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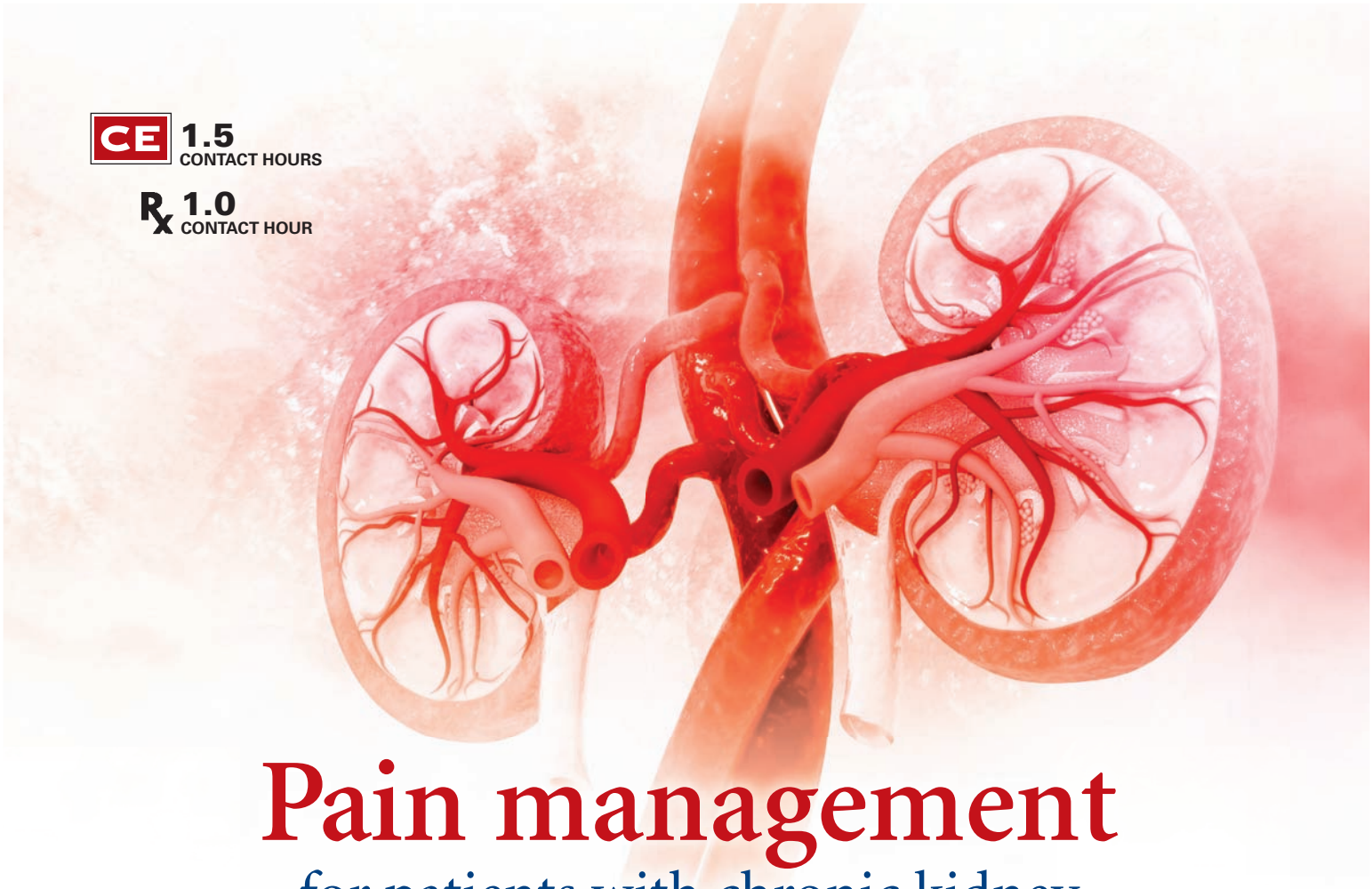
Rx 1.0 CONTACT HOUR



Pain management

for patients with chronic kidney disease in the primary care setting

Abstract: Pain is routinely reported in patients with chronic kidney disease. Pain is often multifaceted, making the treatment of this complex patient population even more challenging. Understanding pain types as well as treatment options for this patient population is an important skillset for the primary care provider.

