

# **INTRAVENOUS LIDOCAINE INFUSIONS RELIEVE CHRONIC ABDOMINAL PAIN: CASE REPORT**

Danielle Levin, MD, Travis Schaeffer, DO, Martin Acquadro, MD, DMD, and Frederic Gerges, MD

**Background:** Endometriosis is a debilitating disease that presents with chronic pelvic pain, dysmenorrhea, dyspareunia, and infertility. Treatment methods include surgery, no treatment, or medical therapy, commonly including nonsteroidal anti-inflammatory drugs, oral contraceptives, androgenic agents, progestins, and gonadotropin-releasing hormone analogs. Unfortunately, many of these patients have pelvic pain refractory to conventional medical treatment. Intravenous (IV) lidocaine infusions have been studied extensively for neuropathic pain, but there is no report available in regards to whether it could be beneficial for those afflicted with chronic pelvic pain secondary to endometriosis.

**Case Report:** We would like to share the first report of a 37-year-old woman with chronic refractory abdominal pain from endometriosis continuously receiving greater than 3 weeks of pain relief from IV lidocaine infusions.

**Conclusions:** This case report demonstrates that IV lidocaine infusions may be an effective and safe treatment option for those suffering from chronic abdominal pain from endometriosis.

**Key words:** Lidocaine infusions, lidocaine, chronic pain, endometriosis, abdominal pain

## **BACKGROUND**

Endometriosis is a debilitating, pain condition that is often difficult to treat. Various pharmacological medications, such as nonsteroidal anti-inflammatory drugs, oral contraceptives, androgenic agents, progestins, and gonadotropin-releasing hormone analogs, nerve blocks, and physical therapy have been utilized with no guaranteed effectiveness (1). Currently, the gold standard therapy is laparoscopic excision surgery.

The purpose of this article is to expand the knowledge regarding the use of intravenous (IV) lidocaine infusions (2) and suggest a new way of treating chronic abdominal pain secondary to endometriosis.

We report the first case of monthly IV lidocaine infusions that have consistently provided the patient with significant pain relief and improvement in activities of daily living for 3 weeks at a time.

## **CASE PRESENTATION**

A 37-year-old woman with a known diagnosis of fibromyalgia, interstitial cystitis, and endometriosis had been suffering from chronic abdominal pain for approximately 10 years. The pain was worst in the lower abdominal region, radiating to the patient's lower back. She described the abdominal pain as "crampy" and occasionally sharp. While taking tramadol and gabapentin for management of this pain, the patient continued to report that her pain was as 7 out of 10, on the Numeric Rating Scale, where 0 is no pain and 10 is the worst pain ever. She reported that this pain was significantly affecting her quality of life.

In addition to oral pharmacological medications, the patient opted to try interventional pain management treatments. At first, the patient received a diagnostic and therapeutic ganglion impar blocks with steroids.

From: Department of Anesthesiology, Critical Care & Pain Medicine, St. Elizabeth's Medical Center, Boston, MA

Corresponding Author: Danielle Levin, MD, E-mail: daniellelevinmd@gmail.com

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The first injection provided the patient with 50% pelvic pain relief, but the second injection provided only 20% pain relief that lasted about one to 2 weeks. Then, the patient received diagnostic and therapeutic superior hypogastric plexus blocks to treat her pelvic pain. The diagnostic block provided excellent relief, but the second block provided the patient only with 30% pain relief that lasted for 3 to 4 days. Given the initial success but lack of sustained improvement, the patient needed an alternative treatment.

A trial of IV lidocaine infusion was discussed with the patient, and after an in-depth discussion of the risks and benefits of this treatment, the patient provided verbal and written informed consent to receive this treatment. At our out-patient pain clinic, during the treatment, the patient was continuously monitored with a noninvasive blood pressure cuff, pulse oximetry, and electrocardiogram. A peripheral IV catheter was inserted, and IV lidocaine was slowly administered to the patient over the course of 45 minutes. The patient tolerated the procedure well, with no adverse effects, and was discharged home after being monitored for an additional 15 minutes.

At the one-month follow-up visit, the patient reported that she had 50% pain relief that lasted for 3 weeks. The patient was offered to repeat the IV lidocaine infusion treatment, and a month later, she reported the same results. Since then, the patient has been receiving these treatments on a monthly basis, for approximately one year, and each time she has the same positive effect from this treatment. During each infusion, the patient received between 200 to 250 mg IV lidocaine. The patient reported that this is the only treatment that has so far provided the patient with significant and consistent pain relief and significant improvement in the quality of her life. The patient provided verbal and written informed consent for publication of her case.

