Fracture unit: a (possible) model of implementation in Italy

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Summary

The "Fracture Unit" is one of the possible answers to the advanced health needs of the growing number of elderly in our Country, aimed at achieving effective and efficient management of fracture events due to osteoporosis or fragility fractures. Here we proposed an implementation model that can represent an ideal and virtuous path that should be dedicated to every fractured patient. This model should provide specific responses to the health needs of the fractured patient and specifically responses to the health needs of the subject as a frail patient. The goal of this model is therefore to define and structure "a priori" a multidisciplinary course where the patient should be automatically inserted at the time of contact with the health facility following the fracture event, to establish a similar structured course even for the post-acute phase, that is taken over by large social-health areas or districts; and meet the cost for the definition of the rehabilitation.
An optimal communication between hospital and general practitioners, responsible necessarily of the continuous reassessment of the patient, and the monitoring of patient's adherence to treatment are needed for a successful outcome and application of the implementation's model.

KEY WORDS: bone fracture unit; osteoporotic fracture; implementation model.

Introduction

It is already well known that the "Fracture Unit" is one of the possible answers to the advanced health needs of the growing number of elderly in our Country, aimed at achieving effective and efficient management of fracture events due to osteoporosis or fragility fractures. These fractures are mainly located at femoral and spinal but also costal, radial, tibial or other fractures, the incidence of which is its highest in those aged over 65 years and over 75 years (1).
The aim behind the concept of "Fracture Unit" is represented by a collaborative optimization of the organizational structure of potentially different medical specialties involved in the management of the fractured patient. The practical implementation of this model (implemented in a particular way at every Orthopedics Traumatology Center) provides for the preparation of structured pathways that facilitate in establishing stable synergies among orthopedic surgeons, neurosurgeons, rheumatologists, geriatricians, gynecologists, endocrinologists, internists, nephrologists, radiologists, psychiatrists, neurologists, ophthalmologists, physiatrists etc. Nothing must be left to improvisation or the goodwill of the general willingness to cooperate: specific pathways of synergic intervention must be structured (by the surgeons and clinicians) for the fractured patient (1).

The model of implementation

The scheme of an ideal and virtuous path that should be dedicated to the fractured patients is depicted in Figure 1. Suitable grids easy to be used will encode the major series of patients and their claims to specific specialized frameworks: e.g. for patients with autoimmune diseases will be required a visit to rheumatologist (executable even after discharge), patients with visual impairment will be undertaken in eye examination, those with dizziness will addressed to ENT unit and so on (1).

Specific tasks of the model

This model should have in its tasks to provide: A) specific responses to the health needs of the fractured patient: 1) Clear need: surgical repair; 2) Unexpressed needs: disorders determining or facilitating the fall to which the fracture follows. Some specific examples are reported at Table 1; B) specific responses to the health needs of the subject as frail patient. Table 2 summarizes some possible examples of these needs.

Objective of the model

The objective is therefore to: A) define and structure "a priori" *a multidisciplinary course* in which the patient is automatically inserted at the time of contact with the health facility following the fracture event. In this structured path, which fits the different specialists, the patient will no longer be subject to requests for expert advice to the delegated discretion of the attending physician in the department, nor should be more "committed himself to" after discharge from hospital (or by the department of Orthopedics and Traumatology); B) establish a similar structured course even for the post-acute phase, that is taken over by large social-health areas or districts; and C) meet the cost for the definition of the rehabilitation (e.g. preparation of rehabilitation plan by hospital physiatrist before of patient's discharge): intensive rehabilitation in hospital or in specialized facilities, or alternatively home rehabilitation, with supply of aids and prostheses.

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Table 1 - Unexpressed needs: disorders determining or facilitating the fall to which the fracture follows.

- visual disturbances (eye specialist);
- hypotension/fainting (cardiologist);
- nicturia (internist, nephrologist, geriatrician)
- neuropathies (neurologist, diabetes);
- sarcopenia (geriatrician, physiatrist);
- osteoarthritis/connetivopaties (rheumatologist);
- changes in blood glucose (internist, diabetologist, geriatrician);
- thyreopaties/hyperparathyroidism, hypovitaminosis D, hypogonadism... (endocrinologist, geriatrician)

Table 2 - Specific responses to the health needs of the subject as frail patient.

