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Principles of the Orthogeriatric Model of Care: A Primer

Fundamentos dos Modelos Assistenciais de Ortogeriatria: Uma Introdução

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ABSTRACT

It is well known that over the last few decades, there has been significant growth of the aging population worldwide and especially in Europe, with an increase of more than two years per decade since the 1960's. Currently, in Europe, people aged over 65 years old represent 20% of the population, creating many new and complex challenges for national healthcare systems. In many countries, geriatric medicine is an established medical specialty, integrated into the primary and secondary care of the older population. In some countries, such as Portugal, specialist training in geriatric medicine is not available, even though the life-expectancy in Portugal is currently 81 years due to a decrease in fertility and mortality, and people aged over 60 currently represent nearly a third of the population. There is strong evidence in the medical literature that a fracture following a fall, and especially a neck of femur fracture, is one of the most serious events that can happen in an older person's lifetime. These fractures have been associated with increased morbidity, loss of independence, a high rate of institutionalization, and mortality. Rates of mortality after a year from femoral fractures have been proven to be three to four times higher than the expected in the general population, ranging between 15% to 36%. This emphasizes the importance of developing well-organized care pathways for these patients, which combine specialized geriatric care (also known as orthogeriatric care). This narrative review will focus on the core principles of orthogeriatric care and how medical professionals, including those who are not specialized in geriatric care, can effectively use them.
Keywords: Geriatric Assessment; Geriatrics; Health Services for the Aged; Femoral Neck Fractures; Orthopedics

RESUMO

O envelhecimento da população mundial tem sido exponencial nas últimas décadas, em particular na Europa, onde os adultos com mais de 65 anos representam 20% da população, o que tem criado novos e complexos desafios aos sistemas de saúde. Na maior parte dos países da Europa, a medicina geriátrica é uma especialidade médica bem estabelecida, integrada nos cuidados de saúde primários e secundários. Noutros países, como em Portugal, não existe ainda um internato de formação especifica em medicina geriátrica, apesar de um terço da população portuguesa ter mais de 60 anos. A ocorrência de quedas com fraturas, em particular fraturas da extremidade proximal do fémur, é um marcador de mau prognóstico nas fases mais avançadas da vida. Estas fraturas associam-se a um aumento da morbilidade, perda de autonomia funcional, aumento da necessidade de admissão em estruturas residenciais para idosos e aumento da mortalidade. A taxa de mortalidade no ano seguinte à ocorrência de uma fratura da extremidade proximal do fémur é três a quatro vezes superior à esperada para a população geral, e varia entre os 15% e os 36%. A necessidade de implementar modelos de cuidados específicos para este grupo de doentes baseados nos princípios da medicina geriátrica levou ao desenvolvimento da Ortogeriatria. Esta revisão narrativa centra-se nos princípios dos modelos de cuidados de Ortogeriatria e em estratégias para que os clínicos, mesmo num país em que não existe a especialidade de Medicina Geriátrica, possam aplicar estes princípios e implementar estes modelos.
Palavras-chave: Avaliação Geriátrica; Geriatria; Fracturas do Colo do Fémur; Ortopedia; Serviços de Saúde para Idosos

INTRODUCTION

According to the United Nations World Population Prospects 2022, the older population (aged 65 or over) is increasing worldwide and in Europe it is projected to reach 29% of the total population by 2050, from the current 19%.[1] This growth burdens healthcare systems because of the volume of care required for the aged population. Portugal has seen a rise in life expectancy to 81 years, with 23% of the population aged 65 and over as per 2022 statistics.[2,3] Management of older patients with fractures, particularly neck of femur fractures (NOF), poses a significant challenge within healthcare frameworks, given the high prevalence and associated morbidity and mortality.[4-6]

Orthogeriatric care is a medical-surgical model involving a multidisciplinary team (MDT). The MDT is an interprofessional and interdisciplinary team that includes medical professionals such as orthopedic surgeons, geriatricians, nurses, physical and occupational therapists, social workers, nutritionists, pharmacists and, most importantly, the patient and their next of kin. The role of the MDT is to optimize the management of surgical and medical complications surrounding NOF fractures.[7,8]