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Pain is routinely reported by patients with chronic kidney disease (CKD) and end-stage renal disease (ESRD). In fact, 60% to 90% of individuals with CKD receiving renal replacement therapy (RRT), such as hemodialysis and peritoneal dialysis (PD), experience pain.[1-3] Of these patients, up to 75% describe their pain regimens as inadequate.[2] Sequelae of insufficiently managed pain include decreased quality of life and satisfaction, decreased dialysis compliance, psychological disturbances, and increased hospitalizations.[4,5] Managing the complexities of the kidney patient population is challenging, making the treatment of pain within this subset of patients an even bigger obstacle for providers.

Although appropriate management of pain in patients with CKD often requires a multidisciplinary approach, the primary care provider is usually responsible for initiating this process. The Department of Health and Human Services identifies the primary care provider as the hub of pain assessment and treatment in the US, yet a lack of consensus exists among guidelines for providers treating pain in CKD patients.[6]

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Keywords: chronic kidney disease, CKD, end-stage renal disease, neuropathic pain, nociceptive pain, nonsteroidal anti-inflammatory drugs, opioids, PQRST pain assessment tool

Given the ubiquity of chronic pain in patients with CKD, there is a definitive need for primary care providers to familiarize themselves with the most recent literature in order to make sound judgments pertaining to pain management for their patients. This article aims to improve the primary care provider's understanding of pain in the patient population with CKD/ESRD by providing an overview of basic pain concepts, terminology, treatment modalities, and special considerations related to medication dosing. Emerging therapies, including cannabis, are briefly discussed.

Pain defined

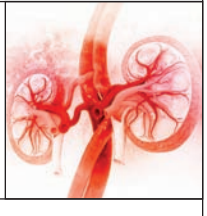
Pain is experienced when noxious stimuli activate peripheral and/or central nociceptors.[3] The physiologic purpose of pain is to signal actual or impending tissue injury.[7] There are two major types of pain: acute and chronic. Acute pain typically lasts between 7 and 30 days or until the original insult has healed. Acute pain occurs due to actual tissue damage or trauma and responds well to pharmacotherapy. Chronic pain persists for longer than 3 months, beyond the healing of the original trauma. Chronic pain is caused by the persistent activation of nociceptors from prolonged tissue injury or inflammation, a lesion or disease of the somatosensory system, or idiopathic causes. Chronic pain responds well to multimodal therapies, involving both pharmacologic and nonpharmacologic treatments. These pain types can be delineated further based on additional characteristics pertaining to their chronicity and neurobiology.[8] Acute pain can be either somatic or visceral. Somatic pain results from trauma in a well-localized area and is transmitted via somatosensory neurons, whereas visceral pain is diffuse pain resulting from the distension of hollow viscera or organs and is transmitted by sympathetic fibers.[3,9] Because acute pain is usually attenuated easily with pharmacologic agents, it must be identified promptly and treated appropriately.

When acute pain is inadequately managed, the substances released in response to tissue damage can sensitize nerves involved in the acute pain process.[3,7,10,11] These substances include, but are not limited to, vasoactive peptides (substance P and neurokinin A) and mediators (prostaglandin E2, serotonin, and epinephrine).[3] Normally these pain-potentiating substances elicit protective reflexes, such as splinting, needed to limit more tissue damage.[3] When these substances sensitize nerves, chronic pain can subsequently develop. Sensitization can, in part, be avoided by dampening pain transmission at various points along the pain pathway.