- Evaluation of kidney function (kidney specialist, geriatrician)
- Liver function (internist, hepatologist)
- Malabsorption (internist, gastroenterologist)
- Evaluation of bone turnover markers/BMD
- Coagulation (internist, cardiologist, geriatrician)
- Hearing loss (audiologist)
- Dizzy syndrome (ENT)

A successful outcome and application of the implementation's model will require an optimal communication between hospital and general practitioners, which are responsible necessarily of the continuous reassessment of the patient, monitoring adherence to treatment (drug and rehabilitation) and the management of subsequent checks of expertise, to be prefixed at the time of hospital discharge, within the dedicated paths, as it happens in the Target project (2).

TARGET Project as an example of an implementation model

The Region of Tuscany, which has set itself the objective of promoting high levels of health for all citizens and especially for the elderly, decided to start a four-year program for the prevention of femoral re-fractures, open to all residents in Tuscany aged over 65 who have a hip fracture. The project aims to ensure effective and timely treatment to all patients who suffer a hip fracture (not less than 80%), through a structured path that includes the involvement of general practitioners, the orthopedic and other specialists who dealing with the treatment of osteoporosis. Within the project, there will be a facilitated access to intravenous therapies that include regional specialized centers (2). Figures 2 and 3 summarizes the aims of this project.

Extension of the implementation model to osteoporotic vertebral fractures at the Orthopedic Traumatology Center at Florence, Italy

The definition of osteoporotic vertebral fractures has undergone considerable changes in recent years. They have gone from being regarded as the initial clinical sign of osteoporosis following an outdated definition of disease to be treated instead as a complication of osteoporosis as a consequence of the bone fragility. This definition is further strengthened because the recurrent vertebral fractures have irreversible clinical consequences, such as loss of height or chronic spinal pain.
Most fractured patients are discharged without an accurate bone turnover evaluation and, therefore, without identification of the causative factor.
In over 95% of patients with recent fractures BMD has not been evaluated and, therefore, a correct diagnosis of osteoporosis has not been placed and adequate therapy not prescribed.

Multidisciplinary approach to the prevention and treatment of osteoporotic vertebral fractures: Clinical Vertebral Fracture (CVF) Unit

This approach aims to evaluate the introduction of the appropriate medical treatment variable in the path of osteoporotic patients undergoing kyphoplasty after vertebral fracture. Appropriate therapy might include calcium and vitamin D, bisphosphonates, SERMs, bone anabolic agents and combinations of multiple drugs. The safety of medical therapy and possible side effects will be monitored at all visits using an appropriate questionnaire.
Comparison between the outcome of the group who followed a traditional route with the one of the group that followed a modified path (prescription of a targeted medical therapy) will be performed by metabolic and clinical controls at 2 months, 6 months, 1 year and 2 years.
The overall objective of the study will be to evaluate the efficacy and safety of a modified path rather than a traditional route in assisting patients undergoing kyphoplasty for osteoporotic vertebral fractures. The primary objective of the study will be the success rate in the group path different from that in traditional route. Secondary objectives will consist of: 1) the change in lumbar and femoral BMD;

