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ORIGINAL ARTICLE

Fracture liaison service model: project design and accreditation

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Abstract

Summary Frailty fractures place a significant socioeconomic burden on the health care system. The Italian Society of Orthopaedics and Traumatology (SIOT) is proceeding to fracture liaison service (FLS) model accreditation in several Italian Fracture Units (FUs), which provides a multidisciplinary approach for the management of the fragility fracture patient.

Introduction Osteoporosis and the resulting fragility fractures, particularly femoral fractures, place significant socioeconomic burdens on the health care system globally. In addition, there is a general lack of awareness of osteoporosis, resulting in underestimation of the associated risks and suboptimal treatment of the disease. The fracture liaison service (FLS) represents an exemplary model of post-fracture care that involves a multidisciplinary approach to the frail patient through the collaboration of multiple specialists. The purpose of this article is to highlight the path undertaken by the Italian Society of Orthopaedics and Traumatology (SIOT) for the purpose of certification of numerous FLS centers throughout Italy.

Methods SIOT is proceeding with international FLS accreditation in several Italian Fracture Units (FUs), following the creation of a model that provides specific operational and procedural steps for the management of fragility fractures throughout the country. FUs that decide to join the project and implement this model within their facility are then audited by an ACCREDIA-accredited medical certification body.

Results The drafted FLS model, thanks to the active involvement of a panel of experts appointed by SIOT, outlines a reference operational model that describes a fluid and articulated process that identifies the procedure of identification, description of diagnostic framing, and subsequent initiation of appropriate secondary prevention programs for fractures of individuals who have presented with a recent fragility fracture of the femur.

Conclusion Accreditation of this prevention model will enable many facilities to take advantage of this dedicated diagnostic-therapeutic pathway for the purpose of fracture prevention and reduction of associated health and social costs.

Keywords Fracture liaison service · Fragility fracture · Osteoporosis · Socio-economic burden · Treatment gap

Introduction

Fragility fractures: epidemiology and criticality

The World Health Organization has recognized osteoporosis as a well-defined condition that afflicts more than 75 million people in Europe, the USA, and Japan [1]. In fact, this condition represents one of the greatest health risks for individuals aged 50 years and older, even when compared with hypercholesterolemia and hypertension [2]. Osteoporosis is characterized by a decrease in bone mass, resulting in deterioration of the microarchitecture of bone tissue, which is inevitably reflected in an increased risk of fragility fractures [3]. It is estimated that more than 23 million men and women are at high risk of osteoporotic fractures in the

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European Union, and the trend is rapidly increasing worldwide [4]. In a recent document related to 6 European countries similar in demographic and care characteristics (Italy, France, Germany, Spain, Sweden, UK), together referred to as EU6, the data on fragility fractures and related projections are alarming. In fact, it was estimated that there were 2.7 million new fragility fractures in the EU6 in 2017, or 7332 fractures/day (or 305/h). In addition, almost twice as many fractures occurred in women (66%) as in men [4]. According to the latest scientific evidence, in 27 member states of the European Union, together with the UK and Switzerland (termed EU27 + 2), hip fractures comprise only 17% of the total number of fragility fractures but account for 54% of the direct costs and 49% of deaths due to fracture [1].

