Pharmacologic Pain Management in Outpatient Uterine Fibroid Embolization

Abstract

The key for successful uterine fibroid embolization in outpatient setting is good management of pain and other postembolization symptoms. Although several different protocols with different medication regimens have been used successfully in multiple institutions, it is still a challenge for interventional radiologists who should be prepared to provide detailed follow-up plans, continuous staff availability, and an oral medication regimen sufficient to alleviate these symptoms. Moreover, the interventional radiologist should be able to educate the patient about this postprocedural pain and available treatments.

Keywords: Outpatient setting, pain, uterine fibroid embolization

Introduction

Uterine fibroid embolization (UFE) is an effective treatment for symptomatic uterine fibroid and an alternative to traditional surgical therapies. It successfully controls symptoms in 85%–95% of patients for a median of 24 months.^[1–4] It was recognized and listed by the American College of Obstetricians and Gynecologists in the Level A treatment category in the management of uterine fibroids as a safe and effective treatment option based on long- and short-term outcomes.^[5]

UFE is accomplished with bilateral occlusion of the uterine artery, with the end point being stasis or near stasis in the artery and with no large uterine artery branches remaining patent. As the fibroid tissue is more vulnerable to embolization than the myometrium, UFE will result in irreversible ischemia and complete infarction of fibroids with gradual reversible ischemia of myometrium.^[6,7] These myometrial ischemic changes most likely cause significant pelvic pain with variable degrees of intensity within the first 24 h. Although such pain should not be considered a complication of UFE but an expected aspect of recovery,^[6] it continues to be a challenge for interventional radiologists to treat especially in outpatient setting of

UFE as it is the most common reason for readmission.^[8]

Pain after Uterine Fibroid Embolization

Post-UFE pain is both variable and unpredictable. It is most commonly described as menstrual-type cramps within the first 24 h after the procedure. Although there is little or no pain during the procedure, the pain starts when embolization is completed. It peaks at 7 h after the procedure and it starts to improve gradually over time.^[9] Its intensity is variable and ranges from mild cramps to cramps comparable with childbirth.^[10] Interpatient variations occur,^[11] and pain degree and experience are unpredictable in general as they are unrelated to the patient age, fibroid size and location, uterine size, and has no significant association with the size of embolic material used.^[9,12] However, the use of a large volume of embolic agents is associated with severe post-UFE pain,^[13] while limited or incomplete embolization with polyvinyl alcohol particles or gelatin-coated tris-acryl polymer microspheres may produce significant effective infarction of fibroids with less severe pain.^[14]

Racial difference in pain perception levels has been noted as a sole predictive factor prior to UFE as Black women recorded greater pain than White women.^[9,15] However, White women who had a greater

**Azzam A. Khankan,
Ibrahim A. Al-Habli,
Turki Alhazmi¹,
Iyad Feteih²,
David A. Valenti³**

*Department of Medical
Imaging, King Abdulaziz
Medical City, Jeddah,*

*¹Department of Radiology,
Umm Al-Qura University,
Makkah, ²Department of
Radiology, King Fahd*

Hospital, Jeddah, Saudi Arabia

*³Department of Diagnostic
Radiology, McGill University
Health Center, Montreal,
Canada*

Address for correspondence:

*Dr. Azzam A Khankan,
Department of Medical
Imaging, King Abdulaziz
Medical City, P.O. Box. 9515,
Jeddah 214 23, Saudi Arabia.
E-mail: khankana@ngha.med.sa*

Access this article online

Website: www.arabjir.com

DOI: 10.4103/AJIR.AJIR_27_18

Quick Response Code:

How to cite this article: Khankan AA, Al-Habli IA, Alhazmi T, Feteih I, Valenti DA. Pharmacologic pain management in outpatient uterine fibroid embolization. Arab J Intervent Radiol 2018;2:50-5.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

mean volume of dominant fibroid in the reported studies are more likely to have severe nausea and emesis associated with pain than Black women.

Pain and other postembolization symptom management is the clinical challenge to perform UFE as an outpatient procedure.^[16] It is the responsibility of the interventional radiologist to manage the symptoms experienced by these patients immediately after embolization.