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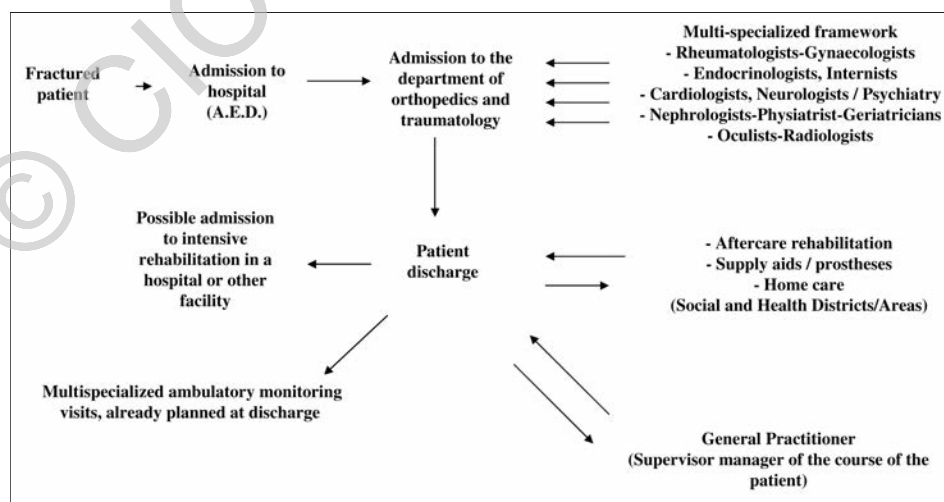
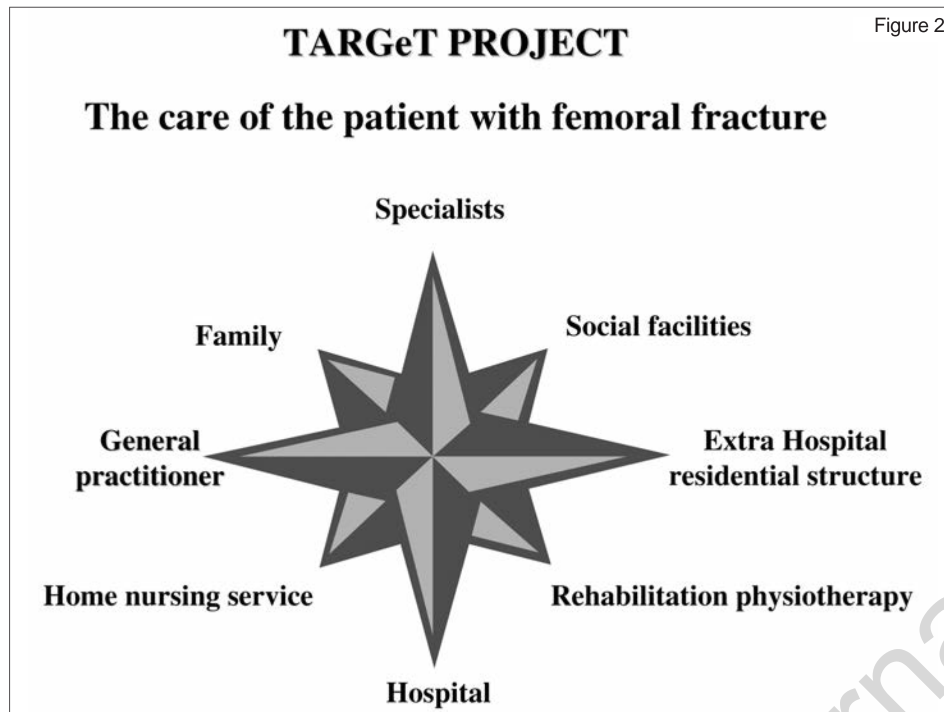
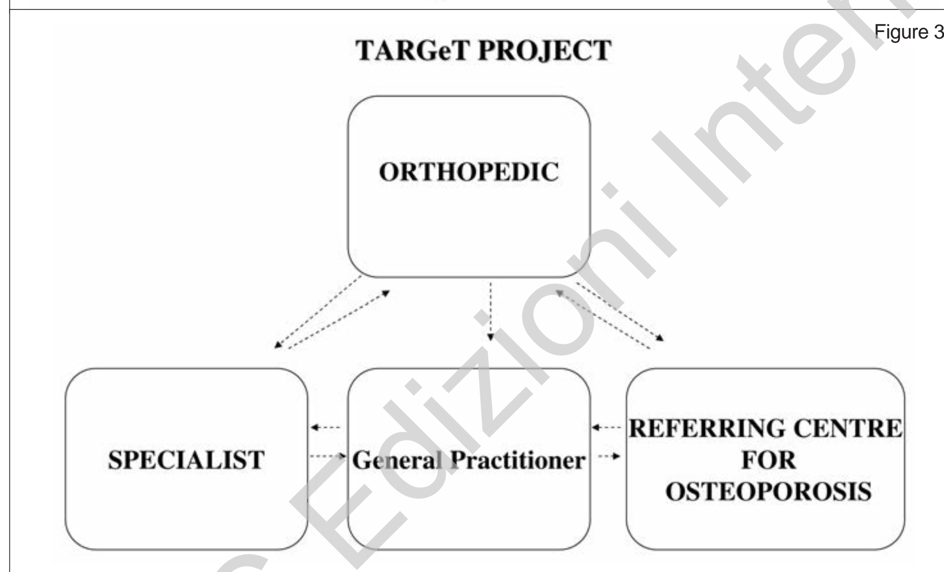


Figure 1 - Explicative algorithm of the management of a fractured patient within a Fracture Unit. This is a horizontal path that takes advantage of existing structures and organizations on the territory, without generating new additional costs (1).





Figures 2 and 3 - What is the pattern of care provided by the TARGET project? During hospitalization and after any surgery, the elderly patient with hip fracture is subjected to careful evaluation of bone metabolism, thanks to a structured collaboration between orthopedic surgeons and other hospital specialists. Wherever possible, the elderly patient with hip fracture are discharged with the prescription of a specific therapy for osteoporosis. If there is no need for further evaluation outside the hospital where the patient has occurred, the orthopedic specialist can refer the patient to a regional reference center following a dedicated channel. In this case, the patient make a reservation through the dedicated reservation centre (CUP) at the nearest regional center. The project will ensure compliance with appropriate times: no more than 60 days between surgery (or hospital discharge, in the case of fractures do not work) and start of therapy. At the time of discharge from the hospital, the orthopedic gives the patient a letter of enrollment to be presented to the general practitioner, who will be the reference point of the patient for the duration of therapy. The monitoring of the patient's condition and any decision related to changes in drug therapy belongs to the general practitioner, in addition to the task of verifying that the processing is executed as long as necessary. All general practitioners, orthopedists and other specialists involved in the project will be regularly informed by the Region of Tuscany on the project.