Although the prevention of fragility fractures was identified as a priority several years ago by the Ministry of Health, the issue of fragility fractures in fact remains an underestimated issue, especially with regard to the management of the fractured patient. According to evidence in the literature, 50.6% of fragility fracture patients are not hospitalized. With the exception of the femur, in which case the percentage of hospitalized patients is 93%, for fragility fractures occurring at skeletal sites other than the hip, the percentage of non-hospitalized patients exceeds 60%. These fractures can be treated in the primary care setting or on an outpatient basis, and therefore patients are not admitted to the hospital. This may result in missed registration, which in turn may lead to an underestimation of the true number of fragility fractures, representing an underestimated problem that needs to be addressed [5]. In addition, scientific evidence shows how the appropriate management of a first fracture can be decisive in preventing a secondary fracture: the first fracture event is sufficient for a comprehensive assessment of bone mineral density (BMD) and fracture risk to be performed, for subsequent patient care and follow-up. This approach should be applied to every type of fracture, considering that 80% of clinical fractures occurring at sites other than the femur are considered "sentinel fractures," indicating an increased risk of further fractures [6]. A number of clinical governance models have recently been proposed with the aim, among others, of reducing this management gap. Although programs of primary prevention of fractures, i.e., in subjects with osteoporosis not yet complicated by fragility fractures, would be desirable, they are difficult to implement on a large scale at the general population level. In contrast, secondary prevention programs of fragility fractures, with identification and appropriate treatment of individuals at high risk of fracture, such as those who have presented with a recent fragility fracture, are to be promoted and represent an important first step in containing the problem. Such secondary prevention programs can be undertaken within clinical pathways that promote the identification, evaluation, and early treatment of individuals who have presented with a recent major fragility fracture. These programs, which involve a coordinated action of various health care professionals with various specificities, can significantly reduce the risk of further fracture events and may represent, therefore, an important resource for both the individual and the community, and the economic sustainability of the financial system [7, 8]. For the fractured femur, once overcome the surgical, medical, peri-operative, and early rehabilitation problems, it is necessary to organize a long-term path for the necessary pharmacological prevention of the refracture together with the maintenance and enhancement of motor activity. Often this second aspect is neglected and one of the most critical issues remains the difficulty of access to health services and continuity of care for patients discharged from the hospital. In this sense, it is desirable to have healthcare programming that accompanies the patient towards the care pathways, overcoming the difficulty that the patient would have in organizing it independently from outside the structure.

Fracture liaison service (FLS) model

In recent years, innovative models for the management of elderly femur-fractured patients have been adopted in many countries, which have mainly focused on the aim of reducing short-term hospital complications, while less attention has been paid to optimizing the subsequent management of the patient within a well-defined care pathway, which is generally more difficult to achieve and support [9, 10]. All the various models proposed find a common denominator in a systematic multidisciplinary and multi-professional collaboration, whose integrated action allows to implement the quality of care and simultaneously reduces costs. The fracture liaison service (FLS) model refers to multidisciplinary functional coordination structures generally established within third-level hospital centers. The FLS organized around the fractured femur patient, following the strategy of case-finding, are generally virtual structures, not endowed with its own budget and autonomy, but organized as a bridge between the various hospital units that can take charge of the patient at various levels [8]. They are indispensable models for taking care of the patient with femoral fragility fractures who have recently undergone surgical treatment. Through this service, the fractured patient can be rapidly initiated into effective secondary prevention programs for refracture. Within the FLS Model, various medical professionals (Orthopedist, Internist, Endocrinologist, Rheumatologist, Geriatrician, Physiatrist, Radiologist, Pain Physician) coordinate or are coordinated by specific nursing staff dedicated around the patient who has suffered a fragility femur fracture [11]. It has been documented that where these structures have been created, supported, and adequately implemented, they have proven to be cost-effective, with an average reduction of 20% in the treatment gap, a 20% increase in

adherence to anti-fracture treatment, and a 5% reduction in the rate of re-fracture and mortality [12].

Methods

Project design of the certification and accreditation process

The Italian Society of Orthopaedics and Traumatology (SIOT) has set itself the goal of international accreditation of the FLS model in several Italian Fracture Units (FUs), according to the international standard UNI EN 150/IEC 17,065: 2012—"conformity assessment, requirements for bodies certifying products, processes, and services." This model implemented some operational and procedural steps for the management of fragility fractures within the FUs in the national territory, previously promoted and approved by the SIOT Executive Committee. The drafted FLS model, thanks to the active involvement of a panel of experts appointed by the SIOT, outlines a reference operational model that describes a fluid and articulated process that identifies the identification procedure, the description of the diagnostic framing, and the subsequent initiation of appropriate secondary prevention programs of fractures of individuals who have presented with a recent fragility fracture of the femur as the steps in which good care allows to achieve better care outcomes. FUs that decide to join the project and implement the FLS model within their facility are then audited by a medical and health certification body accredited by ACCREDIA (Fig. 1).

