Pharmacy Practice Platform Presentations 2018

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Assessment of Automated Usage Forms for Controlled Substance Tracking at a Large Academic Medical Center

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No author of this study has any financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation

Learning Objectives

- Pharmacist
  - Describe the importance of both nursing and pharmacy departmental education in piloting controlled substance usage forms
  - Identify potential limitations of tracking controlled substances with usage forms
- Technician
  - Identify opportunities for technicians to become involved in the controlled substance usage form process
  - Identify the amount of time it took pharmacy technicians to reconcile controlled substance usage forms

Why is it important to track controlled substance dispensing within health-systems?

Background

- Controlled Substance Monitoring
  - Patient Safety, Diversion, Quality Improvement, etc.
- Currently, a paper-based tracking system is used for patient-specific controlled substances dispensed from the pharmacy
  - Strengths and Limitations
- An automated system is in place that has an alternative way to track these patient-specific controlled substances

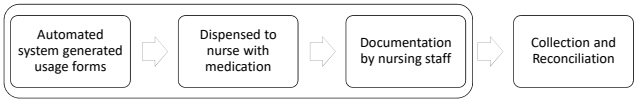
Am J Health Syst Pharm. 2001;58(19):1830-5.

Purpose

- Pilot implementation of automated controlled substance usage forms
  - Patient-specific
  - Matches nursing administration
  - Reviewed on a more continual basis
- Propose feasibility and workflow changes to controlled substance tracking at our institution
  - The implementation impacts groups outside of the pharmacists and technicians

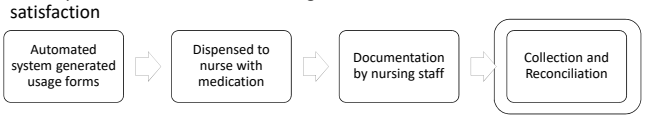
Methods

•A two week pilot of automated system generated controlled substance usage forms was carried out on two units
•Existing paper-based tracking system was continued throughout the pilot
•Nursing staff documented medication administration, waste, and/or return



Methods

•Forms were returned to the pharmacy, and reconciled back to the automated system
•Collected information included complete, incomplete, and missing usage forms, and pharmacy technician time spent
•Surveys were conducted with nursing and technician staff to evaluate satisfaction

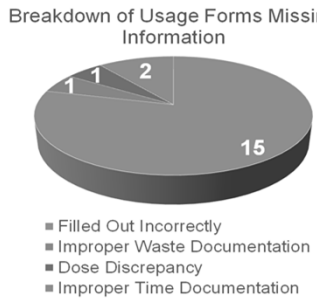


What are some potential barriers to the implementation of a process like this at your institution?

Results

•Approximately 1 of 4 usage forms was not returned to pharmacy
•Almost 50% of the total dispensed usage forms were either missing or incomplete, n=35 (48%)

Table 1: Usage Forms	
Usage Form:	% (N)
Dispensed from Pharmacy	100 (72)
Returned to Pharmacy	78 (56)
Correctly Completed by RN	66 (37)
Missing Information	34 (19)



Results

- Pharmacy technicians workflow
  - Minimal time impact in daily activites
  - Were able to aid in implementation
  - Identified documentation issues
- Decentralized pharmacy technicians dedicated to a specific area were crucial in the success of this process

Table 2: Technician Time to Reconcile	
Average Technician Time Spent:	Time (Minutes)
Per Form	1.32
Per Day	5.57

Results

- Implementation required education and communication
  - Nursing staff and pharmacy staff
- Nurses understood the process but preferred current method

Table 3: Nursing Survey Post-Pilot		
Question	Yes	No
Do you know what a usage form is used for?	11	6
Are the forms easy to understand?	9	2
Do you like forms more than current paper tracking?	1	7

Conclusions

- A retrospective audit of the administration of controlled substances in the electronic medical record was conducted by a pharmacist as a part of this study which currently isn't a part of daily practice
- Current pharmacy technician resources would be a barrier to implementation hospital-wide
- The implementation of hospital-wide automated usage forms at a large academic medical center, especially in units without a dedicated technician, would likely result in similar low rates of compliance

Questions?

Evaluation of intraoperative, local site injections of liposomal bupivacaine as an alternative to standard local anesthetics in patients undergoing total hip arthroplasty

Daniel Knolhoff, Pharm.D., BCPS

The speaker has nothing to disclose

Learning objectives

- Pharmacist:
  - Identify the differences in clinical outcomes and healthcare expenditure in patients undergoing total hip arthroplasty with liposomal bupivacaine compared with ropivacaine or bupivacaine.
- Technician:
  - List different intra-operative treatment options to reduce post-operative pain following total hip arthroplasty.

