Table S1: Data Extraction and Synthesis Sheet

No.	Author(s)/ Year/ Setting	Study aims/ methods	Findings	Codes	Concepts
1	Davidge & Fish, 2008	Review	Optimizing pain control can also be exceptionally difficult due to poor tolerance of narcotics among older adults, and their susceptibility for delirium and oversedation. On occasion, providing appropriate pain relief may necessitate mechanical ventilation. Our centre uses fentanyl as the metabolites are less and it spares the cardiovascular system.	**Use of fentanyl (Pharmacological pain management)**	**Strategies employed in managing geriatric burn pain**
2	Hutchison et al., 2021 USA	To retrospectively characterize pain management strategies (including opioids and non-opioid adjuncts) in this patient population. A retrospective cohort of patients age >65 with burns < 20% total body surface area (TBSA) admitted to the burn stepdown unit from 2014 to 2019. The primary outcome was to quantify opioid use inpatient and at discharge in morphine milligram equivalents (MME). Secondary outcomes included percent of patients receiving opioids and	One hundred elderly patients (mean age 73.9, SD 6.7) with mean TBSA of 5.6% (SD 4.5) were included. Fifty two percent required autografting; the remainder received porcine or non-operative therapy. Mean daily inpatient MME was 18.0 (SD 20.8) and mean discharge MME was 28.0 (SD 20.5) (p=.001), equivalent to 12mg and 18.5mg of oral oxycodone. Inpatient, 72% of patients received opioids vs. 83% at discharge (p=.041). Acetaminophen was the most commonly prescribed non-opioid adjunct inpatient and at discharge; other adjuncts like non-steroidal anti-inflammatories (NSAIDs) and gabanoids were infrequently used. Elderly burn patients are discharged with more opioids than utilized while inpatient. Aside from acetaminophen, non-opioid adjuncts used commonly in younger patients such as NSAIDs and gabanoid medications are under-utilized, presumably due to concern for comorbidities.	Opioids and acetaminophen more often used; NSAIDs and gabanoids less frequently used **(Pharmacological pain management)**	**Strategies employed in managing geriatric burn pain**

		adjunct analgesics at these timepoints.			
3	Pham 2012	Book chapter	Appropriate pain management in aging adults has been historically hampered by two contradictory, yet widely held beliefs: first, that pain perception decreases with age, and second, that chronic pain in geriatric patients is so prevalent that it is assumed to be part of "normal aging". Pain assessment and treatment are both challenging in this population. Multiple studies have established that the standard visual analog scale (VAS) has limited value in older patients. Instead, pain experts currently recommend using numeric rating scales (NRS), verbal description scales (VDS), or the McGill Pain Questionnaire. Observational scales become necessary when cognitive impairment or mechanical ventilation preclude self-reporting. Whether these tools can be validated for older burn patients or a new scale should be developed remains a topic for investigation. Burn providers are also appropriately cautious when using pharmacologic agents to relieve pain in older adults. The initial opioid analgesic dose for acute pain should be 25 – 50 % of that in younger adults and carefully titrated upwards to achieve comfort. rbiturates, benzodiazepines, and tricyclic antidepressants are other classes of agents that require caution in older patients because of decreased clearance and side effects. Pharmacists and geriatricians' expertise can contribute greatly to the multidisciplinary team in carefully titrating medications and minimizing of polypharmacy.	Barriers to burn pain management Lack of pain assessment tool specific to burned older adults	Key issues in managing pain in geriatric burns

4	Keck et al., 2009	Review	There is a risk for pain undertreatment in the elderly burn patient due to the simple misconception, that there is less pain with increasing age. The applied dose of pain medication should carefully be adapted to co-morbidities and diminished function of the renal, pulmonary and cardiovascular system. As an example, elderly patients more likely suffer from preexisting renal insufficiency the use of COX-2 selective inhibitors must be carefully considered. Similarly, acetaminophen might increase the risk of liver failure in patients with preexisting liver diseases.	Barriers to burn pain management	Key issues in managing pain in geriatric burns
5	Abu-Sittah et al., 2016	Review	Pain control in the elderly is often inadequate following burn injuries, and the premise that there is less pain with increasing age is baseless. Undertreated post-operative pain in the elderly is worrisome given its predisposition for delirium. Nevertheless, the regimen should carefully take into consideration the patient's comorbidities, and renal, pulmonary, as well as cardiovascular functions.	Barriers to burn pain management	Key issues in managing pain in geriatric burns
6	Sheaffer, 2017	Book chapter	The presence of pain in the burn setting is inevitable and will be the chief complaint of any patient presenting with first- or second-degree burns unless the patient has underlying neuropathy or deeper burns owing to underlying nerve damage. Pain can be a useful assessment tool for helping to ascertain burn depth. Treatment of acute burn pain is done with judicious use of narcotics. The patient ideally can complete a competent neurological exam and tolerate care with sedation.	Judicious use of opioids	Strategies

