Chapter (8)

SUMMARY

Osteoporosis is a systemic disorder characterised by decreased bone mass and microarchitectural deterioration of bone tissue leading to bone fragility and increased susceptibility to fractures ***(Cummings et al., 2002).***

Osteoporosis is recognized worldwide as a major public health problem since many decades ago, mainly due to the cost of treatment for related fragility fractures ***(Ortiz-Luna et al., 2009).***

Osteoporosis is often divided into primary and secondary causes. Although primary causes (due to postmenopausal bone loss and age-related bone loss) are often considered the major drivers of osteoporosis, the number of secondary causes is large and cumulatively accounts for the considerable morbidity associated with osteoporosis ***(Kok et al., 2009).***

Fragility fractures are the most important and disabling consequence of osteoporosis. They result in loss of functional ability, increased morbidity, and mortality. The incidence of osteoporotic fractures has increased in the greater proportion of the world population ***(Kutsal et al., 2005).***

The most typical fracture due to osteoporosis occurs at the spine, hip and wrist. Other forms of osteoporotic fractures occur at the forearm, humerus, pelvis, tibia and fibula, ribs, clavicle, scapula, and sternum ***(Johnell et al., 2006).***

Hip fracture is the most severe and economically most important complication of osteoporosis in aged people ***(Cadarette et al., 2008).***

Osteoporosis is underdiagnosed and undertreated, even though it is common and causes serious problems, and even though effective treatments are available ***(US Department of Health and Human Services, 2004).***

Because bone mineral density (BMD) correlates positively with bone strength and helps to predict future fracture risk, dual-energy x-ray absorptiometry (DEXA) to assess BMD at the hip and spine is central to the diagnosis of osteoporosis ***(Bilezikian et al., 2009).***

Early diagnosis and effective long-term treatment will be critical not only from a clinical perspective but also for containment of skyrocketing healthcare costs. The major treatment goal for patients with osteoporosis is to prevent fractures by maintaining or increasing BMD and reducing excessive bone turnover ***(Bilezikian et al., 2009).***

In osteoporotic fracture repair, failure rates of implant fixation up to 50% have been reported. Cut-out is a well known implant failure mechanism in orthopaedics, especially in peritrochanteric hip fractures in the presence of predisposing factors such as osteoporosis, unstable fractures, or poor reduction. One of the reasons for this failure is the altered remodelling condition in osteoporotic bone, whereby bone resorption exceeds bone formation.

The supporting ability of the implant is reduced and loosening of the implant may occur ***(Lindner et al., 2009).***

Conclusion:

Fracture care techniques often require modification to be useful to treat osteoporotic bone.

Surgical Intervention:

1. Screws should be placed into the best-quality-bone available, which is usually an opposing cortex. Screw fixation can be augmented by using PMMA.
2. With plate fixation, stable bone contact at the fracture site is the most important factor for reducing strain in the plate. Shortening of the affected bone can achieve this contact in comminuted fractures. Plates should not be used to bridge areas of comminution in osteoporotic bone and should be as long as possible, with screws placed close to and far from the fracture site.
3. Locked intramedullary nails can be used for diaphyseal fractures or fractures with metaphyseal-diaphyseal comminution.
4. Angled blade plates are very applicable to osteoporotic metaphyseal fractures but should be used as tension band plates that require stable, load-sharing contact opposite the plate.
5. Antiglide plating and use of tension band wires also are effective strategies for osteoporotic fractures.

6. Use of bone graft substitutes is particularly applicable to reduce the morbidity of bone graft harvest and ensure adequate volumes of graft in the elderly.
7. Patients with evidence of osteoporosis should be started on a medical regimen that includes calcium supplementation with a prescription for bisphosphonates or other antiresorptive regimes to combat further bone loss ***(Cornell 2003).***

Medical Intervention:

This consists of:

1. Providing information about osteoporosis to the patient, lifestyle advice, optimalisation of calcium intake and vitamin D status, fall prevention to reduce fall risk, correction of reversible contributors to secondary osteoporosis and a wide array of drugs for prevention of a first or subsequent vertebral, hip and non-vertebral, non-hip fracture.
2. Drug treatment is based on manipulation of bone remodelling by inhibiting bone resorption (bisphosphonates, selective oestrogen receptor modulator (SERMs), calcitonin), stimulating bone formation (parathyroid hormone) or mixed effects (strontium ranelate).
3. Follow-up allows to check tolerance and safety, to optimise adherence and to decide about adequacy of response, duration and switching of therapy ***(Geusens 2009).***

The use of anti-osteoporosis medication, however, is very important in preventing bone loss ***(Lu¨thje et al., 2009).***

Effective medical treatments can reduce the risk of fracture by up to 50%. Orthopaedic surgeons should be in good position to identify patients with osteoporotic fractures and to initiate further medical intervention ***(Seagger et al., 2004).***

Orthopedic surgeons must be careful that they do not just concentrate on the technical aspects of fracture fixation and that they arrange for patients who present with low-energy fractures to be probably advised and investigated for osteoporosis. It is also the responsibility of every orthopedic surgeon to be aware of the different treatment modalities that exist and to appropriately advise the patient. ***(Karlsson et al., 2006).***