Background

- 310,800 total hip arthroplasties (THA) were performed among inpatients aged 45 and over in USA in 2010.*
- Approximately 2.5 million Americans were living with THA in 2010.**
- Perioperative pain management is challenging, which can result in delayed discharge, increased opioid use, and decreased functional recovery.

*Wolford ML, Palso K, Bercovitz A. Hospitalization for total hip replacement among inpatients aged 45 and over: United States, 2000–2010. NCHS data brief, no 186. Hyattsville, MD: National Center for Health Statistics. 2015.
**Maradit Kremers H, Larson DR, Crowson CS, et al. Prevalence of Total Hip and Knee Replacement in the United States. *J Bone Joint Surg Am*. 2015; 97(17): 1386-1397.

Background (Continued)

- Liposomal bupivacaine (Exparel®, Pacira Pharmaceuticals Inc., Parsippany, NJ) is an extended-release formulation of bupivacaine, indicated for administration into the surgical site to produce postsurgical analgesia, designed to allow drug diffusion to occur for up to 72 hours following a single administration perioperatively.

Objectives of study

- To evaluate the clinical outcomes, post-discharge utilization, and expenditure of patients undergoing THA with either liposomal bupivacaine (LB) versus plain bupivacaine or ropivacaine.
  - Opioid (morphine-equivalent) consumption
  - Opioid complications
  - Post-operative pain scores
  - Physical function (walking distance in feet)
  - Length of hospital stay (LOS)
  - Discharge disposition
  - Readmission rate at 30, 60 and 90 days after hospital discharge
  - Hospital costs
  - Post-discharge payment and utilization at 30, 60, and 90 days

Study design

- This was a retrospective cohort study of consecutive patients undergoing total hip arthroplasty (THA) at 3 hospitals (members of the Accountable Care Organizations) within a U.S. healthcare system from January 2013 to July 2016.
- The control group received the standard of care undergoing THA surgery (plain bupivacaine or ropivacaine), while the liposomal bupivacaine (LB) group received a mixture containing this drug as the alternative to the standard care.
- Peoria and Rockford, Illinois IRB approved.

Treatment protocol

A standard cementless total hip arthroplasty was performed through a posterolateral approach. The following medications were injected locally in the soft tissues around the hip during the procedure.

- **Control**: **plain bupivacaine** or **ropivacaine,** which may be combined with ketorolac, epinephrine, morphine, or fentanyl.
- **LB**: a mixture of 20 ml liposomal bupivacaine (Exparel®), combined with any of the following: ketorolac (30mg, 15mg, or 0 mg depending on patient age and renal function status), and 30 ml bupivacaine with epinephrine, or clonidine.

Exclusion criteria

- 21 patients were excluded

Reason for exclusion	Frequency
Congenital deformaties and multiple pre-op comorbidities	1
Hardware removal	2
Infected hip prosthesis pre-op & hardware removal	1
Major systemic complications	1
Pre-op LOS	1
Pre-op fracture	12
Pre-op fracture & hardware removal	3

Data source

- Two groups of patients were identified from the OSF Pioneer ACO database during the period of January 2013 to July 2016. For each eligible patient, data was extracted from the electronic medical record.
- Facilities: OSF Saint Francis Medical Center, OSF Saint Anthony's Medical Center, and OSF Saint James – John W. Albrecht Medical Center

Sample size

- Total of 146 patients (73 each group) needed to detect the differences of primary outcomes between two groups.[a]

Primary Outcomes	Results in previous internal study (mean±standard deviation)	Sample size (n total) [a]
Distance walked at first day after surgery [b]	201.9±173.3 vs 46.3±72.6	34
Distance walked at discharge [b]	227.8±123.1 vs 154.5±126.4	128
Length of stay [b]	2.6±1.4 vs 3.2±0.7	146

[a] Given a power of 90% and a significance level of 0.05.
[b] Kirkness CS, Asche CV, Ren J, Gordon K, Maurer P, Maurer B, et al. Assessment of liposome bupivacaine infiltration versus continuous femoral nerve block for postsurgical analgesia following total knee arthroplasty: a retrospective cohort study. Current medical research and opinion. 2016;1-10. Epub 2016/06/22. PubMed PMID: 27326760.

Statistical methods

- Descriptive
  - Mean, SD, median, min, max
  - Frequency, percentage
- Univariate analysis
  - Chi-square test, fisher exact test
  - T test for raw data or log transformed data
- Multivariable analysis
  - Generalized linear model with binary distribution
  - Generalized linear model with lognormal or gamma distribution
  - Controlling factors included age, gender, race, BMI, alcohol use, tobacco use and surgeons.