The Fragility Fracture Network (FFN) was established in 2011 to address the growing challenges of the care of fragility fracture patients.[9] The FFN provides support and training to relevant medical professionals, disseminating research and clinical practice improvement across pillars of care for fragility fracture patients that include perioperative care, surgical treatment, rehabilitation, secondary prevention, and policy change. The FFN Four Pillars of Orthogeriatric Care are summarized in Fig. 1.[9]

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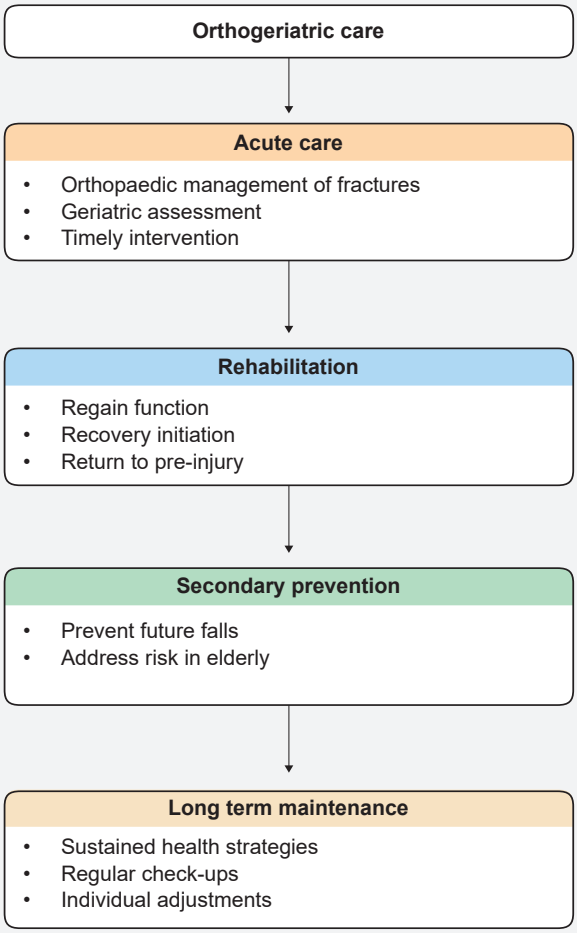

Figure 1 – The Fragility Fracture Network's four pillars of orthogeriatric care

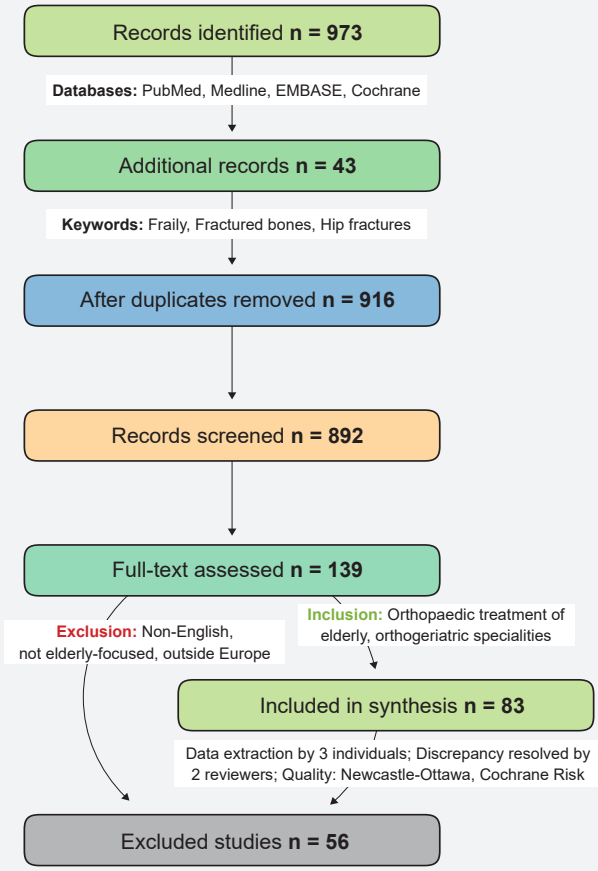

Figure 2 – PRISMA diagram as described in methodology

This review provides an overview of the principles of geriatric medicine and how geriatric care is essential to improve patients' outcomes following a major fragility fracture such as a femoral one.

