Chronic pain in the elderly

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Abstract

Introduction
Chronic pain in the elderly is frequent, often under-recognised and undertreated, resulting in poor quality of life. Because of the ageing population in the developed world, it represents a growing problem, with substantial socioeconomic consequences. Apart from often being multi-factorial, its treatment is complicated by co-morbidities and increased susceptibility to medical side effects. Effective pain relief may require a multi-disciplinary approach and non-pharmacologic therapies. This review aims to address the critical aspects of the causes, recognition and treatment of chronic pain in the elderly.

Conclusion
The management of pain remains a challenge, and besides the administration of analgesics, may require a multidisciplinary approach and the application of non-pharmacological therapeutic interventions.

Introduction

Pain is defined as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’1. Pain is the outcome of complex interactions of sensory and cognitive mechanisms, initiated by potentially compromising thermal, chemical or mechanical stimuli5. The perception of pain is essential for survival, as demonstrated in patients with congenital or acquired disorders associated with diminished pain perception. These patients are unable to sense injuries originating from sharp objects, heat or visceral pathology, such as myocardial heart infarct, and fail to react appropriately even to life-threatening insults2.

Pain is described as chronic when it lasts longer than 3 or 6 months, or when it persists longer than the expected healing time and manifests without obvious residual underlying tissue pathology2,3. Chronic pain affects more than one third of the global population. Annual health care costs are estimated around 100 billion dollars solely for the United States4. Besides underlying somatic pathology, chronic pain may result from emotional, psychological and social distress. If left untreated, it may self-perpetuate, by suppressing immunity and thus predisposing the affected patient to future diseases, which may cause pain4. The aim of this review is to discuss the causes and treatment of chronic pain in the elderly.

Physiology of pain

The perception of pain is initiated by the stimulation of discrete peripheral nerve terminals, the nociceptors, which are excited by intense, potentially harmful, thermal, mechanical or chemical stimuli, thus allowing recognition and elective response to potentially harmful situations4.

Two main groups of nociceptors are identified. One involves medium diameter myelinated Aδ nerve fibres, which transmit the fast (initial), well-localised pain and the other involves unmyelinated C fibres, which transmit slow (delayed) pain, which results in a poorly localised, dull, burning sensation2. In the case of inflammatory tissue injury, C fibres are stimulated by products released after cell breakdown, such as potassium, prostaglandins and bradykinin and histocyte derivatives, such as serotonin2,5.

Pain sensation is transferred to the brain through the antero-lateral system. There is no specific cortical area responsible for the perception of pain. Rather, pain results from activation of a distributed group of structures, some of which are more associated with the sensory-discriminative properties and others with the emotional effects of pain. The brain appears to be significantly involved in the perception of pain, through direct enhancement or inhibition of painful stimuli at the spinal cord level6.

Pathophysiology of pain

Besides being the physiological protective result of receptor stimulation due to active or potential tissue injury, pain may be generated in pathological situations involving the peripheral or central nervous system (neuropathic pain)7. Neuropathic pain may be caused by nerve inflammation (e.g., temporal arteritis), mechanical injury imposed on nerves and their endings, tumour infiltration (e.g., brachial plexus neuropathy), lesions of brain or spinal centres of pain, pathological activity of neuronal circuits (e.g., ‘ghost limb syndrome’8), or even by immunological factors8. It may resemble somatic pain, and be felt like ‘dysesthesia’, i.e., an unpleasant burning or pricking sensation, which may become triggered automatically, or after challenge9, or manifest as reflexory pain, allodynia or hyperalgiesia9,10.

The intensity of pain perception may be amplified and its functional consequences multiplied by factors irrelevant to the severity of the initial tissue injury. Chronic pain may thus lead to excessive pain sensitivity, as a result of aberrant spinal nociceptive processing due to repetitive activation5,6. In a subgroup of
chronic patients, intense pain may also cause mood changes, such as reactive depression, anxiety or sleep disturbances, which, in turn, aggravate the perception of pain and the accompanying feeling of discomfort.

Discussion

Pathophysiology

Limited, and often conflicting results from relevant studies suggest an effect of age on the perception and processing of painful stimuli due to disturbances in the function of peripheral and central nervous system pathways.

Aged people appear to depend more on the C fibres for the perception of morbid stimuli. The number of myelinated and unmyelinated nerve fibres is reduced, compromising the transmission of stimuli. Visceral pain is often underestimated. Age appears to cause a retardation of cognitive processing of morbid stimuli in the central nervous system, and a diminished cortical response to them. These disorders could account for the reduced perception of pain, which has been reported in some studies in elderly populations, although their clinical significance is not clear.