Patient demographics

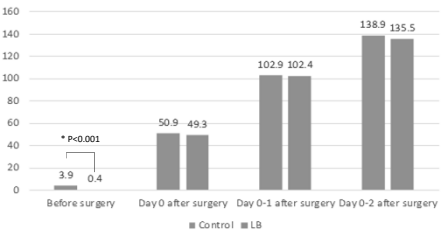
			Control (N=103)	LB (N=70)		
Factors	Label	Total N (%)	N (%)	N (%)	Value	P value
Gender, N(%)	1:Female	102 (59.0)	61 (59.2)	41 (58.6)	0.03	0.932
Age	mean (SD)	73.1(7.9)	72.7(7.3)	73.7(8.8)	-0.76	0.446
Race, N(%)	1:White or Caucasian	167 (96.5)	102 (99.0)	65 (92.9)	3.08	0.079
BMI, N(%)	1:BMI<25	30 (17.3)	16 (15.5)	14 (20.0)	4.57	0.102
	2:BMI 25-29.9	66 (38.2)	46 (44.7)	20 (28.6)		
	3:BMI >=30	77 (44.5)	41 (39.8)	36 (51.4)		
Alcohol use, N(%)	1:Yes	96 (55.5)	53 (51.5)	43 (61.4)		
Tobacco user, N(%)	1:YES	11 (6.4)	6 (5.8)	5 (7.1)	0.87	0.647
	2:Quit	88 (50.9)	50 (48.5)	38 (54.3)		
	3:Never	74 (42.8)	47 (45.6)	27 (38.6)		
Location, N(%)	1:SAMC	44 (25.4)	29 (28.2)	15 (21.4)	6.49	0.039
	2:SFMC	97 (56.1)	50 (48.5)	47 (67.1)		
	3:SJH	32 (18.5)	24 (23.3)	8 (11.4)		
Surgeon, N(%)	1:A	44 (25.4)	29 (28.2)	15 (21.4)	13.68	0.003
	2:B	40 (23.1)	27 (26.2)	13 (18.6)		
	3:C	57 (32.9)	23 (22.3)	34 (48.6)		
	4:D	32 (18.5)	24 (23.3)	8 (11.4)		
Anesthesia, N(%)	1:Spinal	115 (66.5)	67 (65.0)	48 (68.6)	0.23	0.630
	2:General	58 (33.5)	36 (35.0)	22 (31.4)		

Intraoperative medications

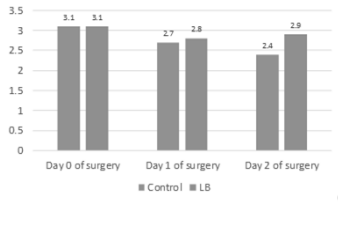
				Control (N=103)	LB (N=70)		
Group	Drugs	Label	Total N (%)	N (%)	N (%)	Value	P value
Regional med used	bupivacaine, N(%)	1:Yes	106 (61.3)	59 (57.3)	47 (67.1)	1.71	0.191
	morphine, N(%)	1:Yes	14 (8.1)	11 (10.7)	3 (4.3)	2.29	0.130
Local med mixture	liposomal bupivacaine, N(%)	1:Yes	70 (40.5)	0 (0.0)	70 (100.0)	173.00	<0.001
	bupivacaine, N(%)	1:Yes	23 (13.3)	0 (0.0)	23 (32.9)	39.03	<0.001
	bupivacaine/epinephrine, N(%)	1:Yes	105 (60.7)	58 (56.3)	47 (67.1)	2.05	0.152
	ropivacaine/epinephrine, N(%)	1:Yes	44 (25.4)	44 (42.7)	0 (0.0)	40.10	<0.001
	ketorolac, N(%)	1:Yes	90 (52.0)	45 (43.7)	45 (64.3)	7.08	0.008
	fentanyl, N(%)	1:Yes	2 (1.2)	2 (1.9)	0 (0.0)	0.20	0.654
	morphine, N(%)	1:Yes	17 (9.8)	17 (16.5)	0 (0.0)	12.81	<0.001
	clonidine, N(%)	1:Yes	15 (8.7)	0 (0.0)	15 (21.4)	24.17	<0.001
Other meds	diphenhydramine, N(%)	1:Yes	16 (9.2)	13 (12.6)	3 (4.3)	3.45	0.063
	dexamethasone, N(%)	1:Yes	70 (40.5)	37 (35.9)	33 (47.1)	2.18	0.140
	ondansetron, N(%)	1:Yes	105 (60.7)	64 (62.1)	41 (58.6)	0.22	0.638