Purpose

The purpose of the FLS model is to define and codify a service model that follows a fluid and articulated process that identifies in the procedural identification, in the description of the diagnostic framework, and the subsequent initiation of appropriate secondary prevention programs of re-fractures of subjects who have presented a recent fragility fracture of the femur, phases in which a good care allows to achieve the objectives set. Adoption of the FLS model by fracture units, units already organized nationally to ensure early surgical and appropriate early orthogeriatric treatment of the fractured patient, aims to reduce the treatment gap, i.e., aims to increase the percentage of individuals receiving the specific and appropriate treatment that has been shown to be essential for the prevention of refracture. The pragmatic and correct application of the FLS model has as a short-term goal the increase of patients with recent fragility femur fracture initiated to anti-fracture therapy and as an ultimate long-term goal the reduction of the number of refracturative episodes. This is expected to result in a containment of the overall cost of fragility (femur) fracture management to the National Health System and ancillary costs.

Specifically, the potential outcomes that adoption of the FLS model by fracture units is intended to provide are as follows:

1. Facilitating access of femur fragility fracture patients to tertiary care facilities as an outpatient for mineral and skeletal metabolism assessment in anticipation of subsequent initiation of secondary refracture prevention programs;

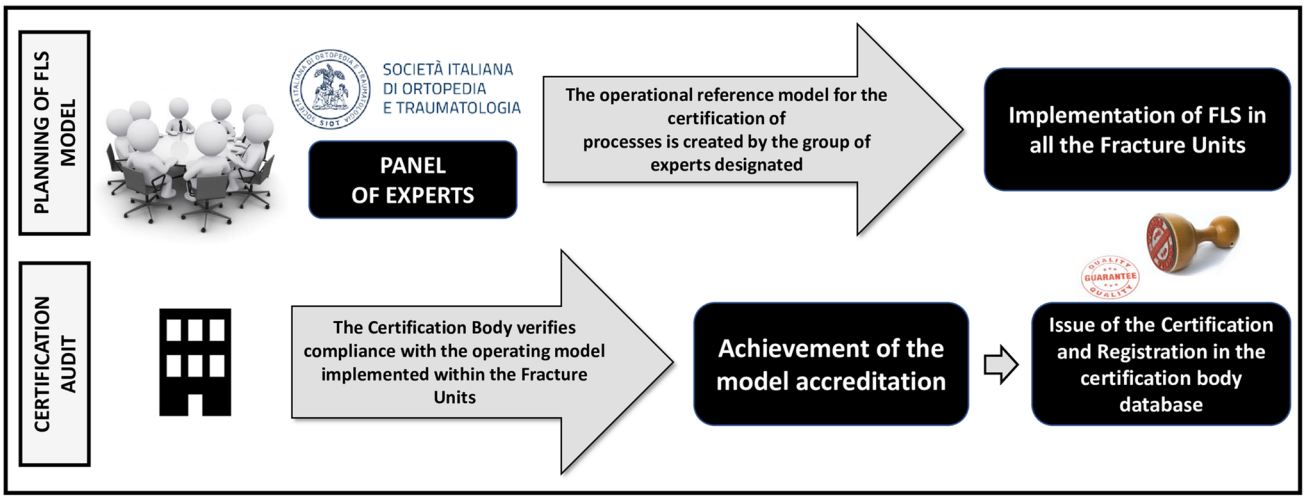

Fig. 1 Iteration of the planning, certification, and accreditation of the FLS model in Italy

2. Reducing the treatment gap, i.e., increasing the percentage of patients with femur fracture who begin anti-fracture therapy as part of secondary prevention programs for re-fracture;
3. Encourage/facilitate entry into secondary re-fracture prevention programs in order to respect the right to care of the patient with femur fracture, even if elderly or super-old;
4. Encourage increased adherence to anti-fracture therapy with consequent reduction of health care costs for inadequate and insufficient brief therapies for re-fracture prevention;
5. Reduce fragility refractures with a consequent reduction in healthcare costs of managing them and related complications;
6. Increase patient satisfaction due to a univocity of treatment by different healthcare professionals coordinated among themselves;
7. Reduce waiting times for appropriate services, promoting facilitated subsequent access according to priorities of care for patients with fragility fractures.

