

Supplemental Online Content

Mian BM, Singh Z, Carnes K, et al. Implementation and assessment of no opioid prescription strategy at discharge after major urologic cancer surgery. *JAMA Surg*. Published online February 8, 2023. doi:10.1001/jamasurg.2022.7652

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Medications used under the ERAS protocol during hospital stay.

	Cystectomy, Open	Renal Surgery*, Open	Renal Surgery, Robotic	Prostatectomy, Robotic
Pre-operative medications¹	-Acetaminophen, 1 G -Celecoxib if GFR > 60 -Pregabalin/gabapentin -Scopolamine patch	-Acetaminophen 1 G -Celecoxib if GFR > 60 -Pregabalin/gabapentin -Scopolamine patch	-Acetaminophen 1 G -Celecoxib if GFR > 60 -Pregabalin/gabapentin -Scopolamine patch	-Acetaminophen, 1 G -Celecoxib if GFR>60
Intra-operative Medications^{1,2}	-Propofol -Ketamine -Dexmedetomidine -Lidocaine, I.V. -Ketorolac (depending upon GFR) -Opioids	-Propofol -Ketamine -Dexmedetomidine -Lidocaine, I.V. -Ketorolac (depending upon GFR) -Opioids	-Propofol -Ketamine -Dexmedetomidine -Ketorolac (depending upon GFR) -Lidocaine, I.V. -Opioids	-Propofol -Ketorolac -Opioids
Regional/local analgesia	TAP Catheters	Intercostal catheters	Long-acting Bupivacaine	Long-acting Bupivacaine
Post-operative oral analgesic¹	-Acetaminophen, 1G, Q6h -Ibuprofen 600 mg (If GFR > 60) Q8h PRN <i>For breakthrough pain:</i> -Tramadol 50 mg, Q6-8h PRN -Oxycodone 5 mg, Q6-8h PRN -Hydrocodone 5 mg/acetaminophen 650 mg, Q6-8h PRN	-Acetaminophen, 1G, Q6h -Ibuprofen 600 mg (If GFR > 60) Q8h PRN <i>For breakthrough pain:</i> - Tramadol 50 mg, Q6-8h PRN -Oxycodone 5 mg, Q6-8h PRN -Hydrocodone 5 mg/acetaminophen 650 mg, Q6-8h PRN	-Acetaminophen, 1G, Q6h -Ibuprofen 600 mg (If GFR > 60) Q8h PRN <i>For breakthrough pain:</i> - Tramadol 50 mg, Q6-8h PRN -Oxycodone 5 mg, Q6-8h PRN -Hydrocodone 5 mg/acetaminophen 650 mg, Q6-8h PRN	-Acetaminophen, 1G, Q6h -Ibuprofen 600 mg (If GFR > 60) Q8h PRN <i>For breakthrough pain:</i> - Tramadol 50 mg, Q6-8h PRN -Oxycodone 5 mg, Q6-8h PRN -Hydrocodone 5 mg/acetaminophen 650 mg, Q6-8h PRN

* Renal surgery includes radical nephrectomy, partial nephrectomy and nephroureterectomy

¹ Not all meds used in all patients; Listed in order of preference for escalating pain control

² All medications dosed for ideal body weight; At the discretion of the anesthesia team

TAP: Transversus Abdominis Plane

eTable 2. Opioid prescription patterns for all patients, *including* presurgical opioid users.

		Control	Lead-In	NOPIOiDS	P-value
Number of Patients		202	100	384	
Type of Opioids Prescribed, No. (%)	Hydrocodone	5 (2.5)	0 (0)	2 (16.7)	<0.001
	Oxycodone	93 (46.0)	11 (18.3)	4 (25)	
	Tramadol	103 (51.0)	49 (81.7)	9 (56.3)	
	Hydromorphone	1 (0.5)	0 (0)	1 (6.3)	
Opioid Prescriptions at Discharge, No. (%)	Overall	202 (100)	60 (60)	16 (4.2)	< 0.001
	Open Kidney	60 (100)	11 (64.7)	5 (7.5)	< 0.001
	Robotic Kidney	69 (100)	22 (71.0)	7 (8.1)	< 0.001
	RALP	58 (100)	21 (56.8)	0 (0)	< 0.001
	Cystectomy	15 (100)	6 (40)	1 (1.6)	< 0.001
Opioids Prescribed, Oxycodone 5mg, Median (IQR) (Range)	Overall	14 (10-20) (3.3-80)	4 (0-5.3) (0-20)	0 (0-0) (0-53.3)	< 0.001
	Open Kidney	18 (10.8-20) (6-80)	4 (0-9.3) (0-20)	0 (0-0) (0-53.3)	< 0.001