McGill University Health Center Protocol

At our institution, McGill University Health Center, we use a simplified protocol for pain management after UFE [Table 1]. The protocol was designed and assessed in close cooperation with the departments of anesthesiology and gynecology. It includes acetaminophen, codeine, and nonsteroidal anti-inflammatory drugs naproxen in addition to meperidine and fentanyl, when necessary. Based on a previous study by Pisco *et al*.^[17], we started medications the night before and the day of the procedure to reduce the severity of postembolization symptoms, especially in regards to pain. After the procedure, the patient is transferred to the recovery room and aggressive treatment of pain is started until achieving the desired level of pain control. Pain is assessed on a regular basis to enable the administration of analgesics before progression to a level

where pain control is virtually impossible. Switching to oral medication starts usually after 4 h. We believe that oral medication if works in hospital, will work at home. The patient will be discharged home after 6–8 h and given appropriate instructions. In general, patients are recommended to take 1 week off from work. All patients are given appropriate contact numbers for the interventional radiology service, should any problems arise, and informed to return to the emergency department in case of severe pelvic pain which is unresponsive to the treatment. Patient follow-up consists of initial telephone contact during the first few days after UFE and a clinic visit at a 3- to 4-month interval. A magnetic resonance imaging scan is obtained at the 3-month follow-up visit. Nearly 81% of patients are discharged on the day of procedure and 19% of patients are admitted for pain control and/or fever control.^[16]

Reported Protocols

Although a fixed pain medication protocol cannot be recommended,^[15] several different protocols with different medication regimens have been published in the literatures.^[18–22] They have been used attempting to control the pain and manage the nausea and vomiting associated with UFE in outpatient setting. No consensus regarding the best pain management method after UFE has been achieved,^[23] and most of the protocols use a combination of opioid analgesics and nonsteroidal anti-inflammatory drugs to control post-UFE pain in addition to antiemetics for the associated nausea.

In addition, the use of superior hypogastric nerve block may significantly reduce pain and the need for narcotics.^[24]

The reported medication protocols in outpatient UFE are summarized in Table 2.

Patient Education

Most UFE patients are otherwise well and are able to communicate their experience and needs regarding pain and other symptoms. To achieve such needs, it is important to inform the patients during the initial consultation and on the morning of the procedure about the expected symptoms during the post-UFE recovery period and the medication regimen that will be used to manage these symptoms, especially the pain and vomiting. Moreover, the patient must receive a written form about all these symptoms with clear instructions regarding the adjustment in their medications, especially those prescribed for pain.

In summary, post-UFE pain in outpatient setting poses unique challenges to the interventional radiologists, who must be fully knowledgeable of the available methods and medications to provide safe and reliable pain relief, tailored for each individual patient. Both the education of patients regarding expected symptoms and the interventionalists' experience with a spectrum of medications in each

Table 1: McGill University Health Center protocol for outpatient uterine fibroid embolization

Timing	Medications
Day before and morning of UFE	Anti-inflammatory drug: naproxen 500 mg PO Stool softener/light laxative Colace® 100 mg PO
Day of UFE – at angiography suite	Anxiolytic: Midazolam 1-2 mg IV
Before procedure	Analgesic: Fentanyl 50-100 µg IV
During the procedure: As soon as the embolization is completed	Analgesic: Fentanyl 50-100 µg IV then 25-50 µg IV until the desired effect is achieved
Day of UFE – at surgical recovery room	Analgesic Fentanyl 25-50 µg IV for a maximum dose of 250 µg or Meperidine 10-25 mg IV with 5 min interval and a maximum dose of 50 mg then 50-100 mg IM every 3 h
Pain control is by an experienced operating room nurse	Antiemetic: Ondansetron 2 mg IV
Start fair aggressively for initial pain	Analgesic: Acetaminophen 325 mg and Codeine phosphate 30 mg PO
Switch gradually to oral medication after 4 h as same as that will be used at home	Anti-inflammatory drug: naproxen 500 mg PO Stool softener/light laxative Colace® 100 mg
Discharge after 6-8 h	