Results

Phases

The FLS model consists of the following phases:

1. Inpatient intake within the FLS with scheduling of outpatient specialist evaluation of mineral and skeletal metabolism
2. Discharge with prescription of (I and Il) level examinations for osteoporosis and calcium and vitamin D supplementation
3. Evaluation of mineral and skeletal metabolism at hospital or territorial specialist unit with differential diagnosis
4. Computerized bone mineralometry and vertebral morphometry if necessary
5. Identification and dispensing of appropriate anti-fracture therapy
6. Monitoring of the patient and rescheduling of the check-up in the specialist structure of level III and/or continuation of the therapeutic-assistance pathway by the general practitioner.

The reduction, ultimately, of refractures is the main purpose of the FLS that goes to meet on the one hand the primary needs of the health system for cost optimization and, on the other hand, towards the increase of years in good quality of life in the elderly population, primary objective of the World Health Organization.

Macrophases of fracture liaison service model

The initiation of the patient with recent fragility fracture of the femur after surgical treatment to secondary prevention programs of the refracture involves a coordinated intervention of various specialists within the facilities that are part of the FLS, starting with the heads of the orthopedic service. It consists of 4 fundamental phases that may involve, at various levels, various medical and surgical specialist branches and, finally, the general practitioner. Each phase will be subject to specific monitoring at the level of the individual FLS.

Macrophase 1: patient referral to refracture prevention programs

Within the Orthopedic Department after surgical treatment, prior to discharge, the patient will be started on the refracture prevention program. At this stage, in order to establish the most appropriate pharmacological and non-pharmacological strategy of refracture prevention, it is essential to classify the frail individual into the appropriate risk range, making use of the dedicated FRAX and DeFra algorithms, especially for the assessment of the impending risk of refracture. In addition, this fracture risk assessment must be supplemented with a concurrent fall risk assessment by investigating muscle strength and performance. Muscle strength will be assessed by Handgrip Strength test, while muscle performance will be assessed by performing the Timed Up and Go Test (TUG) and the short physical performance battery (SPPB), which involves balance test, walking test, and chair test. Among nonpharmacological treatment strategies, numerous studies in the literature show that balance and strength training, based on exercises against resistance, is effective in reducing the risk of falls [13]. Therefore, based on the results of the investigations performed, it is important that the subject also be directed to training programs for the purpose of strengthening the musculoskeletal system to prevent falls and subsequent fractures. The orthopedic specialist or the internist/orthogeriatrician/specialist (physiatrist, endocrinologist, rheumatologist) responsible for the discharge of the patient, possibly assisted by dedicated nurses or technicians, will carry out the planning (with related prescription) of the medical re-evaluation of mineral and bone metabolism at 1–6 months after the fracture episode. In this phase, computerized bone mineralometry (DXA) and vertebral morphometry may also be scheduled, preferably on the same day as the medical re-evaluation. At the time of discharge, the doctor in charge will prescribe blood tests and possibly urine tests (on 24-h urine) of level I and possibly also of level II (the latter if necessary) to be performed at home. Level I examinations can also be performed during hospitalization, if possible. At discharge, if not in place, appropriate supplementation with calcium and vitamin D will be prescribed. An osteoanabolic drug may be prescribed at discharge if indicated, once contraindications have

Table 1 Macrophase 1: patient referral to refracture prevention programs

1. Referral of patients to refracture prevention programs			
Activities	Description	In charge	Documents/checks
Discharge from the Department of Orthopaedics/Orthogeriatrics after surgical treatment of fragility femur fracture (FLS facility I)	• Fall and fracture risk assessment • Physician schedules an examination for assessment of bone metabolism • Physician recommends performance and delivers specific prescriptions for performing Level I (and possibly Level II) examinations to be performed at home and any instrumental tests (alternatively performs Level I and possibly Level II examinations during hospitalization for surgical treatment) • The physician records in the medical record the therapies performed and recommended (vitamin D and calcium supplementation); if indicated, osteoanabolic therapy may be prescribed at discharge • The patient is discharged from the hospital facility in charge of the patient with the above	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Paper medical record • Electronic medical record on hospital/private facility database • Other
Direct scheduling of appointment at the referring facility for medical evaluation of bone fragility	FLS facility takes charge of the patient and registers the first appointment in the medical/orthopedic clinic to start the patient on the diagnostic/care pathway of refracture prevention	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Electronic reservation agenda of the hospital/private facility information system • Use of local booking software (internal diaries) • Manual appointment book
Outpatient visit dedicated to the initial assessment of the bone metabolism of the femur fracture patient once discharged from the orthopedic facility	At the FLS facility, which the patient accesses as an outpatient, possibly with Level I (and possibly Level II) examinations already performed (and with any vertebral and femoral MOC/morphometry already performed or executable on site)	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Internal to hospital/private facility of orthopedic relevance, on dedicated agenda • Internal to hospital/private facility of orthopedic relevance, on non-dedicated agenda • Internal to hospital/private facility, of internist relevance (specify medical specialty), on dedicated agenda • Internal to hospital/private facility, of internist relevance (specify medical specialty), on non-dedicated agenda • External to hospital/private facility, i.e., territorial, on dedicated agenda • External to the hospital/private facility, i.e., territorial, on non-dedicated agenda
Creation of electronic file of patients with femur fracture and planning of the subsequent secondary prevention pathway of refracture		Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Excel document in hospital PC • Excel document maintained on enterprise server • Other