Attenuation of acute pain can be achieved in multiple ways. The body modulates pain transmission via the release of endogenous neurohormonal transmitters that bind to pain-reducing receptors, such as the mu, kappa, delta, and N-methyl-D-aspartate receptors.[3] These same receptors are the binding sites for synthetic opioids, antidepressants, antiepileptic drugs, and other anesthetic agents.[3,7,12] Hypoalgesia, or reduction in perceived pain intensity, can also be achieved through alternative therapies that result in the release of endogenous opioids.[3,6,13-16]

Inadequately managed acute pain can become chronic and a biologic process unto itself.[11] Chronic pain is pathologic and serves no protective biologic purpose. It can be categorized as nociceptive, neuropathic, or nonneuropathic.[12] *Chronic nociceptive pain* results from ongoing tissue injury because of continued activity of peripheral pain neurons after healing has occurred.[12] An example of chronic nociceptive pain is the pain associated with osteoarthritis. *Chronic neuropathic pain* results from anomalous functionality of the nervous system, a consequence of damage to the nervous system itself.[3,12] The final type of chronic pain is *nonneuropathic pain*. This type of chronic pain is experienced in the absence of any obvious nervous tissue damage.[3] Examples of chronic neuropathic pain and chronic nonneuropathic pain are painful diabetic peripheral neuropathy and phantom limb pain, respectively.[3,12] These two types of pain are of particular importance to the provider caring for patients with CKD.

Assessment tools such as the "PQRST" line of questioning can aid in obtaining a complete pain history.



Origins of pain in CKD

Like the underlying disease processes present in CKD, the pain experienced by kidney patients is multifaceted. (See *CKD pain origins*.) Etiologies of pain in patients with CKD can be either straightforward or

complicated to diagnose. Symptoms can range from the pain experienced as a direct result of an underlying kidney disease process, such as autosomal dominant polycystic kidney disease, to the sequelae of pain associated with underlying systemic and comorbid diseases such as diabetes, peripheral vascular disease, and various musculoskeletal processes.[18] Pain may also be experienced as a direct result of the actual hemodialysis or PD procedure. It is important to remember a triad of diagnoses that often overlap in patients experiencing pain: anxiety, depression, and insomnia.[17] These conditions further feed into a cycle of challenges that coincide with treating pain manifesting in this subset of the chronic pain population.

CKD pain origins[17-19]

Pain origin	Examples
Dialysis-related	• AV fistula/graft surgical creation; needle-stick cannulation of hemodialysis AV access • instillation of PD fluid/PD-associated peritonitis, low back pain • headache • muscle cramping from dialysis ultrafiltration • pruritus • chest pain associated with intradialytic hypotension • infected dialysis catheter • dyspnea
ESRD pathology	• limb ischemia secondary to dialysis access/steal syndrome • calciphylaxis • renal osteodystrophy (bone pain) • dialysis-related amyloid arthropathy
Underlying disease process	• diabetic peripheral neuropathy • vascular peripheral neuropathy • autosomal dominant polycystic kidney disease • malignancy • phantom limb pain • amyloidosis • dermatologic conditions
Pain unrelated to ESRD	• osteoarthritis • malignancy • sciatica • migraines • gout • fibromyalgia • postviral neuralgia • restless leg syndrome • carpal tunnel syndrome

PQRST pain assessment tool[4,5,17]

P	What makes you hurt (Precipitating factors)?
Q	How intense is the pain (Quality)?
R	Is the pain referred (Radiates)?
S	How bad is the pain (Severity)? Where is the pain (Site)?
T	When does the pain occur (Timing)?