	Robotic Kidney	14 (10-20) (3.3-56)	4 (0-6.7) (0-20)	0 (0-0) (0-8)	< 0.001
	RALP	14.5 (12.5-20) (6-30)	3.3 (0-6) (0-14)	0 (0-0) (0-0)	< 0.001
	Cystectomy	20 (13.3-24) (6.7-40)	0 (0-5) (0-6.7)	0 (0-0) (0-10)	< 0.001
Total Phone Calls, No. (%)		38 (18.8)	11 (11)	46 (11.98)	0.052
Phone Calls for Pain, No. (%)		12 (5.94)	8 (8)	19 (4.9)	0.49
Patients Receiving Additional Opioid, No (%)		9 (4.5)	2 (2)	10 (2.6)	0.37

eTable 3. The rate and dose of opioid analgesics used *during* hospital stay.

	Patients Receiving Opioids No./Total (%)	p value	Mean (SD) Tablets Used*	Median (IQR) Tablets Used*
Lead-in Group: <i>Opioid naive</i>	53/95 (55.7%)	0.05	5.4 (16.3)	2 (1.0-4.0)
Lead-in Group: <i>Opioid users</i>	5/5 (100%)		5.4 (6.1)	1.3 (0.8-12.1)
NOPIODS Group: <i>Opioid naive</i>	170/358 (47.4%)	0.01	2.6 (4.6)	1.3 (0.6-20)
NOPIODS Group: <i>Opioid users</i>	19/26 (73.0%)		35.1 (108.7)	3.6 (1.3-10.3)

* Oxycodone-5mg Equivalent

eTable 4. Reason for phone calls made by the patients within 30 days after discharge.

Reasons for phone calls*	Control No. (%) Total: 194	Lead-in No. (%) Total: 95	NOPIOIDS No. (%) Total: 358
Total calls	34 (17.5)	9 (9.5)	41 (11.4)
Abdominal/Pelvic Pain	9 (4.6)	2 (2.1)	11 (3.1)
Gastrointestinal	5 (2.6)	4 (4.2)	2 (0.6)
Catheter/Urinary Issues	3 (1.5)	2 (2.1)	9 (2.5)
Fever	1 (0.5)	-	4 (1.1)
Wound	1 (0.5)	1 (1.1)	4 (1.1)
Hematuria/Bleeding/Edema	6 (3.1)	2 (2.1)	6 (1.7)
General/Appointments	8 (4.1)	-	6 (1.7)
Medications/Miscellaneous	6 (3.1)	2 (2.1)	5 (1.4)

*Total is > 100% because multiple reasons were recorded for some patients

eTable 5. Incidence of 30-day NSQIP complication rates.

Group	Overall complications**	Pneumonia*	PE*	DVT*	Readmissions*
Control, No (%)	33 (16.3)	1 (0.5)	2 (1.0)	0 (0)	22 (10.9)
Lead-in, No (%)	21 (21)	1 (1.0)	1 (1.0)	1 (1)	9 (9.0)
NOPIOIDS, No (%)	65 (17.0)	3 (0.8)	1 (0.3)	2 (0.5)	34 (8.9)

* No statistically significant differences noted between any group

#Includes all complications recorded in the NSQIP database

PE: Pulmonary embolism; DVT: Deep venous thrombosis requiring treatment

Avoiding Narcotic Use After Surgery

Our goal is to help you recover from surgery quickly, with minimal pain and without the risk of complications.

Most patients have concerns about having a lot of pain after surgery. In the past, narcotic pain medications were prescribed commonly. However, narcotic pain meds can cause many side effects and complications which can delay your recovery.

