Supplementary Online Content

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eAppendix. Search Strategy

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Search Strategy

Search 1: We specifically sought to identify studies of commonly administered pharmacologic and non-pharmacologic treatments that reported results relevant in the care of older adults. Findings from this review are reported in the text of the article in print.

Search Strategy: We searched MEDLINE and the Cochrane database from January 1, 1990 through May 31, 2014 using the terms *aged, older adults, elderly, chronic pain, persistent pain, pain management, intractable pain and refractory pain*. We limited the search to articles involving humans, those published in English, and to studies with a mean sample age of 60 years or greater or ones that reported age stratified results (i.e., for groups with a mean age above 60 years). Given the relative paucity of randomized controlled trials focusing on older adults with persistent pain, we also reviewed systematic reviews, published guidelines, and consensus statements.

MEDLINE Search Results:

1. Aged (MESH Term) (2310314 articles)

2. Term "older adults" appeared in citation title (13937 articles)

3. Term "older adults" appeared in citation abstract (26555 articles)

4. Term "elderly" appeared in citation title (76752 articles)

5. Term "elderly" appeared in citation abstract (129625 articles)

6. 1 or 2 or 3 or 4 or 5 (2342334 articles)

7. Chronic pain (MESH term) (3260 articles)

8. Pain management (MESH term) (17024 articles)

9. Intractable pain (MESH term) (5513 articles)

10. Term "refractory pain" appeared in abstract (255 articles)

11. Term "persistent pain" appeared in abstract (2735 articles)

12. 7 or 8 or 9 or 10 or 11 (27836 articles)

13. 6 and 12 (6153 articles)

14. Limit search to articles published from 1/1/1990 through 5/31/2014 (4920 articles)

15. Limit search to English language and humans (4325 articles)

16. Exclude duplicates (4283 articles)

17. Excluded based on review of the abstract or full manuscript.

- Qualitative study (95)
- Focus on cancer pain or pain at the end-of-life (695)
- Epidemiologic study (669)
- Focus on pain at time of (or after) surgery including anesthesia studies (567)
- Interventional approaches to pain reduction (eg, nerve blocks, nerve stimulation) (493)
- Focus on specific pain states (eg, dental pain, burn pain, rectal pain, facial pain) (324)
- Health services research (210)
- Non-systematic reviews (153)
- Case reports (119)

−Focus on pain measurement to include pain assessment and instrument development (189)

−Basic pain research (154)

−Treatment study but with sample mean age less than 60 years (163)

−Focus on provider attitudes/beliefs or targeted educational intervention (64)

−Focus on use of imaging to diagnose and/or treat pain (96)

−Pain not focus of study (65)

−Focus on acute pain (83)

−Specific pain treatment focus (eg, botulinum toxin, laser therapy, ketamine, shock waves) (43)

−Did not report pain outcomes (20)

18. Number of articles following above reasons for exclusion (81)

19. Additional eligible publications found by review of Cochrane Database and search of reference lists (11)

20. Total number of articles included in review (92 articles)

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Persistent pain is common and frequently disabling in later life. It is most often due to musculoskeletal causes, usually involves multiple sites and rarely occurs in the absence of other medical conditions. Untreated or undertreated pain can lead to poor quality of life,

disability, depression, decreased socialization, as well as falls, and impaired sleep. Older patients who report experiencing pain should be routinely assessed for its impact on quality of life, mood and functioning.

As a first step, the physician and the patient should reach an agreement regarding realistic goals and expectations and where they overlap and diverge. For example, reduction in pain severity or frequency, improvement in activities of daily living, and maintenance of the patient's independence are likely to be agreed-upon goals. To remain realistic and relevant, goals often have to be refined at various points throughout the course of treatment.

Physician-patient agreement on specific therapeutic approaches is also necessary. Since later-life pain is often caused by multiple factors and conditions, the combination of drug and non-drug therapies is strongly recommended. Non-drug therapies may be used to relieve the emotional and cognitive burdens of persistent pain; these include supportive psychotherapy, cognitive behavioral psychotherapy, or problem-solving therapy. Rehabilitation therapies (eg, exercises supervised by a physical therapist or physical activity at home to improve strength) constitute critically important components of the management plan. If appropriate, home health aides and family members may also help the patient to keep up with exercises between therapy sessions. Increasing opportunities for social interaction and distraction from the pain itself are other non-drug approaches that should be strongly considered.

In combination with non-drug approaches, developing a medication regimen that is tolerable and effective is critical. Often the pharmacologic regimen involves a combination of drugs, introduced in a step-wise manner, starting with acetaminophen, then non-steroidal anti-inflammatory agents (NSAIDs), tramadol and opioids. However, bleeding and gastrointestinal side effects are not uncommon with NSAIDs; and fatigue, dizziness,

confusion, and falls can occur with opioid treatment. Antidepressants when added to the regimen may not only improve mood, sleep and energy but can also provide additional analgesic relief, as can anti-epileptic and mood-stabilizing drugs. Having a "rescue" medication for when the pain becomes especially intense or difficult to bear, is an important component of the overall pharmacologic strategy. The patient should understand, even if he or she is skeptical, that analgesic medications that were ineffective in the past, may be helpful now when employed in combination with other drugs or therapies.

At the heart of any successful long-term management plan is a positive doctor-patient relationship. The physician must be accessible, informed, and able to communicate with the patient about the various drug and non-drug therapies, and their risks and potential benefits. In turn, the patient should adhere to agreed-upon therapies and communicate outcomes and tolerability. Cultivating an enduring, trusting relationship, where mutual treatment goals are established, may be one of the most rewarding aspects of delivering (for the physician) and receiving (for the patient) pain care over time.