Pain assessments and screening tools

Tailoring an appropriate pain regimen for the patient with CKD begins with a thorough assessment of the patient's pain history. This assessment should bring forth symptomology pertaining to three major attributes of pain: intensity, chronicity, and type.[4] Even for the experienced provider, obtaining information specific to these three definers of pain can prove challenging, so use of assessment tools such as the "PQRST" line of questioning can aid in obtaining a complete pain history.[4,5,17] (See *PQRST pain assessment tool.*)

Additional pain and symptom assessment tools include the Edmonton Symptom Assessment System Revised: Renal (ESAS-r:Renal), Physical Symptom Distress Scale (PSDS), Palliative Care Outcome Scale-Renal (POS-S Renal), Dialysis Symptom Index (DSI), Brief Pain Inventory (BPI), and the Kidney Dialysis Quality of Life Short Form (KDQOL-SF).[18] Information obtained when employing any or a combination of the aforementioned assessment tools can help guide the treatment regimen chosen for each patient. For instance, symptomology elicited from the "Q" in the "PQRST" assessment tool will aid the provider in making the distinction between nociceptive and neuropathic pain. Patients will use terms such as aching, dull, throbbing, or sharp when describing nociceptive pain, whereas qualifiers such as burning, stabbing, numb, or tingling are used to describe neuropathic pain.[4,12,20] Successfully distinguishing between these two pain types will assist in selection of the appropriate pharmacologic agent for treatment. For example, opioids are rarely able to temper neuropathic pain; however, an opioid would be an appropriate choice for nociceptive pain.[1-5,18,20]

While assessing pain, it is appropriate to screen patients for a history of addiction or aberrant behaviors.[5] These include patients identified by state prescription drug monitoring programs as receiving multiple prescriptions from different practitioners, self-adjusting of or misusing their medication regimens, requesting early refills, making multiple ED/urgent care visits all

Preferred medications in reduced kidney function

Medication	Normal kidney function	Recommended dose adjustments	CKD Stage 4 potential starting dose
Stage 1: Mild Pain (1-3)			
Acetaminophen	650 mg q 4–6 h prn	Can consider increasing dosing interval; Cl_{cr} 10–50 mL/min: every 6 h; Cl_{cr} <10 mL/min or dialysis: every 8 h; supplemental dose not needed in dialysis; maximum daily dose 4,000 mg	650 mg q 6 h prn
Stage 2: Moderate Pain (4-6)			
Oxycodone (short-acting)	10–30 mg q 4–6 h	Cl_{cr} 10–50 mL/min: give 75% of normal dose, consider longer dosing intervals, such as every 6 h; Cl_{cr} <15 mL/min not on dialysis: 2.5–5 mg q 8–12 h	5 mg PO q 4–6 h prn
Tramadol (short-acting)	50–100 mg q 4–6 h	eGFR 10–50 mL/min/1.73 m^2: 50–100 mg q 8–12 h; Cl_{cr} <30 mL/min: increase dosing interval to 12 h, maximum daily dose 200 mg; dialysis: maximum daily dose 50 mg q 12 h, dose after dialysis	25 mg q 12 h
Stage 3: Severe Pain (7-10)			
Hydromorphone (short-acting)	2–4 mg q 4–6 h prn	Cl_{cr} 30–50 mL/min: consider dose reduction; Cl_{cr} <30 mL/min: increase dosing interval	1 mg PO q 6 h prn
Fentanyl (long-acting)	Dose variable based on opioid equivalent dose of patient's oral medications	Cl_{cr} 10–50 mL/min: 75% of normal dose; Cl_{cr} <10 mL/min or dialysis: 50% of normal dose	12.5- to 25-mcg patch; should only be initiated in patients with chronic pain who have been on opioids prior; dose titration should not occur prior to 72 h after initial use; absorption is limited in patients with low muscle mass, cachexia
Methadone (short- or long-acting)	Referral		Referral

Abbreviations: mg = milligrams; q = every; h = hour; prn = as needed; Cl_{cr} = creatinine clearance; mL/min = milliliters per minute; mcg = microgram

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related to pain management, concurrently using illicit drugs or alcohol, or refusing to employ nonopioid/alternative therapies as first-line attempts to manage pain.[5,21] Practitioners may use assessment tools, such as the Screener and Opioid Assessment for Patients with Pain-Revised (SOAPP-R), to aid in the detection of aberrant behaviors.[4] If histories or behaviors are identified, referral to pain management specialists for further evaluation and management may be appropriate.