We know that using narcotic pain meds:

- Can cause **nausea, vomiting and constipation** which can result in **worse pain**
- Result in **drowsiness, fatigue** and lower activity level which can increase the **risk of complications**
- Sometimes **cross-react** with many other medications
- Have the potential for **abuse** by the patient or their family members
- Can cause 1 in 15 patients to become **dependent** on the narcotics

Preferred Pain Control Method after surgery

Vast majority of patients can achieve good pain control without using any narcotics. Your healthcare team will help you get through the recovery period, without being in pain, by using this protocol which has been developed over the last several years:

- **Before/during surgery:** using non-narcotic pain meds, meds to block the nerves, long-acting local anesthesia
- **During anesthesia:** Narcotic-free anesthesia, non-narcotic meds such as ketorolac
- **After surgery:** Combination of acetaminophen, ibuprofen, ketorolac, medications for nerves or anxiety, and if needed low-dose of narcotics
- **At home:** Combination of acetaminophen and ibuprofen, and possibly meds to relax the nerves and muscles.

*If any narcotic pain meds were prescribed, those may be used only if other meds are not controlling the pain.

**Please take any leftover narcotic pain meds to your local pharmacy for proper disposal. If that's not possible, then you may flush it down the toilet.

After discharge, if you are not able to continue the required activities (such as walking) due to pain, you will be **assessed by your surgeon or an associate**, and pain medications will be adjusted appropriately.

You can reach a member of your healthcare team at xxx-xxx-xxxx, **at any time, 24/7.**

Albany Medical center

eFigure 1. Instruction for patients in the *Lead-in* group.

Pain Assessment After Discharge

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You can reach a member of your healthcare team at xxx-xxx-xxxx, **at any time, 24/7.**

Please complete the “pain assessment” form at home. Please mail it using the provided envelop or bring it in to your follow up appointment.

Albany Medical Center

eFigure 2. Instruction for patients in the NOPIOIDS group.

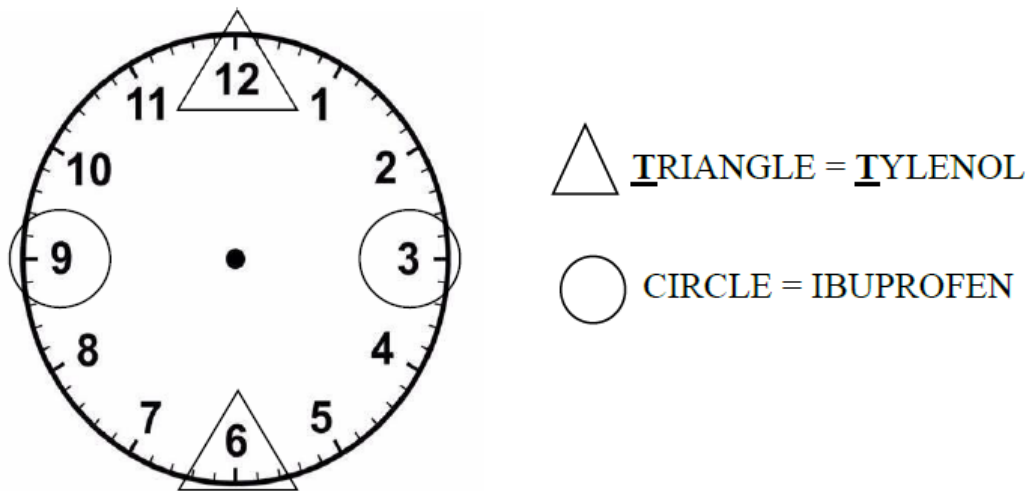
Pain Medication Schedule

You will be taking an over-the-counter pain medication EVERY 3 HOURS around the clock, switching between ACETAMINOPHEN (TYLENOL) and IBUPROFEN (MOTRIN), as explained below.

Acetaminophen (brand name: Tylenol): Take 3 pills of regular strength (325mg each) every six hours around the clock for the first 48 hours following surgery. (or you may take 2 pills of extra strength acetaminophen, 500 mg each).