Table 2: Reported medication protocols for UFE in outpatient settings

Study, year	Medications	Remarks
Sisken <i>et al.</i> , 2000 ^[22]	<p>Before UFE</p> <p>Cefazolin 1 g IV</p> <p>Prochlorperazine 25 mg PRN</p> <p>During UFE</p> <p>Midazolam 1 mg IV; repeated in 0.5 mg increments at 5-20 min intervals</p> <p>Fentanyl 0.50 µg IV; repeated in 0.50 µg increments at 5-20 min intervals</p> <p>Ketorolac 60 mg IV (administered in two doses of 30 mg; one dose after each uterine artery is embolized)</p> <p>After UFE</p> <p>Meperidine 75 mg IV with Vistaril</p> <p>25 mg IV (may be repeated once if necessary for continued pain)</p> <p>Ketorolac 30 mg IV PRN continued pain after meperidine</p> <p>Lortab 15 mg po PRN continued pain after meperidine and ketorolac</p> <p>At discharge</p> <p>Prochlorperazine 25 mg PRN q12 h PRN nausea for 3 days (days 1-3)</p> <p>Levofloxacin 250 mg po qd for 5 days (days 1-5)</p> <p>Meperidine 100 mg po q6h PRN pain for 24 h (day 1)</p> <p>Lortab 15 mg po q6h PRN pain for 4 days (days 2-5)</p> <p>Hydrocodone replaces meperidine after day 1</p> <p>Ketorolac 10 mg po q6h PRN pain for 3 days (days 1-3)</p> <p>Ibuprofen 400 mg po q6h PRN pain for 4 days (days 4-7)</p> <p>Ibuprofen replaces ketorolac after day 3</p>	98% discharged within 8 h
Klein and Schwartz, 2001 ^[20]	<p>Promethazine suppository</p> <p>Cefazolin – single dose</p> <p>Ketorolac tromethamine – 60 mg IV preembolization</p> <p>Ibuprofen - TTO</p> <p>Oxycodone - TTO</p>	83% of patients were discharged after an average of 6.9 h
Pron <i>et al.</i> , 2003	<p>Before UFE</p> <p>Ketorolac tromethamine 30 mg PO or</p> <p>Ibuprofen 30 mg IM</p> <p>Indomethacin 50 mg suppository</p> <p>After UFE</p> <p>PCA morphine sulfate 40 mg set 1-1.5 mg bolus with 5-min lockout periods</p> <p>Ibuprofen 800 mg PO then 400 mg q4 h</p> <p>Nausea/vomiting: Metoclopramide, dimenhydrinate, or ondansetron</p> <p>At discharge</p> <p>Ibuprofen</p> <p>Codeine noroxycodone with acetaminophen (one or two tablets every 4-6 h as necessary)</p> <p>Stool softeners</p>	
Rasuli <i>et al.</i> , 2004 ^[24]	<p>Regimen split into regimen A and regimen B; after being reviewed by the pain management practice. Regimen B pointed out a possible better solution for managing pain and nausea</p> <p>Regimen A</p> <p>Before and during UFE</p> <p>Indomethacin</p> <p>Lorazepam 2 mg sublingually 15 min before</p> <p>Fentanyl 50 g IV as needed at 30-min intervals during</p> <p>After UFE</p> <p>Fentanyl 25 g IV as needed at 10-min intervals</p> <p>Metoclopramide 10 mg IV</p> <p>Dexamethasone IV 8 mg</p>	<p>Superior hypogastric nerve block was used</p> <p>All patients discharged within 6 h</p>

Contd...

Table 2: Contd...

Study, year	Medications	Remarks
Baerlocher <i>et al.</i> , 2006 ^[19]	At discharge	
	Morphine 10 mg orally every 4 h as needed for 7 days	
	Metoclopramide 10 mg orally daily as needed for nausea	
	Indomethacin 100 mg rectal suppository every 12 h	
	Ciprofloxacin 500 mg orally daily	
	Note – IV intravenous	
	Regimen B	
	Before and during UFE	
	Naprosyn 500 mg rectal suppository before UFE	
	Morphine 5-10 mg IV during UFE	
	Midazolam 1-2 mg IV during UFE	
	Cefazolin 1 g IV before UFE	
	After UFE	
	Long-acting morphine 30 mg orally	
	Morphine 2 mg IV PRN at hourly intervals	
	Dimenhydrinate 50 mg IV	
	Dexamethasone 8 mg IV	
	Prochlorperazine 10 mg rectal suppository PRN for nausea	
	At discharge	
	Long-acting morphine 30 mg PRN 12 h for 7 days	
	Morphine 10 mg orally q4 h as needed for 4 days	
	Dimenhydrinate 50 mg rectal suppository daily for 7 days	
	Naprosyn 500 mg rectal suppository daily for 7 days	
	Ciprofloxacin 500 mg orally daily for 7 days	
Pisco <i>et al.</i> , 2009 ^[21]	Before UFE	Morphine was used through a controlled analgesic pump
	IV two-thirds 5% dextrose, one-third 0.9% normal saline at 150 cc/h	
	Cefazolin 1 g IV or vancomycin 500 mg	
	Metoclopramide 10 mg IV	Most of patients discharged 6-10 h after UFE
	Ketorolac 30 mg IV	
	Ondansetron 16 mg orally	
	After UFE	
	IV two-thirds 5% dextrose, one-third 0.9% normal saline at 150 cc/h	
	Morphine 2-4 mg IV every 5 min as needed	
	Gravol 25-50 mg IV every 4 h as needed	
	Oxycodone 10 mg orally 4 h postprocedure	
	Day before UFE	
	Omeprazole 20 mg by mouth	
	Naproxen 1000 mg by mouth	
	Hydroxyzine 25 mg by mouth	
	Stool softener suppositories	
	Day of UFE	
	Diazepam 5 mg sublingually	
	Omeprazole 20 mg IV	
	Metamizole 2 g IV	
	Tramadol 100 mg IV	
	Metoclopramide 25 mg IV	
	Droperidol 0.10 mg IV	
	Piroxicam 20 mg IV	
	Cefazolin 1 g IV	
	During UFE	
	Ketorolac 30 mg IV × 2	
	Midazolam 1 mg IV if needed	
	After UFE	