Thorough screenings will also identify patients who may benefit from referrals to specialists who may serve as the leader in their pain management. For instance, a palliative care referral to gain assistance with identifying goals of care and further advanced care planning is warranted in patients who continue to experience increased symptom burden despite their current pain management plan. Palliative care programs, while traditionally serving in only inpatient roles, are becoming increasingly available in the outpatient care setting. Palliative care referrals are appropriate at any stage of an underlying disease process and generally allow ongoing curative therapies, such as dialysis, to be continued. Referrals to hospice care, which focuses on relieving suffering rather than curative strategies, are generally indicated for patients with a prognosis carrying a life expectancy of 6 months or less. Hospice referrals may also allow for continued dialysis treatment, primarily if the hospice referral is for a condition other than ESRD.[22]

The assessment of pain, as well as the development and implementation of a pain management plan, routinely extends beyond the scope of a sole provider. Encouraging the development of interdisciplinary teams for ongoing open discussions and communication about patient management allows for optimal, safe, and effective pain control in patients with CKD.

Pain management

It is critical that providers set expectations and management realities with the patient before prescribing by identifying specific goals of care. It is important to discuss with patients that pain may not be completely resolved or controlled, with a 30% reduction in pain symptomology often being identified as the best degree of relief to be expected.[23] By setting realistic goals, such as helping a patient return to normal function level but perhaps not achieving total pain relief, treatment takes a different direction. Providers should review the potential for addiction to, and adverse reactions of, opioid pain medications and consider creating a pain contract prior to prescribing that class of pain medication.

Nonpharmacologic interventions should be attempted first to manage pain, if applicable, followed by nonopioid agents rather than opioids. This basic conceptual framework for the responsible management of pain is reflected in both the World Health Organization (WHO) and CDC guidelines.[3,24] It is advised to consult both sets of recommendations while devising an individual plan of care for each patient with CKD.

The WHO ladder for analgesic pain control, originally created for cancer pain treatment, has been validated for use in the CKD population.[1] The ladder follows a three-step approach in pain management.[5,18,25,26] (See *Preferred medications in reduced kidney function*.) Mild pain is generally treated in step 1 using nonopioid analgesics, such as acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs). Of note, the National Kidney Foundation promotes acetaminophen as the non-narcotic analgesic of choice in CKD.[5] Step 2 treats moderate pain with the addition of mild or weak opioids such as tramadol, low-dose oxycodone, and low-dose hydromorphone.[5,17,18,24] Step 3 initiates higher-dosed opioids, such as higher doses of oxycodone/hydromorphone, fentanyl, methadone, and buprenorphine for treatment of severe pain. Adjunctive medications, such as gabapentin, pregabalin, tricyclic antidepressants (TCAs), and serotonin norepinephrine reuptake inhibitors (SNRIs) can be added at any step of the ladder.[5,17,18,24] (See *Adjunctive medications for neuropathic pain*.)

When pharmacologic interventions for pain management are considered, it is best to understand the degree of residual renal function. NSAIDs are typically avoided in patients with CKD whose estimated glomerular filtration rate (eGFR) is less than 60 mL/min/1.73 m^2 (stage 3). A recent study by Möller and colleagues, however, proposed that long-term NSAID use is safe in patients with CKD stages 1–3. On the other hand, they did report a more rapid decline in renal function for patients with CKD stage 4 and 5 with concurrent NSAID use.[27] NSAID use has been associated with both renal and nonrenal complications. Toxicities include acute kidney injury by way of acute interstitial nephritis, vasoconstriction, and acute tubular necrosis thus leading to progression of existing CKD with ongoing

