KJP The Korean Journal of Pain
| Letters to Editor |
Korean J Pain 2013 April; Vol. 26, No. 2: 209-210
pISSN 2005-9159 eISSN 2093-0569
http://dx.doi.org/10.3344/kjp.2013.26.2.209

Can Vitamin C Be Used as an Adjuvant for Managing Postoperative Pain? A Short Literature Review

Department of Anesthesiology, Faculty of Paramedicine, *Faculty of Medicine, Mazandaran University of Medical Sciences, †Department of Nursing, Faculty of Nursing and Midwifery, Mazandaran University of Medical Sciences, Sari, Iran

Farshad Hasanzadeh Kiabi, MD, Aria Soleimani, MD, Mohammad Reza Habibi, MD*, and Amir Emami Zeydi, MSc†

LETTER TO EDITORS

Postoperative pain management remains a major challenge for health care providers [1,2]. Despite huge technological advances in pain management, many researchers have documented that unrelieved pain remains common after surgeries. Although most surgical patients receive some form of postoperative pain management, it is estimated that up to 75% of patients do not achieve adequate pain relief postoperatively [2,3]. A study conducted by Apfelbaum et al. showed that approximately 80% of the patients experienced pain after surgery. Of these patients, 86% had moderate, severe, or extreme pain [3]. Poorly controlled postoperative pain may result in clinical and psychological changes such as atelectasis or pneumonia, myocardial infarction, coronary ischemia, poor wound healing, insomnia and demoralization. These changes cause increase in morbidity and mortality and patients' health-care costs while impoverishing quality of life and patient satisfaction [4,5]. The major goal in the management of postoperative pain is to minimize the dose of medications to lessen the side effects while still providing adequate analgesia, because side effects of commonly used pain medications are known to be the reasons that could lead to inadequate postoperative pain treatment. This goal is best accomplished with multimodal analgesia [6,7]. One agent that can exert antinociceptive and pain reducing effects is vitamin C [8,9].

Vitamin C (ascorbic acid) is water-soluble, found throughout the body and is especially highly concentrated in the brain [10]. Vitamin C is necessary for normal growth, development and the formation of collagen which is important for the healing of skin and scar tissue, blood vessels, ligaments and tendons [7]. In addition, vitamin C has antioxidant and neuroprotective properties [10,11]. Moreover, it has been proven that the plasma vitamin C concentration decreases after surgery and the requirement for vitamin C increases in surgical patients, possibly due to greater demand caused by increased oxidative stress [12]. Regarding the effect of vitamin C on acute pain, a result from a recent study with the aim to evaluate the potential role of vitamin C in reducing acute pain after laparoscopic cholecystectomy showed that supplementation with oral vitamin C significantly decreased morphine consumption after surgery [7]. Two studies by Zollinger et al. [13] and Besse et al. [14] with the aim to assess the effectiveness of vitamin C in the prevention of complex regional pain syndrome after orthopedic surgery revealed that vi-

Received January 14, 2013. Accepted January 29, 2013.
Correspondence to: Mohammad Reza Habibi, MD
Mazandaran Heart Center, Hazrat Fatima Hospital, Artesh Boulevard, Mazandaran Province, Sari, Iran
Tel: +98-1512226262, Fax: +98-1512268915, E-mail: contactroute@yahoo.com
This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/3.0/), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.
Copyright © The Korean Pain Society, 2013

tamin C significantly reduces the prevalence of complex regional pain syndrome. Additionally, a case report by Byun et al. [15] showed that in the case of postherpetic neuralgia, which did not respond to conventional therapy such as analgesics and nerve block, an intravenous infusion of vitamin C resulted in an immediate reduction in pain which is in agreement with the result by Chen et al. [16] who reported that an infusion of vitamin C was effective in zoster associated neuralgia. The antinociceptive effect of vitamin C and its site of action are not well understood; however, vitamin C has several potential functions, including antioxidation and neuromodulation, which may play an important role in pain relief [7]. Because vitamin C is water soluble and easily excreted in the urine, supplementation with high doses has little adverse effect when administered either orally or parenterally [12].

In summary, because of the reduction in vitamin C concentration after surgery and the modest evidence for vitamin C's antinociceptive effect and role in postoperative pain relief, further clinical trials are warranted to determine its potential effect on postoperative pain, as well as its optimal doses and routes of administration.

REFERENCES

1. Mac Lellan K. Postoperative pain: strategy for improving patient experiences. J Adv Nurs 2004; 46: 179–85.
2. Chung JW, Lui JC. Postoperative pain management: study of patients' level of pain and satisfaction with health care providers' responsiveness to their reports of pain. Nurs Health Sci 2003; 5: 13–21.
3. Apfelbaum JL, Chen C, Mehta SS, Gan TJ. Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. Anesth Analg 2003; 97: 534–40.
4. Carr DB, Goudas LC. Acute pain. Lancet 1999; 353: 2051–8.
5. Breivik H. Postoperative pain management: why is it difficult to show that it improves outcome? Eur J Anaesthesiol 1998; 15: 748–51.
6. Kehlet H, Dahl JB. The value of "multimodal" or "balanced analgesia" in postoperative pain treatment. Anesth Analg 1993; 77: 1048–56.
7. Kanazi GE, El-Khatib MF, Yazbeck-Karam VG, Hanna JE, Masri B, Aouad MT. Effect of vitamin C on morphine use after laparoscopic cholecystectomy: a randomized controlled trial. Can J Anaesth 2012; 59: 538–43.
8. Lu R, Kallenborn-Gerhardt W, Geisslinger G, Schmidtko A. Additive antinociceptive effects of a combination of vitamin C and vitamin E after peripheral nerve injury. PLoS One 2011; 6: e29240.
9. Ringsdorf WM Jr. Vitamin C supplementation and relief from pain. A review and interpretation. J Ala Dent Assoc 1984; 68: 47–53.
10. Rice ME. Ascorbate regulation and its neuroprotective role in the brain. Trends Neurosci 2000; 23: 209–16.
11. Rosa KA, Gadotti VM, Rosa AO, Rodrigues AL, Calixto JB, Santos AR. Evidence for the involvement of glutamatergic system in the antinociceptive effect of ascorbic acid. Neurosci Lett 2005; 381: 185–8.
12. Fukushima R, Yamazaki E. Vitamin C requirement in surgical patients. Curr Opin Clin Nutr Metab Care 2010; 13: 669–76.
13. Zollinger PE, Tuinebreijer WE, Breederveld RS, Kreis RW. Can vitamin C prevent complex regional pain syndrome in patients with wrist fractures? A randomized, controlled, multicenter dose-response study. J Bone Joint Surg Am 2007; 89: 1424–31.
14. Besse JL, Gadeyne S, Galand-Desmé S, Lerat JL, Moyen B. Effect of vitamin C on prevention of complex regional pain syndrome type I in foot and ankle surgery. Foot Ankle Surg 2009; 15: 179–82.
15. Byun SH, Jeon Y. Administration of vitamin C in a patient with herpes zoster – a case report –. Korean J Pain 2011; 24: 108–11.
16. Chen JY, Chu CC, So EC, Hsing CH, Hu ML. Treatment of postherpetic neuralgia with intravenous administration of vitamin C. Anesth Analg 2006; 103: 1616–7.