Methodology

A comprehensive literature search on geriatric care in patients with neck of femur and fragility fractures was undertaken across databases including PubMed, Medline, EMBASE, and the Cochrane Library, spanning the period from January 1990 to December 2022. The following keywords which represent the essence of geriatric medicine and geriatric care in femoral fractured old people were used for the search: "geriatric care", "orthogeriatric", "hip fracture", "frailty", "delirium", "outcome" and "orthopedic care". For inclusion, the studies focused on orthopedic treatment of the older person in Europe, the origins of orthogeriatric specialties, and clinical trials related to orthogeriatric therapies. Non-English articles, those that included data of participants younger than 60 years old or outside of Europe, and those with insufficient data or weak methodology, were excluded. Fig. 2 illustrates the review process in a PRISMA diagram.

Ethical considerations

Since this was a review article, no primary data were gathered, hence there was no need for ethical approval. However, the ethical implications of each study that was reviewed as well as the permission received for the original research were evaluated. The authors did not receive any financial support from third parties.

PRINCIPLES OF GERIATRIC MEDICINE

Geriatric medicine is a recognized independent medical specialty in 17 of 31 European countries, a recognized subspecialty in 10 countries, and in two countries (Germany and France), both models (independent specialty and subspecialty) exist. Only five countries (Cyprus, Estonia, Greece, Portugal, and Slovenia) do not have a recognized

postgraduate medical degree in geriatric medicine (medical specialty) as of 2016.[10]

Geriatric medicine is a specialty concerned with physical, mental, functional, and social conditions in acute, chronic, rehabilitative, preventive, and end-of-life care in older patients. This group of patients are considered to have a high degree of frailty and active comorbidities, requiring a holistic approach. Diseases may present differently in old age, are often very difficult to diagnose, the response to treatment is often delayed, and there is frequently a need for social support. Geriatric medicine therefore exceeds organ-oriented medicine offering additional therapy in a multidisciplinary team setting, the main aim of which is to optimize the functional status of the older person and improve the quality of life and autonomy.[11]

Geriatric syndromes

Geriatric syndromes are distinct conditions occurring in older patients that do not stem from identifiable diseases but rather occur due to the accumulation of impairments across multiple systems affecting multiple domains. They are often the consequence of multiple underlying factors and include frailty, urinary incontinence, falls, delirium, polypharmacy, and pressure ulcers. It is well known that in the general geriatric population, geriatric syndromes are predictors of hospitalization, increased healthcare costs, and increased overall mortality.[12-17] The most common geriatric syndromes and screening tools are listed in Fig. 3.

The use of the comprehensive geriatric assessment (CGA) is of utmost importance in the identification of geriatric syndromes, encompassing complex illnesses which frequently result in adverse health outcomes among older individuals.[18,19]

Frailty

Frailty can be described as "a biological syndrome characterized by a reduction in physiological reserve and resistance to stresses".[20]

This condition arises from the cumulative deterioration across several physiological systems, ultimately rendering individuals more susceptible to negative health outcomes.[21,22] In the evaluation of frailty, it is customary to employ instruments such as the Clinical Frailty Scale (CFS), which classifies individuals into nine distinct stages ranging from highly robust to terminally ill, considering factors such as mobility, energy levels, physical activity, and overall functional capacity.[23] The validity of this scale has been established for diverse populations, including the Portuguese population.[24] Based on our experience, the CFS is more advantageous than other scales for NOF patients as it eliminates the need for mobilization to measure muscle strength.

Sarcopenia

Sarcopenia, as described by the European Working Group on Sarcopenia in Older People's (EWGSOP) second meeting, in 2018, is "a progressive and generalized skeletal muscle condition linked with an elevated risk of undesirable consequences such as physical disability, poor quality of life, and mortality".[25]

According to a recent metanalysis, sarcopenia is associated with a high risk of osteoporosis, falls, fracture, functional decline, hospitalization, cognitive impairment, metabolic syndrome, diabetes, non-alcoholic liver disease, liver fibrosis, hypertension, depression, dysphagia, and increased mortality.[26] The prevalence of sarcopenia ranges from 5% to 13% in people aged 60 to 70, rising to 11% to 50% in people over 80 years old.[27,28]

