

## **Can intracutaneous sterile water injection be used as a possible treatment for acute renal colic pain in the emergency department? A short literature review**

Sir,

Renal colic is an important and severely painful condition which is frequently encountered in the emergency department (ED).<sup>[1]</sup> More than 12% of people worldwide will suffer from this condition in their lifetime; with the recurrence rate of 50%.<sup>[2]</sup> Each year, renal colic affects about 1.2 million people and accounts for 1% of all ED visits and hospitalizations.<sup>[3]</sup> Urinary tract obstruction caused by calculi is the most common cause of renal colic occurrence. Sudden onset of colicky pain begins in the flank that radiating to the groin is the classic clinical

features of a ureteric colic. This pain is usually described as the worst pain experienced by humans.<sup>[1,4]</sup>

Due to the intense nature of the pain associated with renal colic, prompt and effective pain control is one of the first responsibilities of emergency physicians, and the main issue in the management of these patients until the time stone passes spontaneously or is removed surgically.<sup>[5,6]</sup> Considering that most kidney stones will pass spontaneously, conservative management including observation with analgesia remains the preferred approach for these patients.<sup>[1]</sup> Many pharmacologic agents such as nonsteroid antiinflammatory drugs (NSAID), opioid analgesics, antispasmodics and antidiuretic hormones, can be administered for pain management in renal colic.<sup>[6,7]</sup> Nonetheless, the most effective analgesic regimen has not been determined.<sup>[8]</sup> Intravenous (IV) administrations of analgesics, either NSAIDs or opioids are still routine clinical practice for pain management in patients with renal colic.<sup>[9]</sup> Although IV administration of these drugs has been reported to be effective, they are generally problematic in terms of side effects, availability especially in private clinics or opioids abuse.<sup>[1,9]</sup> In addition, considering that the NSAIDs may potentially interfere with the kidney's autoregulatory response to obstruction by reducing renal blood flow, renal failure may be induced with preexisting renal disease.<sup>[1]</sup> Furthermore, the majority of physicians are not comfortable with using these drugs due to their side-effects including; respiratory depression, lightheadedness, nausea, vomiting, narcotic dependence, sedation, dizziness, disorientation, and hypotension. Therefore, administration of alternative therapies for the control of renal colic pain would appear to be inevitable.<sup>[10]</sup>

In recent times, an intracutaneous sterile water injection (ISWI) has been proposed as a new modality for acute renal colic pain management with none of the aforementioned negative outcomes and problems. In a study that conducted by Ahmadnia *et al.* with aim to evaluate the efficacy of Intracutaneous injection of sterile water or normal saline (0.5 mL) in the treatment of renal colic pain, have shown that although in all patients, pain had been relieved; but in patients who received intracutaneous injection of normal saline, only 34% reported a decrease in pain, whereas in all treated patients with sterile water injection (100% of cases), pain was relieved.<sup>[11]</sup> Similar results were observed in a study by Bengtsson *et al.* in treatment of pain due to urolithiasis by ISWI.<sup>[12]</sup> In another study with the aim to evaluate the analgesic efficacy of ISWI (0.5 mL) compared with oral paracetamol in pregnant women with acute renal colic pain showed that pain severity was significantly less in patients who received ISWI compared than patients treated with paracetamol. Also rescue analgesics requirement were significantly lower in patients receiving sterile water injection compared with another group.<sup>[7]</sup> It has been previously

shown that this technique is effective in the pain management following whiplash injuries<sup>[13]</sup> and low back pain in labor; so that, in a systematic review have been demonstrated that administration of sterile water injections, possess powerful analgesic benefits to women experiencing lower back pain during labor.<sup>[14]</sup> The underlying mechanisms of action of sterile water injection in pain control are not fully understood but the majorities of the authors refer to pain inhibition in accordance with the gate control theory and/or diffuse noxious inhibitory control as a pain inhibitory system.<sup>[15]</sup> Furthermore, it has been stated that the ISWI produces chemical irritation in the skin and triggers the A cutaneous afferents. This may lead to endorphin release, similar to that seen with acupuncture. Another explanation is that it may exert its effect through physiological distraction.<sup>[15,16]</sup> In this technique, onset of pain relief is almost immediate and if requested, the injections can be repeated several times.<sup>[16]</sup> In some of studies which conducted in this regard, isotonic saline has been considered to be placebo treatment.<sup>[11]</sup> This is based on the fact that the percentage of salt is similar to that in the human body, which probably means that saline does not cause osmotic irritation or mechanical stimulation as salt-free water most likely does.<sup>[16]</sup>

In conclusion, considering the importance of acute renal colic pain management and some problems and side-effects in the use of common pharmacologic agents for renal colic pain, it seems that ISWI can be used as an effective, inexpensive, safe and low technology analgesic option that is suitable for all emergency care settings. Although further clinical trials are warranted to determine its potential effect on acute renal colic pain, as well as the optimal amount of sterile water in each injection.

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