Table 2 Macrophase 2: patient reception and intake in dedicated department

2. Patient reception and taking charge in dedicated ward			
Activities	Description	In charge	Documents/checks
Outpatient acceptance on specific agenda	Administrative staff accept patients who actually show up for the appointment for the first outpatient evaluation	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification by inspection • Verification on electronic agenda hospital/territorial service/private facility
Reception in the ward	Dedicated nursing staff of the department welcomes the patient to the ward	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification by inspection
Pathway facilitation with specific identification	Dedicated nursing staff in the department gives the patient/indicates to the patient-specific sequence number	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification by inspection
Facilitation of the performance of any instrumental examinations	Dedicated nursing staff facilitate any access to instrumental examinations, where these are available on the ward or in the immediate vicinity and duly scheduled in advance	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification by inspection • Verification on electronic agenda hospital/territorial service/private facility

been ruled out. On the other hand, antiresorptive therapy will not be prescribed at discharge as early treatment may affect fracture healing. It will be explained to the patient and/or the patient's family/care giver the therapeutic-assistance path that will be started within the FLS and its importance for the purposes of prevention of refractures. A letter will also be prepared for the patient's General Practitioner for the purpose of constructive collaboration to facilitate secondary prevention (Table 1).

Macrophase 2: patient reception and intake in dedicated department

The patient, who has duly performed the level I/level II examinations, arrives at the level I hospital facility or territorial service that houses the Medical Specialty Unit that will take charge of the patient. The patient/caregiver or dedicated nursing staff, the latter if the patient has arrived alone with an equipped vehicle, will perform the outpatient admission on a specific agenda. The patient will be directed to the specialist department where the specific outpatient clinic is located. The patient will be greeted in the ward by nursing staff. If instrumental exams have been scheduled in Macrophase 1, they will be performed before the visit. The person in charge of Macrophase 2 may be the specialist responsible for the dedicated pathway or specific nursing staff (Table 2).

Macrophase 3: care process of diagnosis and treatment (secondary prevention of refracture)

The patient will then be properly evaluated and examined at the specialist clinic. The correct implementation of vitamin D supplementation, the dietary intake of calcium (in order to assess the need for supplementation with calcium) the blood tests performed will be verified. In order to facilitate the path of the patient, where possible, the vertebral and femoral DXA and vertebral morphometry will be performed at the same site or in the same structure. If it is not possible to perform these instrumental examinations, they will be recommended/prescribed and examined in subsequent outpatient visits. If

Table 3 Macrophase 3: care process of diagnosis and treatment (secondary prevention of refracture)