The EWGSOP consensus meeting in 2018 defines sarcopenia as a condition characterized by low muscle strength (criterion 1) and low muscle quantity or quality (criterion 2). If low physical performance is also present (criterion 3), then the sarcopenia is considered severe.[25]

Considering the adverse physical outcomes and the economic cost of sarcopenia to the national healthcare systems, the "International Clinical Practice Guidelines for Sarcopenia" produced by the task force of the International Conference on Sarcopenia and Frailty Research (ICSFR) and the EWGSOP recommend annual screening of everyone older than 65 in general practice or outpatient clinics using a tool such as SARC-F questionnaire.[25,29] There are five SARC-F components: strength, assistance with walking, rise from a chair, climb stairs and falls. The scores range from 0 to 10, with 0 to 2 points for each component; a score equal to or greater than 4 is predictive of sarcopenia and poor outcomes.[30]

Once patients have been screened via the SARC-F and identified as likely affected by sarcopenia, then their muscle strength (criterion 1) should be assessed. Muscle strength can be measured with the grip strength or the chair stand test. If the patient has low muscle strength, then the presence of sarcopenia is probable. To confirm the presence of sarcopenia, muscle quantity or quality should be measured (criterion 2), but this can be challenging in most clinical settings as it requires access to radiological examinations like dual-energy X-ray absorptiometry (DEXA), magnetic resonance imaging (MRI), or computed tomography (CT) scans; hence, the EWGSOP group recommends searching for the causes and implementing interventions in patients that have been identified as likely sarcopenic using the criterion 1.[25]

Once sarcopenia is confirmed by the presence of criterions 1 and 2, then the physical performance (criterion 3) should be assessed using tests like the gait speed, the 'Timed Up and Go' (TUG), a short physical performance battery, and a 400-meter walk.[25]

