Fracture Liaison Service: Prevention by Coordination

Overview

Osteoporosis, as defined by the National Institutes of Health conference is a “skeletal disorder characterized by compromised bone strength predisposing a person to an increased risk for fracture.”[1] It increases the patient’s likelihood of fracture (importantly vertebral, forearm, and hip fractures). Worldwide 8.9 million osteoporotic fractures occur annually leading to one osteoporotic fracture every 3 s.[2] It is a growing public health problem. Around one in two women and one in five men aged 50 years and above will suffer osteoporotic fractures.[1,4] These low-trauma fractures are associated with increased mortality. Post hip fractures expected survival is reduced from 12% to 20%.[5]

India with population of 1.32 billion is the second largest country in the world.[6] Life expectancy and median age of Indian population has increased over the decades. At present about 14% of population is >55 years of age. There is a paucity of data on fracture rates and fracture trends in India. A study in 2017 estimated 0.142 million hip fractures annually in India and showed that rates are approximately equal to that seen in China, Iran, and South Korea.[7] Owing to aging of the population, these are expected to increase further. Thus there is an urgent need to reduce fracture risk in our population.

Fracture Care Gap

After sustaining an osteoporotic fracture, the risk of second osteoporotic fracture is markedly increased.[8] Hence, thorough evaluation of patients with fragility fractures is warranted to evaluate for osteoporosis and other risk factors for fracture (e.g., risk for fall). Potent medicines have been available for treatment of osteoporosis for over three decades. There is compelling evidence regarding efficacy of anti-osteoporotic medications in terms of preventing secondary fracture and even to reduce death. It is estimated that around 80% of patients are currently never offered screening and/or treatment for osteoporosis.[9] Many orthopedic surgeons and physicians do not have necessary information available to help their patients make informed decision regarding treatment. Lack of proper counseling or communication often leads to premature stoppage of treatment by many patients. This increases the risk of disability, loss of independence, and even death. Apart from medical complications, it is a huge financial burden to patient and family.

Concept of FLS

With an aim to close this treatment gap, various measures such as population-based screening programs; healthcare professional education; and patient education were tried. Fracture liaison service (FLS) is a healthcare model with the aim to reduce second fracture in patients with fragility fracture. It is a coordinator-based service implemented by healthcare system to ensure that all patients with fragility fracture are assessed for fracture risk and treated if appropriate. Coordinator (often a clinical nurse) will act as a link between patient, orthopedic team, primary care physician, and fall prevention services.

FLS was first designed and implemented in two separate National Health Service trusts in Glasgow in 1999.[10] Since then it has been adopted in many countries, including Australia, Japan, New Zealand, Singapore, and Thailand. It has been actively promoted by the International Osteoporosis Foundation (IOF) since 2012. The FLS model of care has been endorsed by governments, healthcare professional organizations, national osteoporosis societies, and national alliances comprising these and other groups.

FLS Model

There are many different types of FLS models depending on the intensity of services offered in the program. However, all models have unifying theme of identifying high-risk patients and referring to FLS coordinator. Then depending upon the model, coordinator does one or all of the following tasks of investigating, educating, treating, and follow up of patient. Ganda et al. have classified FLS models into four types.[11]

- **Type A:** It includes all three services of identifying, investigating, and treatment initiation
- **Type B:** In this type patients are identified, investigated, and educated but for treatment initiation are referred back to orthopedic surgeon/primary physician
- **Type C:** It includes identification and educating patient and informing primary care physician. Patient investigations are not done and treatment is not advised
- **Type D:** In this type patients are identified and educated but no further communication is given to primary physician or other team members.

Our Model

Indian Society of Bone and Mineral Research (ISBMR) has set up a pilot project at PGI, Chandigarh and PD Hinduja Hospital, Mumbai in 2018 after ethics committee clearance. It plans to start another 4–5 centers in 2019.

It operates in the following order:

1. Patient identification: Following patients are to be identified:
A] All females and males >50 years with fragility fracture (fall from standing height or less)

B] Asymptomatic vertebral fracture detected during imaging

Information regarding patients fulfilling the fragility fracture criteria is communicated to FLS coordinator. For such type of referral extensive education and support of specialties such as orthopedics, radiology, rheumatology, and general medicine are required

2] Patient risk assessment: Once referred, FLS coordinator will educate such patients regarding implications of fragility fracture and FLS program. If patient consents for participation in FLS program, then patient’s fracture risk assessment is done. It can be done while patient is admitted or later on follow up

Risk assessment includes following:

A] Bone mineral density (BMD) measurement and the Fracture Risk Assessment Tool (FRAX) calculation

B] Secondary causes of osteoporosis are looked for in case of clinical suspicion

C] Assessment of lifestyle factors for risk of falls

D] Review of medications likely to cause osteoporosis

3] Treatment:

A] Details of treatment offered are recorded

B] For those at risk of fall, education and fall prevention service is provided

4] Adherence: Adherence to treatment is checked at 6 and 12 months (either on follow up or telephonically). Thereafter there is an annual telephonic contact. Detailed inquiry of treatment adverse effects (if any) is also done

5] Data base: Institutional base of these patients is kept with plans to share with regional and national data base. Reduction in re-fracture risk (hazard ratio) will be evaluated.

**Effectiveness**

FLS ensures that BMD is done on maximum patients with osteoporotic fracture. Education and fall prevention services are delivered to all patients. Thus by preventing secondary fracture they are cost effective. Local, regional, or national data base would be built up.

Many studies have studied fracture risk reduction which is primary function of FLS. For measurement purpose patients in the FLS program are compared against historic cohorts, those following up with primary physician, or from patients in hospital without FLS. Dell et al. showed 38.1% reduction in hip fracture by FLS when compared against previous hospital performance.[12] Similarly, studies have shown reduction in mortality and improvement in bone health assessment, treatment initiation after FLS. Best outcomes are seen in most intensive FLS models (Type A and B).

**Conclusion**

With high prevalence of osteoporosis, preventing all osteoporotic fracture is a herculean task. Even if provisions were made for finances and manpower, it would be next-to-impossible to track all senior citizens at high risk for fragility fractures. But patients who already have had an osteoporotic fracture are at high risk for another fracture. Targeting them for secondary prevention is reasonable. Try and get the low-hanging fruit first! FLS aims to achieve this by working on institutionally accepted protocols. A single coordinator is given the responsibility which varies depending on FLS type. In most intensive types FLS identifies, educates, investigates, initiates treatment, keeps follow up, and maintains data base under supervision of FLS head. Successful implementation requires cooperation from multiple departments. On successful implementation, benefits in terms of reduction in secondary fracture, mortality, and healthcare expenditure on fractures are seen.

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