7	Norman & Judkins, 2004	Review	NSAIDs should be used with caution in the shocked patient or the elderly.	Cautious use of NSAIDS	Strategies
8	Faucher et al., 2006	Practice guidelines	Normeperidine results from hepatic demethylation and has an extremely prolonged elimination half-time. Accumulation of normeperidine may occur after multiple doses and is associated with seizures, confusion, and myoclonus. Repetitive administration, and use in children, elderly adults, or patients with renal failure is contraindicated.	Avoid use of meperidine in older adults with renal failure	Strategies
9	Connor-Ballard, 2009	Review	In frail or elderly adult patients, use incremental doses of midazolam 0.5 mg and fentanyl 25 micrograms. Both drugs should be given by slow push over one to two minutes to avoid respiratory depression. But whenever conscious sedation is induced, an RN certified and experienced in the safe IV administration of these agents should be present; also necessary are monitoring equipment (such as telemetry and continuous pulse oximetry), oxygen, and anesthesia and respiratory therapy personnel in the event of emergency.	Incremental use of midazolam and fentanyl (non-pharmacological pain management) Monitoring	Strategies Key issues in managing pain in geriatric burns
10	Huang et al., 2008	Review	Pain control is often a forgotten topic in the management of burn wound care. In consideration of the elevation of deleterious catecholamine levels associated with pain, it is paramount to provide adequate and proper pain control and/or sedation. The geriatric burn patient is often undertreated for pain. The most likely reasons may be due to the prevalent misconception of having less pain with age and the consideration of decreased clearance of prescribed analgesics by clinicians.	Undertreatment of pain	Key issues in managing pain in geriatric burns

11	Honari et al., 1997 USA	To assess the range of requirement and use of opioids among elderly patients with burns of different age categories Retrospective review of 89 consecutive admissions of patients over 55 years of age Individuals were divided into three age categories: Group I (55 to 65) $n = 20$; Group II (66 to 75) $n = 14$; and Group III (76 to 92) $n = 10$.	Pain medications administered to the elderly patients with burns included hydromorphone (orally vs IV), fentanyl (IV), and oxycodone (oral). The nurses administered a dose within the range ordered for PRN or procedural pain (dressing change) based on their assessment of the patient's level of pain. Use of commonly prescribed opioids for procedural pain and breakthrough pain were evaluated. We compared the opioid equivalents of medications prescribed versus the actual amount administered. Paired t tests comparing minimum amount of medication ordered with that given revealed Group I patients received significantly more procedural medication than the minimum prescribed ($t = 3.88$, $p = 0.001$), and that Group III patients were given significantly less as needed medication than the minimum prescribed ($t = 2.58$, $p < 0.05$).	Pharmacological pain management	Key issues in managing pain in geriatric burns
12	Nosanov et al., 2020	Review	Management may be complicated by cognitive impairment or difficulty with communication which may limit the utility of many pain assessment tools and scales. Concern for oversedation and generalized lack of comfort in managing pain in this population contribute to the tendency of providers to undertreat pain in the elderly. The additional input from consultants in Geriatric Medicine can be invaluable in providing a balanced approach to this special population.	Barriers to burn pain management	Key issues in managing pain in geriatric burns
13	Sheridan, 2007	Review	An additional consideration in the elderly is their response to medications. The compromised renal function associated with age may slow the metabolism of commonly used narcotics. Elders	Barriers to burn pain management	Key issues in managing pain in geriatric burns

			also may have difficulty in expressing pain, making the treatment of pain and anxiety problematic. Elderly patients are often taking powerful pharmacologic agents when they are injured. Beta-blockers are particularly common and can mask tachycardia as a sign of volume depletion or pain. In addition, the elderly may have occult renal disease, making them more susceptible to nephrotoxic drug effects.		
14	Askay at al., 2009	Review	Intravenous or oral ketamine is commonly used for procedures requiring deep sedation in large part due to its rapid onset of action and short duration of action due to rapid redistribution. However, ketamine use is limited by the potential risk of associated emergence delirium reactions, particularly in the elderly.	Ketamine (PO/IV); Pharmacological pain management	Strategies
15	Summer et al., 2007	Review	A large thermometer-like numeric rating scale designed with white numbers (0 to 10) on a crimson background. Whereas this and other assessment tools can be used in adults and elderly patients (eg, faces) no pain assessment tool has been validated for use among elderly burn-injured patients. This may be, in part, because pain in older burn-injured patients is only beginning to be described. Research in other patient populations has demonstrated that the verbal descriptor scale is best for measuring pain in older adults, including those with mild to moderate cognitive impairment	Pain assessment tools	Strategies
16	Montgomery, 2004	Review	Ketamine IV or intramuscularly has been used as a safe and effective means to produce analgesia and sedation during burn wound care It produces a state of dissociative anesthesia–light anesthesia with profound analgesia. Certain features make it	Pharmacological pain management	Key issues in managing pain in geriatric burns

			useful for providing sedation and analgesia in trauma care: the airway tends to be preserved, respiration is not depressed, and cardiac output and blood pressure are maintained. The cardiovascular maintaining effects during nonemergent procedural care, however, can lead to adverse effects of increased heart rate, arterial blood pressure, and cardiac output. Other disadvantages of ketamine are increased salivation, nausea, hallucinations, and emergence of delirium reactions. The elderly is at more risk for delirium reactions (5%–30%). The concomitant use of midazolam can prevent these reactions but may cause respiratory and cardiac suppression. Ketamine has a rapid onset (1–3 minutes) and peak (5 minutes) and short duration (15 minutes). Subanesthetic doses are 0.5 to 1 mg/kg IV boluses every 10 to 15 minutes.		