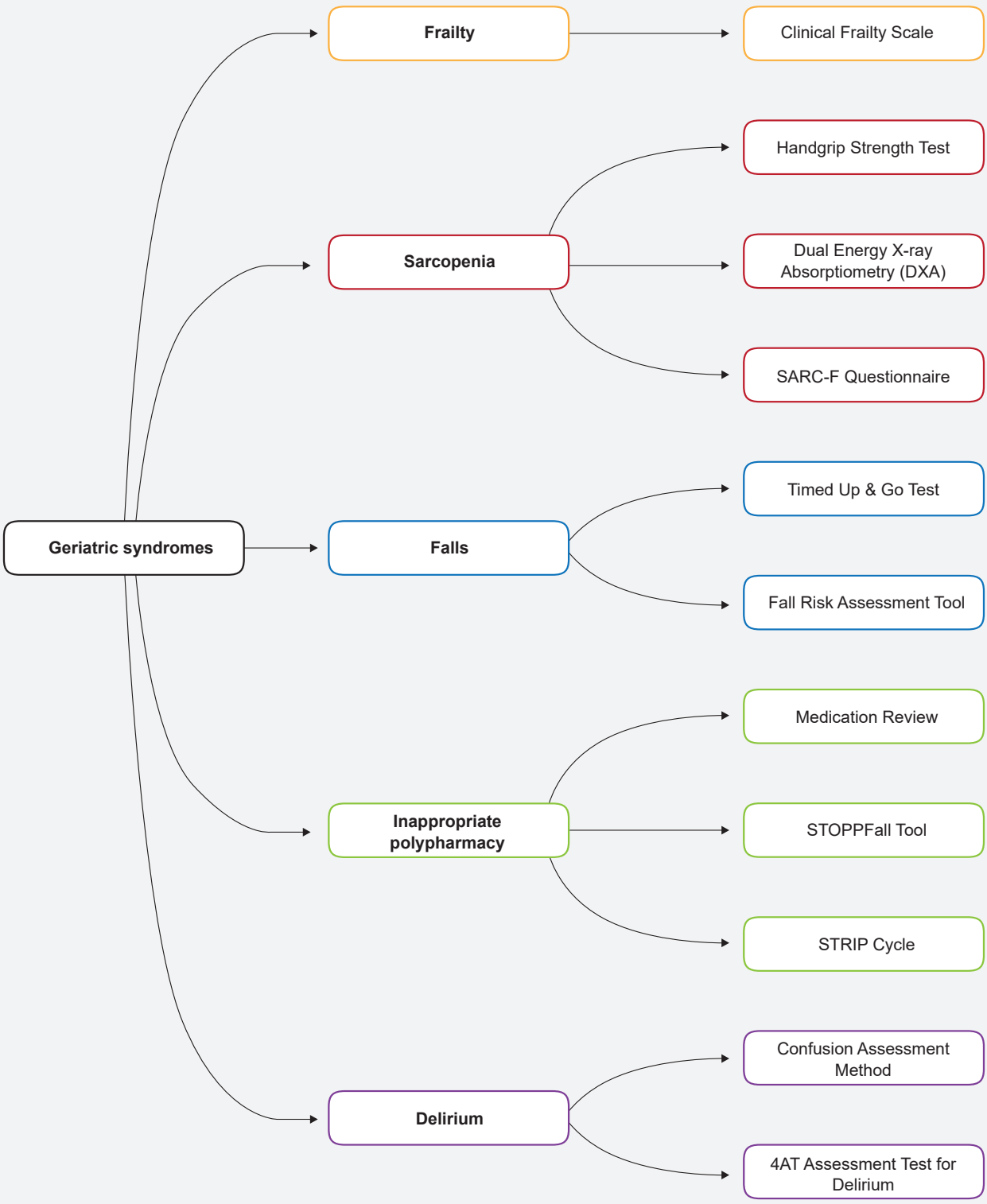

Figure 3 – Geriatric syndromes and screening tools
SARC-F: strength, assistance in walking, rise from a chair, climb stairs – falls; STOPPFall: screening tool of older persons prescriptions in older adults with high fall risk; STRIP cycle: systematic tool to reduce inappropriate prescribing cycle; 4AT: assessment test for delirium and cognitive impairment

Falls

It is well known that falls are the main cause of hip fractures in the aging population.[31] Falls occur in 30% of adults over 65 years old[32] and they have well known consequences and negative health outcomes such as personal distress and loss of confidence, increased disability, hospital admissions, and mortality.[33-35]

In September 2022 the "World Guidelines for Falls Prevention and Management for Older Adults: A Global Initiative" were published.[36] The guidelines recommend "a multiprofessional and multifactorial assessment to community-dwelling older adults identified to be at high risk of falling, to guide tailored interventions".[36] Part of the recommendation on falls assessment includes consideration of factors such as the patient's environment (e.g., lighting, cluttered rooms, etc.), footwear, fall history, eyesight and balance issues, daily activities, and medication side effects.[36,37] The guidelines also recommend the use of three key questions to identify individuals at risk of falls: A) "has the person fallen in the past year?"; B) "do they feel unsteady when standing or walking?"; C) "do they worry about falling?".[36] The patient is considered being at high risk of falling if the answer is positive for one of the three key questions and there is the presence of at least one of the following five events that determine the fall severity: a) injury following the fall; b) two or more falls in a year; c) frailty; d) lying on the floor or unable to get up after a fall; e) loss of consciousness or suspected syncope; and individually tailored interventions should be put in place.

In case there are no fall severity events, then the gait and balance of the patient should be assessed with the TUG test or the gait speed (cut off > 15 sec and < 0.8 m/s, respectively). If the gait and balance are impaired, then the patient is considered at intermediate risk of falls, and they should be offered tailored exercises on balance, strength, and gait, and education on fall prevention.[36]

Recognizing individuals through these metrics allows for timely and effective interventions that can significantly lower the likelihood of falls. Prioritizing fall assessments and focused interventions can provide immediate and noticeable benefits in reducing hip fractures and related morbidities in the older population.

Inappropriate polypharmacy

Inappropriate polypharmacy is rather prevalent in the population concerned and has the potential to cause a myriad of complications, such as falls.[21,38,39]

In the context of post-operative care, the completion of a medication review allows for the optimization of patient care. Not only does this have the potential to decrease the pharmaceutical burden on the patient or their carer, but also reaps benefits for the healthcare system at-large, decreasing the dispensing of unnecessary or unwanted medications hence decreasing costs in this area.[40,41] Carrying out such a review should be done on any admission, ensuring medications are genuinely indicated and at optimal dose if so.