Epidemiology

Pain is often encountered in the elderly; it affects up to 50% of the elderly in the community and up to 80% of elderly in nursing homes. 45.8% of elderly patients admitted in hospitals complain of pain, and in 19% of them, the pain is of significant intensity. The elderly suffer more often from chronic pain when compared to younger populations.

In the elderly, pain tends to be continuous, of moderate to severe intensity, prolonged duration, diffuse and multi-fatorial. Major causes include osteoarthritis, post-herpetic neuralgia, spinal canal stenosis, fibromyalgia, malignancies, pain secondary to cerebrovascular events, peripheral diabetic neuropathy etc. Moreover, there is an increased prevalence of atypical pain, due to decreased body reserves and interaction with other co-morbidities.

Elderly people tend to be less sensitive to harmful stimuli; this does not translate into a less intense sensation of pain. When elderly people complain of pain, this is usually secondary to a severer underlying pathology in comparison to younger people with pain of comparable intensity.

Pain and quality of life

Pain markedly affects the quality of life, being associated with depression, anxiety, sleep disturbances, anorexia, weight, reduction in cognitive function and restraint in daily activities. Elderly people with chronic pain appreciate their health less and appeal to health services more often than those without.

Evaluation

The most reliable evidence of pain existence is the patient’s reference. Medical and nursing staff are expected to consider all reports of pain. Even patients with mild or moderate cognitive dysfunction may be evaluated with simple questionnaires or diagnostic screening tools. A simple verbal pain intensity scale from 0 to 10 in most cases is the initial evaluative tool. For patients with difficulty to comprehend and respond to this form of evaluation, alternative visual analogue scales (pain thermometers, expressive faces) may be employed.

Patients with moderate or severe dysphasia or dementia are assessed indirectly through their caregivers. In this case, painful expressions during passive or active mobilisation or unusual behaviours are evaluated accordingly.

Elderly people may fail or avoid mentioning pain, due to dementia, patient-unfriendly pain questionnaires or misled concepts of pain and its management. Thus, pain may be concealed due to fear of anticipated arduous investigations, or it may be stoically endured as a normal consequence of advanced age, or due to an unrealistic assumption of unavailability of effective treatment.

After the initial assessment of pain, an analytical history and physical examination should follow, focusing on the time course of events that led to this condition and the co-morbidities of the patient, in order to establish a working diagnosis, plan the appropriate management and assess the prognosis.

Management

Any chronic pain, affecting the physical activities and the psychosocial functionality of the afflicted patient, should be regarded as a significant health problem. However, despite its higher prevalence in elderly people, most therapeutic studies involve younger patients. Furthermore, the effect of age on efficacy is rarely taken into consideration, and there is paucity of scientific data firmly establishing therapeutic management of chronic pain in the elderly. The multiple co-morbidities of elderly people, such as renal or hepatic impairment, malnutrition and central nervous system pathology, often narrow the treatment options with analgesics, due to increased risk of drug side effects and interactions. Analgesics are more efficient when combined with non-pharmacological therapeutic procedures, such as physiotherapy, psychological treatment, social interventions and complementary therapies.

Pharmacological management of chronic pain

Pharmacological management is the most common treatment of pain in the elderly. Its efficacy is maximised with thorough knowledge of pharmacology of the administered agents, as well as regular reassessment of the patients. Differences in efficacy and safety of the drugs are often recorded, therefore treatment should be individualised. Dose adjustment should refer to subjective and objective clinical responses.
objective treatment targets. Patients with severe pain need faster escalation of treatment and occasionally hospitalisation for monitoring of clinical and laboratory parameters (hydration, electrolyte disturbances, serum albumin levels, renal and liver function etc.)."\(^7,13\)

Even though elderly people are more vulnerable to side effects, analgesics may be used in patients of this age group with safety and efficacy. Age progression increases sensitivity to centrally acting drugs, including opioids. Therefore, age-related differences of efficacy and toxicity are expected. Treatment should be initiated with the lowest anticipated effective dose, and the dose should be gradually increased to achieve steady blood levels and desired effects. This procedure may last anything from a couple of days to a week depending on the drug half-life\(^7,13\).

If the pain is not very intense, the physician may initially administer the least potent, safest, yet effective drug. In most cases, there is a gradual escalation of treatment, starting with non-opioid analgesics, like paracetamol, moving then to Nonsteroidal anti-inflammatory drugs (NSAIDs), mainly COX-2 inhibitors, and finally employing opioids. Because of their pathophysiology, most neuropathic pain conditions may respond to non-opioid analgesics, such as antiepileptics\(^6,7,14\).