Adjunctive medications for neuropathic pain

Preferred agents	Maximum dosing recommendations	Potential starting dose
Gabapentin	eGFR 50–70 mL/min/1.73 m^2: 600 mg 3x/d; eGFR 30–49 mL/min/1.73 m^2: 300 mg 3x/d; eGFR 15–29 mL/min/1.73 m^2: 300 mg 2x/d; eGFR <15 mL/min/1.73 m^2: 300 mg daily, dose after dialysis	CKD stage 5: 100 mg every other night; dialysis: 100 mg postdialysis; titration can occur weekly while monitoring for adverse reactions
Pregabalin	eGFR >30 mL/min/1.73 m^2: 150 mg 2x/d; eGFR 15–30 mL/min/1.73 m^2: 150 mg every other day; eGFR <15 mL/min/1.73 m^2: 75 mg every other day, dose after dialysis	Cl_{cr} 30–60 mL/min: 75 mg daily; Cl_{cr} 15–30 mL/min: 25–50 mg; CKD stage 5: 25 mg every other night; dialysis: 25 mg postdialysis; titration can occur weekly while monitoring for adverse reactions

Abbreviations: eGFR = estimated glomerular filtration rate; mg = milligrams; d = day; CKD = chronic kidney disease; Cl_{cr} = creatinine clearance; mL/min = milliliters per minute

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use. Nonrenal adverse reactions include increased BP, decreased effectiveness of certain antihypertensives, and increased risk of gastrointestinal bleeding.[2] The adverse reactions of NSAID use in patients with ESRD on dialysis include increased BP, possible loss of residual renal function (if any remains), and risk of bleeding. For patients on dialysis with residual renal function, renal risks still exist.[2] If NSAID use is considered in patients with kidney disease, a full description of risks and benefits should be discussed with the patient, and ongoing monitoring of renal function throughout treatment should be performed. For patients who ultimately require ongoing NSAID use, or for those who refuse to discontinue use of NSAIDs in chronic disease states, continued monitoring of kidney function is essential. Topical NSAIDs, such as diclofenac gel, can be effectively used without systemic adverse events.[4]

When escalating patient treatment to the use of opioids for pain management, consider the pharmacology of the agent and the metabolites in which it is associated. For example, morphine and codeine are metabolized in the liver to the active metabolites morphine-6-glucuronide (M6G) and morphine-3-glucuronide (M3G), respectively.[28] These metabolites accumulate in patients with decreased kidney function and can lead to potential neurotoxicity as well as adverse reactions such as nausea, vomiting, and respiratory depression.[28] The active metabolite of meperidine, normeperidine, is renally excreted and highly neurotoxic.[28] When it accumulates in CKD/ESRD patients, it places them at a high risk for seizure. Morphine, codeine, and meperidine are generally avoided in patients with decreased kidney function.

Oxycodone is metabolized by the liver, with less than 10% being excreted unchanged in the urine.[4] Even at a reduced dose, oxycodone should be used with caution in patients with renal insufficiency and should generally be avoided in patients requiring dialysis because of lack of safety data.[3,4]

Hydromorphone is metabolized into hydromorphone-3-glucuronide (H3G), which can have similar neurotoxic effects as M3G when accumulated in the plasma.[28] Hydromorphone is more potent than morphine, which decreases the risk of neurotoxicity from its metabolite, H3G. Because less hydromorphone is required to achieve equitable analgesia when compared with morphine, fewer H3G metabolite molecules will be produced, thereby conferring a higher level of safety to the kidney patient being treated with hydromorphone. Although hydromorphone is generally tolerated in patients with decreased kidney function, it should still be prescribed with caution given the potential for accumulation and adverse reactions.

Hydrocodone is synthesized from codeine and is one of the most commonly prescribed opioids. Hydrocodone has many metabolites, including hydromorphone, with both the parent drug and metabolite accumulating in patients with kidney disease.[4] While a 50% dose reduction is recommended for patients with a creatinine clearance of less than 30 mL/min/1.73 m^2, limited safety data exist to support its use in patients with advanced CKD.[3,4]

Opioids should be started at lower doses and titrated upward in a slower manner than is done with patients without CKD.