The European Geriatric Society used an expert Delphi consensus process to produce the STOPPFall tool, defined as Screening Tool of Older Persons Prescriptions in older adults with high fall risk.[42] This tool allows clinicians to identify the fall-risk-increasing drugs and offers a practical deprescribing tool for medical optimization.

This can be thought of as "right drug, right patient, right dose, right time."

Many groups have formulated methods of decreasing polypharmacy, one of which being Systematic Tool to Reduce Inappropriate Prescribing (STRIP).[43] This works on the premise of five steps, which aim to identify and resolve incidents of polypharmacy and reduce inappropriate prescribing, which can be reviewed and cycled regularly for optimization of care, summarized in Table 1.[43]

Delirium

Delirium has been defined by the Royal College of Psychiatrists UK as "a state of mental confusion that starts suddenly and is caused by a physical condition".[44]

Post-operative delirium is one of the most serious complications following NOF surgery. Post-operative delirium can occur in up to 50% of NOF surgery patients, especially older patients with pre-existing cognitive deficits.[45] This delirium has serious consequences, including an increased risk of mortality following surgery, with some studies indicating a threefold increase in the chance of death within the first year.[45] Furthermore, the occurrence of delirium in the context of orthopedic procedures, particularly those involving NOF fractures, remains a major issue due to the associated lengthy hospital stays, healthcare expenses, and rehabilitation challenges.[46,47] It can be detrimental to physiotherapy, extending the rehabilitation period.[48] In addition, delirium increases the risk of falls, leads to long-term cognitive impairment,[49] and admission to long term care.[50-52]

Contributing factors can be summarized using the acronym 'PINCH ME' (Table 2), which is a useful tool to identify

Table 1 – Summary of Systematic Tool to Reduce Inappropriate Prescribing (STRIP) cycle

Step	Summary
Step 1	Drug history
Step 2	Analysis of drugs
Step 3	Treatment plan
Step 4	Patient preferences
Step 5	Follow-up and monitoring

Table 2 – The 'PINCH ME' acronym (pain, infection, nutrition, constipation, hydration, medication/metabolic, environment) helps to identify causes of delirium and possible interventions

Letter	Cause of delirium	Clinical tips and considerations
P	Pain	Undertake a thorough pain assessment. Check for urinary retention.
I	Infection or intoxication	Urinary tract infections can present atypically in the older adult. Review medication and intoxicants.
N	Nutrition (malnutrition)	Check nutritional status, electrolytes, B12, and folate levels.
C	Constipation or central nervous system pathology	Bowel movements history is crucial. Consider imaging for central nervous system pathology if indicated.
H	Hydration (dehydration) or hypoxia	Monitor fluid balance and urine output. Check oxygen saturation and arterial blood gas if needed.
M	Metabolic/medications	Thyroid, liver, and kidney function tests. Review all medications for anticholinergic load or other side effects.
E	Environment (new surroundings) or endocrine	Assess for unfamiliar surroundings leading to disorientation. Thyroid dysfunction, hypo/hyperglycaemia.

the possible cause for delirium and plan an intervention.

For optimal post-operative management in senior patients, it is important that healthcare professionals are trained in delirium prevention, early diagnosis, and therapeutic intervention.[44]

Some commonly used tools for detection of delirium are the 4AT, a quick method that does not require specific training that uses four domains (alertness, abbreviated mental and attention testing, and observation of an acute change in mental state)[53]; and the Confusion Assessment Method.[54]

The comprehensive geriatric assessment

The CGA is a collaborative and interdisciplinary approach that incorporates an inclusive perspective of the health of older individuals, frequently integrating insights from many healthcare professionals such as geriatricians, nurses, social workers, physiotherapists, and occupational therapists.[55]

The CGA is used to identify the presence of geriatric syndromes and following the CGA the MDT will provide an individualized plan to manage patient needs.[56,57]

The assessment typically encompasses multiple fundamental domains:

- Medical evaluation: to assess and address chronic diseases and the use of many medicines, which are frequently encountered in the senior population.
- Functional status: to obtain insight of the patient's ability to engage in self-care activities and move independently.[58]
- Mental health evaluation: involves screening for cognitive impairment and emotional well-being.[59]
- Nutritional status: conducted through the use of validated screening instruments to identify and effectively manage instances of malnutrition or the potential for malnutrition.[59]
- Socio-environmental aspects: comprise the living conditions and social support systems accessible to the individual.[57]