## **DISCUSSION**

Endometriosis has an estimated prevalence of 6-10% in the general population and may have a prevalence as high as 71-87% in women with chronic pelvic pain (3). The pathogenesis of this disease is likely secondary to an irregular expression of endometrial genes leading to increased cyclooxygenase-2 activity, resulting in increased prostaglandin activity. Also, overproduction of aromatase activity results in increased estrogen levels. The combination of increased prostaglandin and estrogen activity causes a pro-inflammatory state

with resulting abnormal attachment of endometrial glands and stroma to the peritoneum. This abnormal attachment to the peritoneum causes infertility and chronic pain (4).

Pain may be worsened by the expression of nerve growth factor leading to an increased density of nerve fibers. Management of this disease consists of pharmacological treatment, such as oral contraceptives, non-steroidal anti-inflammatory drugs, gonadotropic releasing hormone agonists, progestins, and danazol, and/or surgical interventions, such as excision of endometrioma, drainage and ablation of cyst wall, hysterectomy, and/or bilateral salpingo-oophorectomy (4). Unfortunately, these treatments are not always effective and are not void of side effects.

IV lidocaine has been previously reported in literature to effectively treat chronic and acute pain related to perioperative and neuropathic conditions (5). Lidocaine is an antiarrhythmic Class Ib, sodium channel blocker, which also modulates potassium channels, calcium channels, N-methyl-D-aspartate receptors, and the glycinergic system (6). Furthermore, it can inhibit tonic discharges in acutely injured A $\delta$  and C-fibers, reducing the hyper-inflammatory response (5). In chronic pain, there is an increase in expression of the sodium channels at the dorsal ganglia and site injured axons, which in theory IV lidocaine infusions block. Studies have demonstrated that IV lidocaine is superior to placebo in the management of pain from complex regional pain syndrome, phantom pain, central pain, chronic headaches, and chronic neuropathic pain (7-9).

The success of IV lidocaine infusions for chronic abdominal pain from endometriosis may bridge the gap between refractory medical treatment and surgery. The low invasiveness and safety profile of IV lidocaine infusions provides advantages over surgery. Furthermore, the fascinating aspect of this block is that not only does it treat numerous pain conditions, but it also, somehow, provides long-term effect. This is an incredible phenomenon that would benefit from further research.

## **CONCLUSIONS**

Endometriosis is often difficult to manage with physical/occupational therapy, analgesic medications, and nerve blocks. This case report demonstrates that IV lidocaine infusions could be a simple, safe, non-expensive, and minimally invasive treatment option for those affected by chronic abdominal pain from endometriosis.

### Authors' Contributions

DL and TS wrote the first draft and designed the work; MA and FG revised the last version. DL, TS, MA, and FG have made substantial contributions to the conception of the manuscript. All authors have read and approved the manuscript and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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### Presentations at Meetings

1. Poster Presentation at the 21st Annual Pain Medicine Meeting that took place in November 2022 in Orlando, Florida, USA. <https://epostersonline.com/asrafall2022/poster/3731?view=true>
2. Poster Presentation at the 47th Annual Regional Anesthesiology & Acute Pain Medicine Meeting that took place in March 2022 in Las Vegas, Nevada, USA.
3. Poster Presentation at the 75th Annual Post Graduate Assembly in Anesthesiology; in December 2021 in New York, New York, USA.

### REFERENCES

1. Rodgers AK, Falcone T. Treatment strategies for endometriosis. *Expert Opin Pharmacother* 2008; 9:243-255.
2. Kandil E, Melikman E, Adinoff B. Lidocaine infusion: A promising therapeutic approach for chronic pain. *J Anesth Clin Res* 2017; 8:697.
3. Rawson JM. Prevalence of endometriosis in asymptomatic women. *J Reprod Med* 1991; 36:513-515.
4. Practice bulletin no. 114: Management of endometriosis. *Obstet Gynecol* 2010; 116:223-236.
5. van der Wal SEI, van den Heuvel SAS, Radema SA, et al. The in vitro mechanisms and in vivo efficacy of intravenous lidocaine on the neuroinflammatory response in acute and chronic pain. *Eur J Pain* 2016; 20:655-674.
6. Mayhew A, Argáez C. Intravenous Lidocaine for Chronic Pain: A Review of the Clinical Effectiveness and Guidelines [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2018 Jan 26. Available from: [www.ncbi.nlm.nih.gov/books/NBK531808/](http://www.ncbi.nlm.nih.gov/books/NBK531808/).
7. McCarthy GC, Megalla SA, Habib AS. Impact of intravenous lidocaine infusion on postoperative analgesia and recovery from surgery: A systematic review of randomized controlled trials. *Drugs* 2010; 70:1149-1163.
8. Iolascon G. Is systemic administration of local anesthetic agents effective for relieving neuropathic pain? A Cochrane Review summary with commentary. *NeuroRehabilitation* 2020; 47:247-249.
9. Rosen N, Marmura M, Abbas M, Silberstein S. Intravenous lidocaine in the treatment of refractory headache: A retrospective case series. *Headache* 2009; 49:286-291. Erratum in: *Headache* 2009; 49:803.