Tramadol is both a synthetic opioid related to codeine and an SNRI. Tramadol is a prodrug that transitions into its active metabolite, M1, in the liver. Tramadol is generally tolerated in CKD but should be used with caution in advanced CKD/ESRD, as it carries a risk for toxicity because it is renally excreted with minimal clearance by dialysis.[3,5] It should be noted that tramadol increases the risk of hypoglycemia and lowers the seizure threshold.[4]

Fentanyl is metabolized by the liver but does not produce active metabolites. It is generally safe for use in patients with kidney disease with ongoing monitoring for adverse reactions. Buprenorphine and methadone are generally safe for use in patients with kidney disease, although provider experience and comfort level for prescribing, as well as state regulations, may limit the use of these agents. A pain specialty or palliative care consult is often indicated prior to initiating these agents, especially in opioid-naive patients.

Regardless of the drug chosen, it is important to remember that opioids should be started at lower doses and titrated upward in a slower manner than is done with traditional prescribing for patients without CKD. Ongoing reevaluation for effectiveness and adverse reactions should be frequent, within 1 to 4 weeks after making any changes.[5] It is also important to note the

potential dialyzability of the medication being used. Medications that are significantly removed with dialysis often require supplemental dosing during or after dialysis.[4]

Neuropathic pain in CKD is commonly treated using gabapentinoids, SNRIs, and TCAs, with antiepileptic drugs and TCAs being more effective than SNRIs.[4] Of note, limited data and dosing recommendations exist for the use of SNRIs to manage neuropathic pain in CKD.[4] Gabapentinoids for the treatment of neuropathic pain may also assist in the management of restless leg syndrome and pruritus, but the dose must be decreased because of the risk of sedation from accumulation as kidney function declines.[4]

Adjunctive therapies

CKD often alters the pharmacokinetics and dynamics of oral and I.V. medications making regional techniques an attractive option for managing both acute and chronic pain. Likewise, patients with CKD routinely have multiple comorbid conditions that make use of potent opioids and anesthetics less attractive options. Therefore, regional blocks that involve instilling local anesthetics around nerve bundles (interscalene or supraclavicular blocks) are routinely used in practice for analgesia during surgical procedures to obtain upper extremity dialysis access. The utility of regional modalities is not limited to alleviating acute surgical pain. Some regional techniques have proven useful for chronic pain. Epidural steroid injection, although not always effective for long-term relief, has proven particularly useful in patients with chronic pain seeking short-term relief of their chronic cervical, lumbar, and osteoarthritic pain symptoms.[6]

Anesthesiologists, interventional radiologists, and certified registered nurse anesthetists can administer regional blockades. When considering making a referral for these procedures, special considerations must be given with regard to CKD (chronically low platelets or altered platelet function); in these cases, regional techniques may be precluded because of the increased risk of bleeding in this circumstance.

Nonpharmacologic treatment modalities

Chronic pain is the result of multiple biologic, psychological, and social factors.[13] It is only logical that effective treatment strategies must address a combination of most, if not all, of these contributing factors. This approach to pain management is termed multimodal analgesia. The National Center for Complementary and Integrative Health (NCCIH) reports that pain is the primary condition for which patients employ nonpharmacologic treatment modalities.[11] In 2016, the NCCIH created several overarching treatment modalities in order to categorize the multitudes of nonpharmacologic treatment options available today.[11] These categories are:

- mind-body interventions
- diet and lifestyle modifications
- herbal remedies
- manual healing
- bioelectromagnetics
- pharmacologic-biologic treatments.