Contd...

Table 2: Contd...

Study, year	Medications	Remarks
Rasuli <i>et al.</i> , 2013 ^[25]	Omeprazole 20 mg IV Paracetamol 1g IV Metamizole 2 g IV Ketorolac 30 mg IV Piroxicam 20 mg IV Metoclopramide 25 mg IV Ondansetron 2 mg IV At discharge Tramadol 100 mg IV Metoclopramide 25 mg IV	
	Before UFE Diclofenac 100 mg rectal suppository before UAE Morphine 2-5 mg IV Midazolam 1-2 mg IV Cefazolin 1 g IV After UFE Long-acting morphine 30 mg orally Morphine 2 mg IV as needed at hourly intervals Demerol 25-75 mg IV as needed Dexamethasone 8 mg IV Dimenhydrinate 50 mg IV Metoclopramide 10-20 mg IV as needed for nausea Prochlorperazine 10 mg rectal suppository At discharge Long-acting morphine 30 mg orally as needed every 12 h for 7 days Morphine 10 mg orally every 4 h as needed for 4 days Metoclopramide 10 mg as needed orally every 8 h for 7 days Diclofenac 100 mg rectal suppository daily for 7 days Ciprofloxacin 500 mg orally daily for 7 days	
Spencer <i>et al.</i> , 2013 ^[26]	Before and during UAE Toradol 10 mg IM/IV 1 h before Zofran 4 mg IV 30 min before Dilaudid 0.5 mg IV 30 min before PCA is started 0.2 mg q10 min without bolus After UFE Toradol 10 mg IV q6 h until AM Zofran 4 mg IV/PO q4 h PRN Dilaudid PCA 0.2 mg q10 min without bolus Colace® 100 mg PO daily At discharge Percocet 5/325 mg 1-2 tab q4-6 h PRN or Vicodin 5/500 mg 1-2 tab q6 h PRN Naprosyn 500 mg PO BID 7 d then PRN Colace 100 mg daily Miralax 17 g daily	

PCA: Patient-controlled analgesia

category prove helpful in optimizing each patient's care and achieving individual satisfactions.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Marret H, Alonso AM, Cottier JP, Tranquart F, Herbreteau D, Body G, *et al.* Leiomyoma recurrence after uterine artery embolization. *J Vasc Interv Radiol* 2003;14:1395-9.
2. Ravina JH, Aymard A, Ciraru-Vigneron N, Clerissi J, Merland JJ. Uterine fibroids embolization: Results about 454 cases. *Gynecol Obstet Fertil* 2003;31:597-605.
3. Spies JB, Ascher SA, Roth AR, Kim J, Levy EB, Gomez-Jorge J,

