of future fracture, the treatments available to reduce the risk, and when these treatments should be considered. Three case reports are presented to illustrate these points.

Several epidemiological studies have demonstrated an increased risk of osteoporosis and fracture in people with diabetes. Several studies (reviewed in Hofbauer et al, 2007) suggest that, in type 1 diabetes, bone mineral density (BMD) is reduced at the spine and this is associated with the presence of diabetic complications. Studies examining fracture risk estimate that people with type 2 diabetes have a 1.4- to 2.6-fold increased risk of fracture at the spine and hip compared with people without diabetes (Janghorbani et al, 2007).

Studies in people with type 2 diabetes have been complicated by the well-known protective effect of obesity on increasing BMD. Thus a typical overweight person with type 2 diabetes will have a higher BMD than a normal-weight control. There are, however, suggestions that low BMD is more likely with increasing duration of diabetes and with poorer metabolic control determined by HbA_{1c} (Hofbauer et al, 2007).

The relationship between fracture risk and diabetes is also complex. The overall risk of fracture is increased in type 2 diabetes: the risk of hip fracture appears to increase approximately 1.7-fold, and for all fractures about 1.3-fold. People with a very recent diagnosis of diabetes appear to be protected against fracture, even after adjustment for body mass index (BMI; Leslie et al, 2007). It has been speculated that this is due to the high circulating levels of insulin in these insulin-resistant individuals: the insulin is still having an anabolic effect on bone cells despite no longer having a hypoglycaemic effect. However, in people with more than 5 years since diagnosis of diabetes, this protective effect is lost and fracture risk is elevated (reviewed in Hofbauer et al [2007] and Janghorbani et al [2007]).

The importance of falls as a cause of fracture is illustrated in studies examining the impact of diabetes on risk of falls. These show a 2.8-fold and 1.7-fold increased risk of falls in insulin and non-insulin treated people

Article points

1. Patients with type 1 or type 2 diabetes have an increased risk of fracture.
2. The increased risk of fracture is due to the effects of diabetes on bone metabolism and an increased risk of falls.
3. Glitazones increase the risk of fractures in women, but not men, with type 2 diabetes.
4. Screening for fracture risk and its treatment requires a multidisciplinary approach.

Key words

- Diabetes
- Osteoporosis
- Fractures
- Falls
- Bone mineral density

Mark Cooper is a Consultant Senior Lecturer in Endocrinology, Department of Endocrinology and Diabetes, Queen Elizabeth Hospital, Birmingham.