When making recommendations to patients, remain cognizant of the fact that effectively addressing complex pain syndromes will likely necessitate the use of a pain management service. Pain management services use diverse treatment modalities, including alternative therapies and psychological interventions alongside analgesic medications and regional techniques in order to properly handle the multifaceted nature of pain.[7,12] Pain management services often consist of medical physicians, psychologists, and advanced care providers, as well as nutritional experts and physical/occupational therapists.[3,7,12]

Depression reduces quality of life, in part by amplifying pain intensity by lowering the pain threshold. The alternative therapies shown to be most effective at improving depressive symptoms, and thereby improving QOL, belong to the "mind-body" NCCIH category.[10] Cognitive behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) are two of the psychosocial modalities proven most efficacious, with MBSR providing greater benefit than CBT.[3,6,10,13] These two methods focus on skill-based treatments that aid patients in identifying maladaptive thoughts and behaviors related to their pain, while at the same time arming them with helpful thoughts and behaviors with which to replace these thoughts.[13] While working with a psychologist to learn how to employ these two mind-body modalities, patients may experience a reduction in depressive symptoms and chronic pain, and thereby improving quality of life.[3,13,15]

Dry needling is another alternative therapy that is capable of improving quality of life by alleviating depressive symptoms, owed in part to its ability to produce hypoalgesia that is equivocal to the injection of lidocaine into a trigger point for patients with myofascial pain

Cannabinoid characteristics[29-31]

Phytocannabinoid type	General properties	Physiologic effect	Action at receptor	
			CB1	CB2
Cannabidiol (CBD)	• Nonpsychoactive • Activates the endogenous cannabinoid system (ECS)	*Amplifies nonpsychoactive effects of THC, such as: 1. Analgesia 2. Antiemesis 3. Sedation	Antagonist	Antagonist
Δ9-tetrahydrocannabinol (THC)	Psychoactive	• Muscle relaxation • Analgesia • Antiemesis • Sedation • Psychosis • Anxiety	Partial agonist	Partial agonist

Note: CBD amplifies the beneficial effects of THC by blocking the metabolism of THC into 11-hydroxyTHC. 11-hydroxyTHC is responsible for the THC's negative effects, such as paranoia and anxiety. Induction considerations: oral preparations take effect in 1 to 2 hours, whereas inhaled cannabis takes effect as quickly as 30 minutes.

syndrome.[14,16] Dry needling involves insertion of a thin needle into the skin and fascial planes at various trigger points on the body without instilling medications.[14]

To provide a more comprehensive solution to the problem, a variety of other nonpharmacologic interventions are commonly employed by holistic pain management services.

Emerging therapies

Recently, the use of medical marijuana for a multitude of ailments and conditions has increased. Although research primarily investigates cannabinoid use for alleviating cancer or HIV-AIDS-related symptoms, studies examining the use of cannabinoids for the renally impaired patient are now emerging.[29-31] The latest findings are revealing promising information pertaining to cannabinoids' ability to mitigate the large symptom burden of advanced CKD, most specifically chronic neuropathic pain and uremic pruritus.[29,30] Although an overall consensus has yet to be reached, the National Academies of Sciences, Engineering, and Medicine concluded that there is evidence that cannabis and pharmaceutical cannabinoids are effective for the treatment of chronic pain.[30] Despite the fact that the utility of cannabinoids for symptom management in CKD remains limited, these compounds have produced statistically significant reductions in both opioid prescriptions and overdoses in states that have legalized their use.[29-31] Even still, cannabinoids—particularly smoked cannabis—pose significant health risks that must be cautiously weighed against the limited substantiated therapeutic benefits of cannabis.[29] Practitioners should also be cognizant of cannabis's Schedule 1 status under federal law, which disallows reimbursement for its use by health insurance companies.[30] (See *Cannabinoid characteristics*.)

Conclusion

Managing pain in the setting of kidney disease is often a challenge for providers, with pain experienced by this patient population often being inadequately managed. NPs possess the knowledge to diagnose and the skill set to adequately manage pain in patients with kidney disease. Maintaining a working knowledge of current pharmacology and adjunctive therapies is key, with the best approach being starting low, going slow, and reevaluating often. An NP who is willing to remain transparent about realistic goals of treatment best serves the patient with CKD who is suffering from pain. Highlighting to the patient that absolute resolution of pain symptoms is not an appropriate goal is imperative; however, aiming to achieve a 30% reduction in pain intensity is clinically significant. A multimodal pain management strategy is best equipped to achieve this goal. NP

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