- et al.* Uterine artery embolization for leiomyomata. *Obstet Gynecol* 2001;98:29-34.
4. Walker WJ, Pelage JP. Uterine artery embolisation for symptomatic fibroids: Clinical results in 400 women with imaging follow up. *BJOG* 2002;109:1262-72.
5. American College of Obstetricians and Gynecologists. ACOG practice bulletin. Alternatives to hysterectomy in the management of leiomyomas. *Obstet Gynecol* 2008;112:387-400.
6. Hovsepian DM, Siskin GP, Bonn J, Cardella JF, Clark TW, Lampmann LE, *et al.* Quality improvement guidelines for uterine artery embolization for symptomatic leiomyomata. *J Vasc Interv Radiol* 2004;15:535-41.
7. Ruuskanen A, Sipola P, Hippeläinen M, Wüstefeld M, Manninen H. Pain after uterine fibroid embolisation is associated with the severity of myometrial ischaemia on magnetic resonance imaging. *Eur Radiol* 2009;19:2977-85.
8. Walker WJ, Pelage JP, Sutton C. Fibroid embolization. *Clin Radiol* 2002;57:325-31.
9. Kim HS, Czuczman GJ, Nicholson WK, Pham LD, Richman JM. Pain levels within 24 hours after UFE: A comparison of morphine and fentanyl patient-controlled analgesia. *Cardiovasc Intervent Radiol* 2008;31:1100-7.
10. Siskin GP, Bonn J, Worthington-Kirsch RL, Smith SJ, Shlansky-Goldberg R, Machan LS, *et al.* III. Uterine fibroid embolization: Pain management. *Tech Vasc Interv Radiol* 2002;5:35-43.
11. Carr DB, Goudas LC. Acute pain. *Lancet* 1999;353:2051-8.
12. Roth AR, Spies JB, Walsh SM, Wood BJ, Gomez-Jorge J, Levy EB, *et al.* Pain after uterine artery embolization for leiomyomata: Can its severity be predicted and does severity predict outcome? *J Vasc Interv Radiol* 2000;11:1047-52.
13. Volkers NA, Hehenkamp WJ, Birnie E, de Vries C, Holt C, Ankum WM, *et al.* Uterine artery embolization in the treatment of symptomatic uterine fibroid tumors (EMMY trial): Periprocedural results and complications. *J Vasc Interv Radiol* 2006;17:471-80.
14. Spies JB. Recovery after uterine artery embolization: Understanding and managing short-term outcomes. *J Vasc Interv Radiol* 2003;14:1219-22.
15. Hehenkamp WJ, Volkers NA, Birnie E, Reekers JA, Ankum WM. Pain and return to daily activities after uterine artery embolization and hysterectomy in the treatment of symptomatic uterine fibroids: Results from the randomized EMMY trial. *Cardiovasc Intervent Radiol* 2006;29:179-87.
16. Al-Fozan H, Dufort J, Kaplow M, Valenti D, Tulandi T. Cost analysis of myomectomy, hysterectomy, and uterine artery embolization. *Am J Obstet Gynecol* 2002;187:1401-4.
17. Pisco J. How to reduce the severity of pain after uterine artery embolization of fibroid for leiomyomata. Cardiovascular and Interventional Radiological Society of Europe Annual Scientific and Postgraduate Educational Meeting 8-12 September, 2007. Athens, Greece: Springer; 2007. p. S317.
18. Goodwin SC, Walker WJ. Uterine artery embolization for the treatment of uterine fibroids. *Curr Opin Obstet Gynecol* 1998;10:315-20.
19. Baerlocher MO, Asch MR, Hayeems EB, Rajan DK. Uterine artery embolization – Inpatient and outpatient therapy: A comparison of cost, safety, and patient satisfaction. *Can Assoc Radiol J* 2006;57:95-105.
20. Klein A, Schwartz ML. Uterine artery embolization for the treatment of uterine fibroids: An outpatient procedure. *Am J Obstet Gynecol* 2001;184:1556-60.
21. Pisco JM, Bilhim T, Duarte M, Santos D. Management of uterine artery embolization for fibroids as an outpatient procedure. *J Vasc Interv Radiol* 2009;20:730-5.
22. Siskin GP, Stainken BF, Dowling K, Meo P, Ahn J, Dolen EG, *et al.* Outpatient uterine artery embolization for symptomatic uterine fibroids: Experience in 49 patients. *J Vasc Interv Radiol* 2000;11:305-11.
23. Andrews RT, Spies JB, Sacks D, Worthington-Kirsch RL, Niedzwiecki GA, Marx MV, *et al.* Patient care and uterine artery embolization for leiomyomata. *J Vasc Interv Radiol* 2004;15:115-20.
24. Rasuli P, Jolly EE, Hammond I, French GJ, Preston R, Goulet S, *et al.* Superior hypogastric nerve block for pain control in outpatient uterine artery embolization. *J Vasc Interv Radiol* 2004;15:1423-9.
25. Rasuli P, Sabri A, Hammond I, French GJ, Gamache N, Jolly EE, *et al.* Outpatient uterine artery embolization for symptomatic fibroids: Short- and long-term single institution-based outcomes. *J Obstet Gynaecol Can* 2013;35:156-63.
26. Spencer EB, Stratil P, Mizones H. Clinical and periprocedural pain management for uterine artery embolization. *Semin Intervent Radiol* 2013;30:354-63.