3. Care process of diagnosis and treatment			
Activities	Description	In charge	Documents/checks
Outpatient examination with diagnostic framing	The internist/specialist or orthopedic physician clinically evaluates the patient with bone fragility	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Paper medical record • Electronic medical record on database hospital company/ territorial service/ private facility • Excel document in hospital PC • Excel document maintained on company server • Other
Evaluation or represcription of level I exams performed (+any level II exams)	The internist/specialist or orthopedic physician evaluates the Level I exams (Level II exams, if any) performed; if necessary, represcribes them, if not performed, or prescribes additional ones if further study is needed	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Paper medical record • Electronic medical record on database hospital company/ territorial service/ private facility • Excel document in hospital PC • Excel document maintained on company server • Other
Assessment or represcription supplementation (vitamin D and possible calcium)	Internist/Specialty Physician or Orthopedist verifies proper vitamin D supplementation and calcium nutritional intake; represcribes/corrects dosage where suboptimal	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Paper medical record • Electronic medical record on database hospital company/ territorial service/ private facility • Excel document in hospital PC • Excel document maintained on company server • Other
Performance of instrumental examinations (DEXA and vertebral morphometry)	Radiologic technical staff performs instrumental examinations where present in the department or in the immediate vicinity ("in-house") and delivers the report to the medical staff	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification by inspection • Verification on electronic diary hospital/territorial service/private facility • Excel document in hospital PC • Excel document maintained on company server • Other
Prescription of anti-fracture therapy (according to note 79)	The Internist/Specialist Physician or Orthopedist, having verified the optimal vitamin D and nutritional status, prescribes antifracturative drugs according to Note 79, verifying the absence of contraindications; draws up appropriate ministerial treatment plan where the therapeutic choice falls on subcutaneously administered drugs (teriparatide, denosumab)	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Electronic medical record on database hospital company/territorial service/private facility • Excel document in hospital PC • Excel document maintained on company server • Other
Performance/programming of drug therapy in Band H (according to note 79)	The Internist/Specialist Physician or Orthopedist, when indicated, prescribes intravenous antifracture therapy (zoledronic acid) that can be administered in the accredited public hospital, community service, or private facility setting only	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Electronic reservation agenda of the hospital/territorial service/ private facility information system • Use of local booking software (internal diaries) • Manual appointment book Nursing records • Paper Medical Record • Electronic medical record on hospital/territorial service company database • Excel document in hospital PC • Excel document maintained on company server • Other

Table 4 Macrophase 4: monitoring and follow-up

4. Monitoring and follow-up			
Activities	Description	In charge	Documents/checks
Rescheduling outpatient follow-up visit in FLS facility II	Internist/specialist physician or orthopedic surgeon, if indicated, reschedules visit for reassessment/renewal of treatment plan or to perform intravenously administered anti-fracture therapy (zoledronic acid) administered in public hospital, territorial service, or accredited private facility only The visit performed by the orthopedic clinician should be scheduled 1 month after the fracture event, and subsequent follow-up visits every 3 months	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Electronic reservation agenda of the hospital/private facility information system • Use of local booking software • Manual appointment book • Excel document in hospital PC • Excel document maintained on company server • Other
Phone call to check therapeutic adherence (oral anti-fracture therapies) and adverse events (parenteral anti-fracture therapies)	Medical or nursing staff, in the case of orally administered anti-fracture therapies, verify adherence to treatment within 3–6 months of prescription or any adverse events to other therapies given	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Nursing record • Excel document in hospital PC • Excel document maintained on enterprise server • Other
Rescheduling of canceled visits (when possible)	Medical or nursing staff contact patients scheduled within the FLS, who have canceled the visit; record the reason; re-explain the need for secondary prevention of refracture and reschedule the visit if necessary	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Electronic reservation agenda of the hospital/private facility information system • Use of local booking software • Manual appointment book • Excel document in hospital PC • Excel document maintained on company server • Other
Update of electronic file of patients with femur fracture	The medical staff periodically updates the Excel file related to fractured femur and the correct secondary prevention pathway of refracture	Orthopedist Orthogeriatrician Internist Endocrinology specialist Rheumatology specialist Physiatrist specialist Nursing staff Technical staff	• Verification with inspection

the prescribed hematochemical examinations have not been performed or if further diagnostic investigation is necessary, they will be recommended and prescribed again and a re-evaluation will be rescheduled. The prescription of anti-fracture therapy, which may be without the performance of DXA and morphometric examination, will conclude the visit. If proper vitamin D supplementation has not been performed and calcium intake is inadequate, a re-evaluation will be rescheduled and the initiation of anti-fracture therapy will be postponed. Given the age of femur fractured patients and the frequent associated pathological conditions, parenteral therapies will be preferred whenever possible, also given the demonstrated poor adherence to oral therapies in this category of patients. In case of patients eligible for infusion therapy with zoledronate (hospital dispensation), it can be scheduled in the same specialist structure of evaluation. Therapies that can be administered subcutaneously (denosumab, teriparatide) will be prescribed with a therapeutic plan that will be drawn up by the medical specialist of an accredited facility (Table 3).