SPECIFIC CONDITIONS MANAGED BY ORTHOGERIATRICIANS

One of the subspecialties of geriatric medicine is orthogeriatrics. The orthogeriatricians are specialists in the care of the geriatric population and work in collaboration with the orthopedic surgeons to provide the best possible care to the patients admitted with fragility fractures, particularly, but not only, femoral fractures.[60]

Infections

Infections are one of the most common post-operative complications, following surgery for a fractured NOF[61] and may be considered an ongoing battle in the war of perioperative care. A Danish study[62] collating the data of over 74 000 hip fracture patients found that mortality was significantly higher in those with infection "irrespective of patients' age, sex and comorbidity".

Older patients admitted to orthopedic wards following hip fractures are often frail and susceptible to infection, most common chest or urinary. Additionally, the procedure itself poses a potential source of infection.[62,63]

The orthogeriatrician with the experience and knowledge in the field of geriatric care and internal medicine can promptly recognize and manage post-operative complications, including infections.[64]

Pain management

The use of efficient pain management strategies following fractures in senior individuals is crucial, as it serves the dual purpose of mitigating discomfort and facilitating prompt mobilization, which reduces the likelihood of adverse

outcomes such as delirium and extended hospital stays. Nevertheless, the management of pain in older adults is a complex matter as it is influenced by age-related changes in drug metabolism, the existence of multiple simultaneous medical diseases and the heightened susceptibility to potential drug interactions.[65]

Paracetamol is frequently regarded as the primary choice for pain management in older individuals owing to its comparatively favorable safety profile. However, it is imperative for doctors to maintain a state of constant awareness regarding the possibility of hepatotoxicity, particularly in those with pre-existing liver conditions or those who are administered high doses of medication.[66]

Non-steroidal anti-inflammatory drugs (NSAIDs) are a group of drugs often used to treat a variety of medical ailments, including pain relief and inflammation reduction. Despite this, a major implication of NSAID use is that of impaired bone healing. There are contrasting literature findings including several meta-nalyses suggesting an impairment of osteogenesis and increased chances of delayed or non-union, so the regular use of NSAIDs is not recommended.[67-71]

Opioids, despite being beneficial, carry side effects including constipation, respiratory depression, and risk of falls. Opioids should only be used temporarily, starting with the lowest dose and up-titrating, if necessary, frequently assessing for toxicity.[68]

Peripheral nerve blocks can be particularly beneficial for pain or specific pain syndromes.[69] Nerve blocks can be used as an alternative to, or in conjunction with, systemic analgesics. In comparison to NSAIDs or opioids, they frequently have fewer systemic side effects and provide localized pain relief.[70] In the United Kingdom (UK), the National Institute for Care and Health Excellence, in recent guidelines (2023), recommends the fascia iliac block to be offered in the emergency department.[71]

Bone health

In the countries where orthogeriatric care is available, orthogeriatricians are the promoters of secondary prevention for fragility fractures using the local and national guidelines for osteoporosis.[72] The prevention and treatment of osteoporosis is a vast argument and beyond the scope of this review. However, it is important to point out that in a meta-analysis, Van Camp *et al*[73] demonstrate that "orthogeriatric care is associated with higher rates of diagnosing osteoporosis, initiation of calcium and vitamin D supplements and anti-osteoporosis medication".

The benefits of orthogeriatric care

It has been proven, across multiple national healthcare systems, that the established collaboration between orthopedic surgeons and geriatricians improves patient outcomes.