*12.6% Patient Control Analgesia (PCA) use in the control group, 0% in the LB group

Opioid Doses Used (morphine-equivalent, mg)



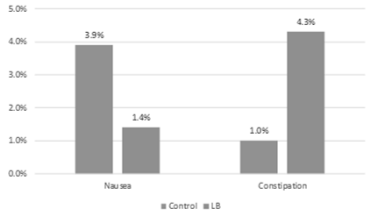
Average pain score (0-10)



No statistical significance, adjusted p>0.05 for all

Opioid-related complications

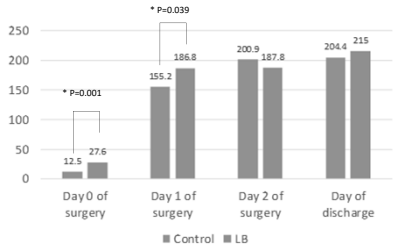
(based on selected medication use)



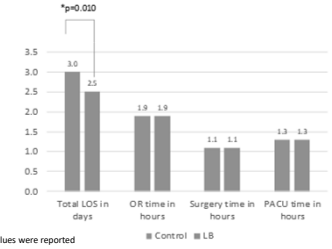
- No statistically significant differences of nausea and constipation between both groups (p>0.05).
- There were no in-patient falls in both groups.

Physical therapy

(walking distance in feet)

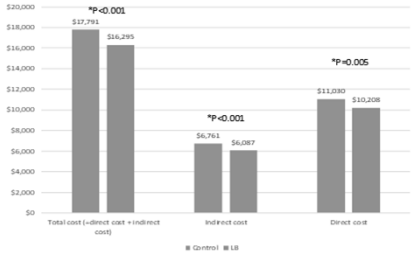


Length of Stay (LOS)

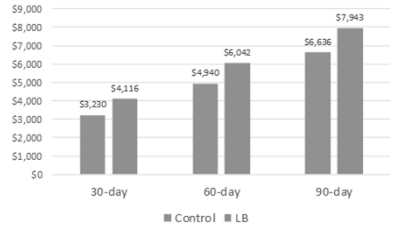


*Adjusted values were reported
OR: Operating room
PACU: Post-anesthesia care unit

Hospital total cost components

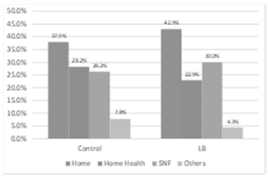


Post-discharge payments



No significant difference for all (p>0.05).

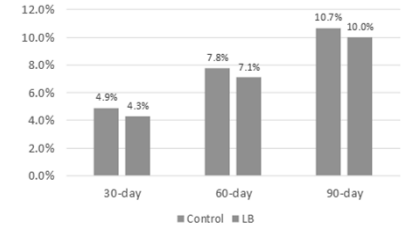
Discharge disposition



No statistical significance, p>0.05 for all

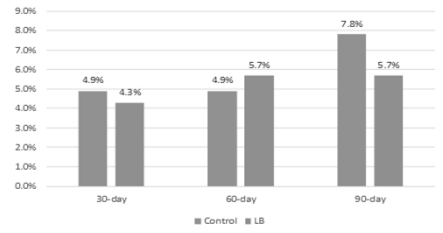
Other discharge	Control	LB
Another type of Health Care Inst not listed	1	0
Discharged/Transferred to IP Rehab Facility (IRF)/Unit	0	2
Discharged/Transferred to Swing Bed	6	0
Short Term Hospital for Inpt Care	1	1

Post-discharge all-cause readmissions



No significant difference for all (p>0.05).

Post-discharge surgery-related readmissions



No significant difference for all (p>0.05).

Study Summary

- Lower LOS (0.5 days)
- Improved walking distances on day of surgery and post-op day one
- Reduced average total hospital cost (~$1500)

What intra-operative medications have been studied for post-operative analgesia in total hip arthroplasty?

1. Liposomal bupivacaine injection
2. Bupivacaine with epinephrine injection
3. Sevoflurane
4. Ropivacaine with epinephrine injection

Answer:

A. 1
B. 1, 3, 4
C. 1, 2, 4
D. All of the above

What did the OSF retrospective study show as significant outcome differences between liposomal bupivacaine and bupivacaine or ropivacaine in total hip arthroplasty?

1. Lower length of stay
2. Reduced morphine equivalents
3. Decreased readmissions
4. Reduced average total direct hospital costs

Answer:

A. 1, 4
B. 1, 3
C. 2, 4
D. All of the above

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Questions?