**Non-opioid analgesics**

Most patients with mild or moderate pain respond to 24-hour coverage with paracetamol. The maximum dose in patients with normal liver and renal function, and without a history of alcohol abuse, is 4 g daily\(^13\). Otherwise, the dose should be reduced by 50 or 75%, or alternative treatment should be considered\(^7\).

If paracetamol does not suffice, one should consider the use of NSAIDs, provided the patient does not suffer from active peptic ulcer disease, chronic kidney disease or heart failure\(^13\). It should also be taken into consideration that the patient may already be on aspirin for cardiovascular prophylaxis, or on corticosteroids for immunosuppression, and that NSAIDs may exacerbate treated hypertension and Chronic Obstructive Pulmonary Disease\(^13\). In the elderly, non-selective NSAIDs are associated with a high incidence of gastrointestinal bleeding; the incidence may be reduced with the use of protein pump inhibitors, but their long-term use should probably be avoided. Selective COX inhibitors may appear safer. However, their interaction with other medications, as well as their effect on other co-morbidities (cardiovascular, renal, liver and respiratory) remains a concern, and their safety in terms of chronic use, may be less than that of opioids\(^7\).

**Opioid analgesics**

The use of opioid analgesics in the management of chronic pain is gradually becoming more accepted in clinical practices. Addiction may be expected, but can be overcome with the gradual withdrawal in a time frame of days or weeks, when the cause for their administration is no longer present. True addiction in elderly people with chronic pain is rare, when compared to the prevalence of un- or undertreated pain. If insufficient compliance is recorded, the physician has to make sure that this does not reflect inadequate control of pain. Clinical studies have shown that tolerance to opioids manifests late, provided that the clinical condition remains stable. Therefore, any change in patient demands should be accompanied by clinical re-evaluation for a possible exacerbation of the underlying morbidity. Concerns regarding the development of addiction should not undermine efforts for effective treatment\(^7\).

Follow-up for side effects of opioid use involves monitoring for neurological or gastrointestinal manifestations and changes in cognitive function and behaviour (constipation, flatulence, nausea, walking disturbances – ataxia, vertigo, falls, sedation and attention/focus disorders). Life-threatening side effects such as the development of myoclonus, lethargy or delirium, hypoxia or respiratory suppression are rare, especially when dosage is gradually increased\(^7\).

**Adjuvant therapies**

Several drugs, initially applied for other indications, have been shown to exhibit analgesic effects. These may be used alone or in combination with non-opioids and opioids, especially in neuropathic pain. They provide analgesia through interactions with membrane receptors or ion channels, or through modulation of transmitter concentrations in the synapses. Older tricyclic antidepressants have proved effective as analgesics. In the elderly, they can however be associated with severe side effects, such as cardiac arrhythmias. Newer antidepressants, e.g., serotonin re-uptake inhibitors are safer, but not as effective in pain management. Gabapentin, pregabalin and other antiepileptics with fewer associated side effects, may represent safer alternatives\(^2,13,15\).

**Non-pharmacological management**

Several non-pharmacological therapeutic strategies are effective alone or in combination with analgesics. Interventions, such as patient education, safe exercise and the use of techniques for self-support should be employed\(^7\).

Educational programs, especially involving techniques of self-support contribute significantly to the management of pain. They provide useful insights about the nature and causes of pain, available pain assessment tools and non-pharmaceutical strategies of pain management.

The application of cognitive and behavioural techniques contributes to the management of chronic pain.
(techniques of attention distraction, meditation, pain acceptance and psychological rejection of disability and ideas of self-destruction, which may augment the discomfort inflicted by pain). Behavioural practices may help the patient manage pain, and organise his/her activities in a pleasant and relaxing fashion. Participation in therapeutic exercise programs, including stretching, strengthening and stabilising exercises, may help decrease pain and improve physical condition and mobility. Some patients may benefit from alternative forms of medicine, such as acupuncture16, herbal medicine17,18, chiropractic medicine19 etc. Finally, interventional modalities including nerve blocks, chemical or cryo-neurolysis, radiofrequency lesioning and neuroaxial drug delivery, may relieve selected patients13.

### Conclusion

Pain is a frequent and significant health problem in aged people. It is usually multi-factorial, under-recognised and undertreated, severely affecting quality of life. Its management remains a challenge, and besides the administration of analgesics, may require a multidisciplinary approach and the application of non-pharmaceutical therapeutic interventions.

### References