Implementation of a Clinical Pathway for Pancreaticoduodenectomy Patients

Zach Whitham

Aaron U. Blackham MD

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Mentor: Aaron Blackham, MD
Lehigh Valley Health Network, Allentown, Pennsylvania

Background

- Pancreaticoduodenectomy outcomes have improved at high volume centers
- Average length of stay remains 11-15 days
- Enhanced Recovery After Surgery (ERAS) pathways revolutionized colonic surgery
  - Focus on preoperative optimization, perioperative multimodal analgesia, early ambulation
  - Shortened length of stay, decreased morbidity rates, and reduced hospital costs
- Other centers report successfully implementing Whipple ERAS pathways
  - Average length of stay 7-13 days
  - Unchanged mortality and morbidity rates
  - Still much variation in pathway design
- Lehigh Valley Physicians Surgical Oncology group recently became a high volume center

Problem Statement

This study aims to analyze the effect of implementing a clinical pathway for pancreaticoduodenectomies at a high-volume center on length of stay and readmission rate

Methods

- Retrospective chart review of patients who underwent a pancreaticoduodenectomy
- Two cohorts
  - Prepathway: May 3rd, 2016 – April 28th, 2017
  - Postpathway: May 19th, 2017 – Sep. 21st, 2018
- Inclusion criteria: patients who underwent pancreaticoduodenectomy from May 1st, 2016 – April 30th, 2018
- Exclusion criteria: procedure performed by surgeons outside LVPG surgical oncology
- Key aspects of pathway

Component	Plan
Preoperative optimization	Preoperative education Nutritional supplementation Cardiology consultation
Perioperative multimodal analgesia	Thoracic epidural Scheduled ketorolac and acetaminophen
Early ambulation	OOB to chair POD 1 Ambulate in hall POD 2
Early enteral feeding	Remove NGT POD3 Clear liquid diet POD 4 Regular diet POD 6

Results

- 84 patients underwent Whipple procedure (42 patients in each cohort)

		Pre-Pathway	Post-Pathway
Age, years		69.5	71
Gender			
	Male	24	23
	Female	18	19
Surgeon			
	Surgeon 1	36	31
	Surgeon 2	6	11

- Primary outcomes

	Pre-Pathway	Post-Pathway
Median LOS, days	8	8
Average LOS, days	9.5	10.3
Readmissions (%)	18 (43%)	6 (14%)

- Readmission diagnoses

Diagnosis	Pre-Pathway	Post-Pathway
Pancreatic fistula	2	0
Pancreatitis	1	1
Delayed gastric emptying	1	0
Abdominal abscess requiring drainage	2	2
Wound dehiscence/surgical site drainage	2	2
Abdominal pain	1	0
Sepsis, peritonitis	2	0
Syncope	2	0
Nausea, dehydration	0	2
Failure to thrive	1	0
Fascial dehiscence	0	1
Altered mental status	1	0
Possible myocardial infarction	1	0

- Pathway compliance

Marker	Pre-Pathway	Post-Pathway	Ideal (%)
Average POD ambulation	4.48	3.88	4 (9.5)
Average POD epidural removed	3.46	3.06	21 (65.6)
Did not receive an epidural	5	10	-
Average POD Foley removed	3.90	3.10	32 (76.2)
Average POD NGT removed	3.48	3.35	27 (64.3)
Average POD clear liquid diet	4.98	4.55	25 (59.5)
Average POD regular diet	7.20	6.59	24 (57.1)
Average POD physical therapy evaluation	3.38	2.77	17 (40.5)
No documented physical therapy	8	3	-
Average POD case management	2.4	2.55	-
Average POD disposition determined	6.43	7.05	-

Discussion

- No reduction in LOS
  - Already at lower end of spectrum prior to pathway
  - Several cases where finding disposition delayed discharge
- Reduced readmission rate
  - Other centers report 15-30%
  - Better conditioning?
  - Better drain management?
- Pathway compliance
  - POD ambulation biggest deviation with PT consultation second largest
  - Poorer epidural placement and removal than expected
  - Similar rates of delayed gastric emptying and NGT reinsertion
- SELECT Principles
  - Kotter's model for leading change
  - Cost reductions with ERAS
  - Plan-Do-Study-Act and continuous improvement

Conclusions

- Successfully implemented pathway with decreased readmission rate
- Identified areas of low compliance that can be targeted for further improvement
- Further refinement required to achieve continued advancements

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