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Review Article

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*

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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

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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 mepiridine 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]

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
	Analgesic: Fentanyl 50-100 µg IV
Before procedure	Analgesic: Fentanyl 50-100 µg IV then 25-50 µg IV until the desired effect is achieved
During the procedure: As soon as the embolization is completed	
Day of UFE – at surgical recovery room	Analgesic
	Fentanyl 25-50 µg IV for a maximum dose of 250 µg
Pain control is by an experienced operating room nurse	or
	Meperidine10-25 mg IV with 5 min interval and a maximum dose of 50 mg then 50-100 mg IM every 3 h
Start fair aggressively for initial pain	Antiemetic: Ondansetron 2 mg IV
Switch gradually to oral medication after 4 h as same as that will be used at home	Analgesic: Acetaminophen 325 mg and Codeine phosphate 30 mg PO
Discharge after 6-8 h	Anti-inflammatory drug: naproxen 500 mg PO
	Stool softener/light laxative Colace® 100 mg

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 2: Reported medication protocols for UFE in outpatient settings

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

Contd...

Table 2: Contd...

Study, year	Medications	Remarks
	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	
Baerlocher *et al*., 2006[19]	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	
Pisco *et al*., 2009[21]	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
	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	
Rasuli *et al*., 2013[25]	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 *et al*., 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.

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Conflicts of interest

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