Studies regarding the benefits surrounding reductions of postoperative complications when orthogeriatric care was involved showed the risk of delirium drop by 19%, as well as a decrease in risk of in-hospital and one-year mortality by 14% and 28%, respectively.[74,75] A further review collated and analyzed data on length-of-stay as well as in-hospital and long-term mortality for orthogeriatric models and hip fracture patients, whilst another study found use of nerve blocks prior to admission also reduced time spent in hospital [OR 1.07 (1.03, 1.11)].[64,75] This showed that orthogeriatric care, particularly that of the shared-care model (where the care of the patient is equally shared between the orthopedic surgeon and the orthogeriatrician), had a significant impact on the reduction of each of these factors.[76] Shared-care models saw a significant reduction in length of stay, from 27.5 to 21 days and 22% in 30-day mortality, following control for factors such as age, sex, American Society for Anesthesiology grade, and Abbreviated Mental Test score.[76]

A review of patients on the Danish Multidisciplinary Hip Fracture Registry[77] pooled data of over 11 000 patients aged 65 or over, assessing six process performance measures, 30-day mortality, length of stay, and time to surgery across orthogeriatric and standard orthopedic wards. It found that those cared for by orthogeriatric specialists experienced a reduction in 30-day mortality (adjusted odds ratio 0.69; 95% CI 0.54 - 0.88) while the length of stay and time to surgery remained similar (adjusted relative time of 1.18 and 1.06, respectively).

The national hip fracture database has shown great improvements in mortality across the UK, from 10.9% to 6.7% between 2007 to 2016 respectively.[78,79] This is related to the presence of geriatricians in the orthopedic wards and the promotion of time to theatre within 36 hours from the admission. From this, it can be concluded that there is strong evidence to support the role of orthogeriatric care, particularly the shared-care model.[80-82]

It could be argued that the overall reduction in postoperative complications decreases strain on healthcare services, reducing costs incurred with prolonged stays and medicines to treat complications. This would also serve to reduce stress and pressures placed on staff members, as a multidisciplinary approach encourages collaborative and well-supported care.[76-78] Regarding costs, direct medical expenses associated with hospitalization, surgical procedures, drugs, and rehabilitation services are extremely burdensome. The yearly cost for hip fractures in the UK was estimated at approximately £2 billion.[83] Financial Aspects of Orthogeriatric Post-Fracture Care are summarized in Table 3.

Table 3 – Summarising the financial aspects of orthogeriatric post-fracture care

Aspect	Details
Direct costs	Encompasses hospitalization, surgical procedures, medications, and rehabilitation.
Indirect costs	Covers lost productivity, caregiver time and resources, and potential home modifications or long-term care facilities.
Potential savings	Proactive geriatric assessments and interventions can reduce hospital readmissions and subsequent costs.
Financial challenges and solutions	Balancing quality of care with rising costs. Collaborative models and preventive measures like fall prevention can improve outcomes and reduce costs.

The use of collaborative shared-care models, which involve the joint management of patients by orthopedic surgeons and geriatricians, has demonstrated potential in enhancing patient outcomes and achieving cost savings.

Research has demonstrated that the use of early intervention strategies and complete geriatric evaluations can effectively decrease the rates of hospital readmissions, resulting in significant financial savings.[56,64]

CONCLUSION

Neck of femur fractures represent a dramatic moment for all patients. However, their subsequent management can be very challenging in the older population. There are proven associations with increased postoperative morbidity, the need for long-term care, and mortality. The care provided by an orthogeriatrician aims to prevent clinical complications such as infections and delirium and to assist with pain management, thus improving the overall care. As discussed, there is evidence that the outcomes for NOF patient drastically improve in the presence of an MDT including an orthogeriatrician.

Orthogeriatricians have the expertise to identify and manage geriatric syndromes as well as other clinical complications that may occur during the admission of a frail patient with a fracture. In countries where geriatric medicine is an integrated part of the healthcare, the collaboration between orthopedic doctors and geriatricians has produced an outstanding improvement in overall patient outcomes. We believe the presence of a geriatrician or a medical physician with expertise in the care of older adults is not only beneficial but should be considered the gold-standard.

Importantly, orthogeriatricians play a pivotal role in the prevention of falls and fragility fractures, whilst promoting appropriate rehabilitation, reducing multidisciplinary stress through providing thorough and ongoing medical support, and reducing the chances of multiple admissions, all whilst ultimately improving outcomes for the patient and their loved ones.

AUTHOR CONTRIBUTIONS

CS, YM: Writing and critical review of the article.

MHA, LM, MPP: Study conception and design, writing and critical review of the article.

All authors approved the final version to be published.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

MP is a member of the executive board of Fragility Fracture Network, Greece.

All other authors have declared that no competing interests exist.

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