Macrophase 4: monitoring and follow-up

The patient will be sent back to the General Practitioner with the record of services performed and the recommended/expected therapy, with any treatment plan. In case of therapy dispensed in hospital (zoledronate e.v.) or therapy prescribed with a therapeutic plan (denosumab, teriparatide) will be rescheduled directly on the specific agenda outpatient monitoring visit. In case of prescription of oral therapy, a phone call may be made to verify adherence to treatment and parenteral therapy programmed where the oral antiresorptive therapy is not tolerated or there are contraindications to treatment (Table 4).

Discussion

Osteoporosis represents a huge and growing public health problem with high health and social costs. It is a systemic skeletal disease characterized by decreased BMD and deterioration of bone tissue microarchitecture, resulting in impaired bone strength and increased risk of fractures. Of the total fractures recorded annually worldwide, 9 million consist of fragility fractures due to osteoporosis, and they have major consequences in terms of mortality and disability [3]. Those who have had their first osteoporotic fracture have an increased risk of further fractures. In addition, fracture risk increases with age, and as average life expectancy increases worldwide, more individuals are expected to suffer fragility fractures. In Italy, it is estimated that 1 in 3 women over the age of 50 (about 5,000,000 people) and 1 in 8 men over the age of 60 (about 1,000,000 people) are affected by osteoporosis [14]. Prevention of osteoporosis is therefore essential and is a goal that, if achieved, allows not only to improve the quality of life of individuals but also to reduce the socioeconomic and health costs associated with such a widespread disease. Preventing the recurrence of subsequent fractures is important not only for the patient but also for the National Health Service, as it would ensure a reduction in associated costs, especially if the fracture is treated in a timely manner [15–17].

To ensure adequate prevention and optimal treatment of osteoporosis and fragility fractures, it is necessary to adopt an interdisciplinary treatment approach, based on the development of cutting-edge models, such as FLS, that aim to reduce the risk of re-fracture in a patient who has already suffered a fragility fracture. There are numerous studies in the literature that highlight well the advantages of acquiring an FLS model worldwide. In the study by McLellan et al. conducted on 4600 patients with fracture of hip, wrist, humerus, ankle, foot, hand, and other sites, it was reported how the FLS model enabled diagnosis of osteopenia or osteoporosis in 82.3% of patients, as they underwent BMD assessment, leading to improved identification and treatment of fractured patients [18]. Wong and colleagues report their experience in China. In their study, 226 patients older than 50 years with a vertebral compression fracture were enrolled. Inclusion in the FLS program resulted in BMD assessment by DXA method in 97.8% of cases and initiation of treatment with Denosumab in 100% of cases. At 2 years, 89.8% of patients showed complete adherence to therapy and overall improvement in quality of life [19]. In agreement, Delbar and colleagues report how placing the frail patient on the FLS pathway for 1 year resulted in good long-term persistence to anti-osteoporosis treatment. Persistence with osteoporosis drugs of any class was estimated at 84.1% at 12-month follow-up and decreased to 70.3% at 24 months. In addition, persistence rates at 12 and 24 months were higher with denosumab than with any other treatment [20].

SIOT represents the first scientific society, internationally, to pursue and implement an accredited FLS model. Accreditation will allow the creation of regional referral points for patients with fragility fracture, and the rationalization of a shared pathway with all adhering FLSs to ensure optimal care outcomes for patients with femur fracture.

Conclusions

Integrated approaches involving interdisciplinary collaboration among multiple professionals prove to be the best strategy for implementing care pathways for patients at high risk of refracture. FLS allows communication between different specialists so as to ensure comprehensive patient care. Close collaboration and communication among all health

care professionals who make contact with the patient, from the time of admission until after discharge, allows for optimization of resources and reduction of waste. Therefore, this model aims to elaborate a network of services that, involving multiple specialist figures, ensures continuous patient care and constant monitoring of all phases of transition between care settings, through different levels of intervention and appropriate assessment tools.

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Declarations

Conflict of interest None.

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