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2) the variation of biochemical bone turnover markers and quality of life; 3) the assessment of safety parameters: total and symptomatic cement leakage, pulmonary embolism, spinal cord compression, radicular pain, radiculopathies; and 4) evaluation of adverse events related to the total procedure. The final aim of the study will be to prepare guidelines for the management of patients with complicated osteoporotic spinal fractures with regard to the metabolic diagnosis and the following prescribed medical treatment. An ideal flow-chart of this model is reported at Figure 4.

What are the potential benefits achievable by the use of the implementation model?
Expected benefits

The models of "Fracture Unit" already tested [Europe: England (3); other continents: Israel (4) and Australia (5)] show a positive and measurable effect in terms of reducing post-fracture complications, mortality, length of stay and need for further hospitalization (6, 7).

Conclusions

The adoption of a model of "Fracture Unit" allows a reduction in major complications (cognitive impairment, pressure sores, DVT events and cardio-circulatory or respiratory sequelae) between 21% and 45%, while the readmission to hospital at 6 months had fallen by 20% and the mortality rate of 3% (8, 9). In addition, important economic effects were observed with reductions in complications and re-hospitalizations, in terms of resource consumption, with: 1) maximizing the effectiveness and efficiency of procedures; 2) searching for greater equity in access to care and rehabilitative treatment, and 3) integration of the available services inside a single hospital or urban/local health district with localized services

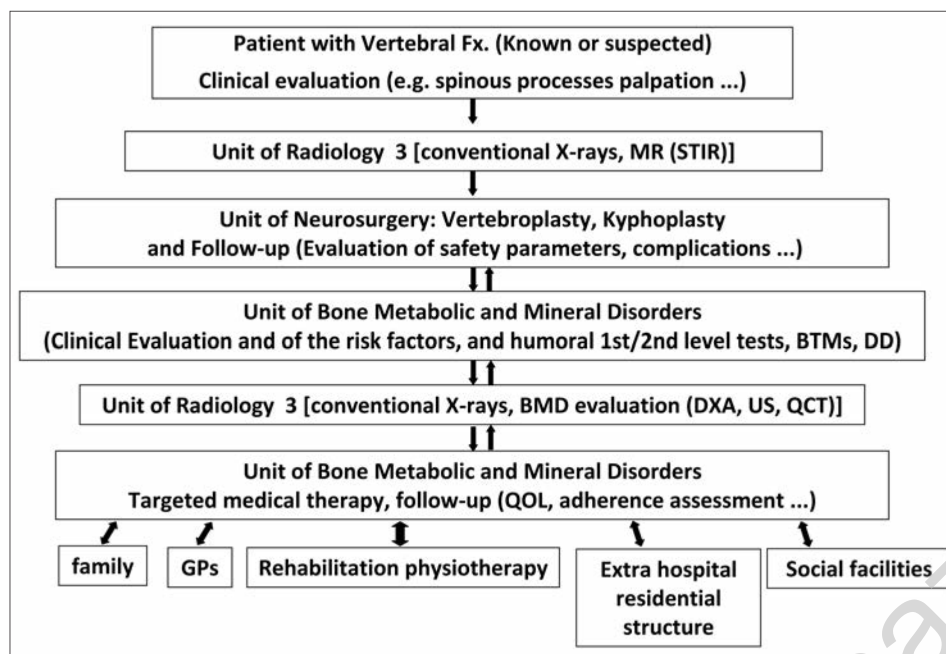

Figure 4 - Multidisciplinary approach to the prevention and treatment of osteoporotic vertebral fractures: Clinical Vertebral Fracture (CVF) Unit, at the Orthopedic and Traumatology Center of Florence, Italy. This is a schematic representation of the virtuous path that a patient with osteoporotic vertebral fracture should have to do. The path can be bi-directional at several steps, depending on the clinical, biochemical findings. BTMs = Bone Turnover Markers; DD = Differential Diagnosis; QOL = Quality Of Life; GPs = General Practitioners.

in the metropolitan area, but detached from the housing in orthopedics/traumatology department, following departmental organization already provided by existing laws.

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