AFTER 3 HOURS, TAKE:

Ibuprofen (brand name: Motrin): Take 3 pills of regular strength (200mg each) every six hours around the clock for the first 48 hours following surgery.



After the first 2 days at home, you can continue this schedule or use it AS NEEDED. Be sure to take the medication BEFORE pain becomes too severe to maintain pain control.

Please complete the attached "Pain Assessment After Discharge" form daily, and mail it to the office after 7 days, using the pre-stamped envelope.

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eFigure 3. Instruction for taking pain medications after discharge.

Pain Assessment After Discharge

Severity	Description of Experience
10 Unable to Move	I am in bed and can't move due to my pain. I need someone to take me to the emergency room to get help for my pain.
9 Severe	My pain is all that I can think about. I can barely talk or move because of the pain.
8 Intense	My pain is so severe that it is hard to think of anything else. Talking and listening are difficult.
7 Unmanageable	I am in pain all the time. It keeps me from doing most activities.
6 Distressing	I think about my pain all of the time. I give up many activities because of my pain.
5 Distracting	I think about my pain most of the time. I cannot do some of the activities I need to do each day because of the pain.
4 Moderate	I am constantly aware of my pain but I can continue most activities.
3 Uncomfortable	My pain bothers me but I can ignore it most of the time.
2 Mild	I have a low level of pain. I am aware of my pain only when I pay attention to it.
1 Minimal	My pain is hardly noticeable.
0 No Pain	I have no pain.

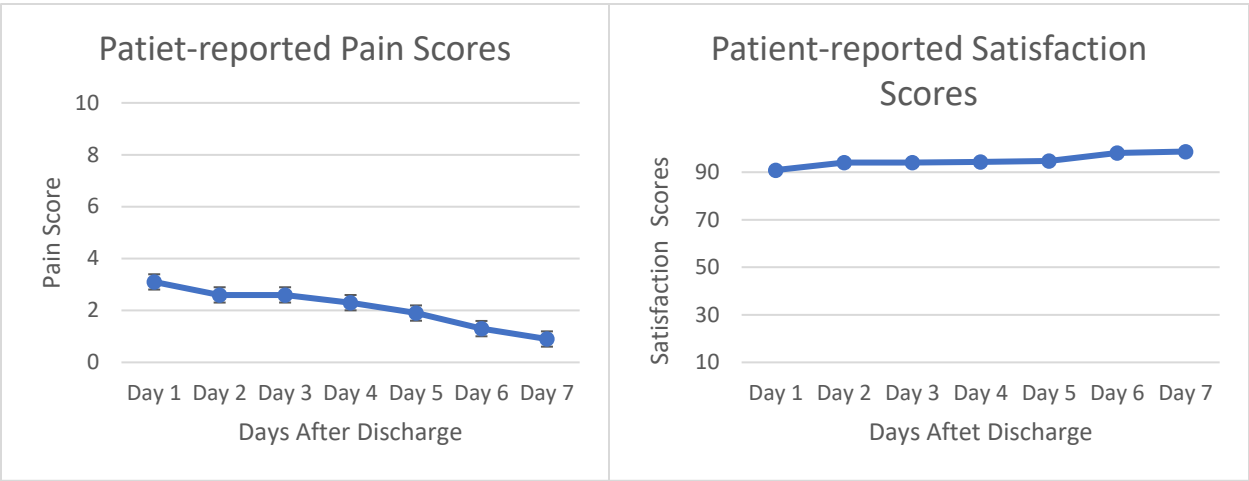
- Place a number in each box which matches your level of pain or discomfort each day.
- Write the name of pain medication used each day, if any.
- Write your satisfaction score about pain control between 0% and 100%.

	Day of Discharge	1 st day at home	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
Pain Score 0-10								
Pain Meds Used								
Satisfaction Score (0-100%)								

Did you call any other doctor's office for pain meds (circle one)? Yes No
 If yes, when did you call? _____

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eFigure 4. Patient self-assessment of pain control after discharge.



eFigure 5. Patient-reported pain scores and satisfaction scores in the Lead-in group.