

Implementation of a Single-Stage Laparoscopic Choledocholithiasis Pathway Using Spyglass Discover™ at an Academic Teaching Institution: Early Clinical and Financial Outcomes

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Introduction

- Choledocholithiasis traditionally involves a two-stage pathway of endoscopic retrograde cholangiopancreatography (ERCP) followed by laparoscopic cholecystectomy (LC).
- This results in prolonged length of stay (LOS), higher costs, and increased patient morbidity.
- Single-stage laparoscopic common bile duct exploration (LCBDE) offers advantages but has been limited by equipment and training.

Objective

- To investigate the efficacy a structured single-stage program at an academic teaching hospital using the Spyglass Discover™ digital choledochoscope.

Methods

- A prospective examination of an initial pilot cohort approved by the hospital administration to undergo Spyglass-assisted single stage approach (Feb-Aug 2025) at an academic tertiary care center.
- A multidisciplinary team established a standardized single-stage choledocholithiasis pathway.
- Program development included device acquisition, operation room staff training, and structured involvement of general surgerty residents and the MIS fellow.
- Financial model constructed using the average institutional and regional mean cost of LC, inpatient bed per day, ERCP, MRCP, and Spyglass disposable scope.
- Outcomes analyzed included LOS, stone clearance, complications, readmissions/reoperations, and projected costs/revenue.

Results

Patient	LOS	Spyglass performed	MRCP performed	Stone removed	Need for ERCP	Readmission	Reoperation
1	2.5	yes	no	yes	no	no	no
2	2	yes	no	yes	no	no	no
3	5	yes	yes	yes	no	no	no
4	2	yes	no	yes	no	no	no
5	2	yes	no	yes	no	no	no
6	2	yes	no	yes	no	no	no
7	1	yes	no	yes	no	no	no
8	3	yes	no	yes	no	no	no
9	2	yes	no	yes	no	no	no
10	2	yes	no	yes	no	no	no

Table 1. Each patient prospective data for choledocholithiasis

Variable	Single stage	Two-stage	p value
Overall LOS	2.35 days	5.08 days	<0.001
Total cost	\$45965.7 +/- 10524.6	\$52162.2 +/- 12059.3	0.039

Table 2. Cost analysis for single-stage vs two-stage

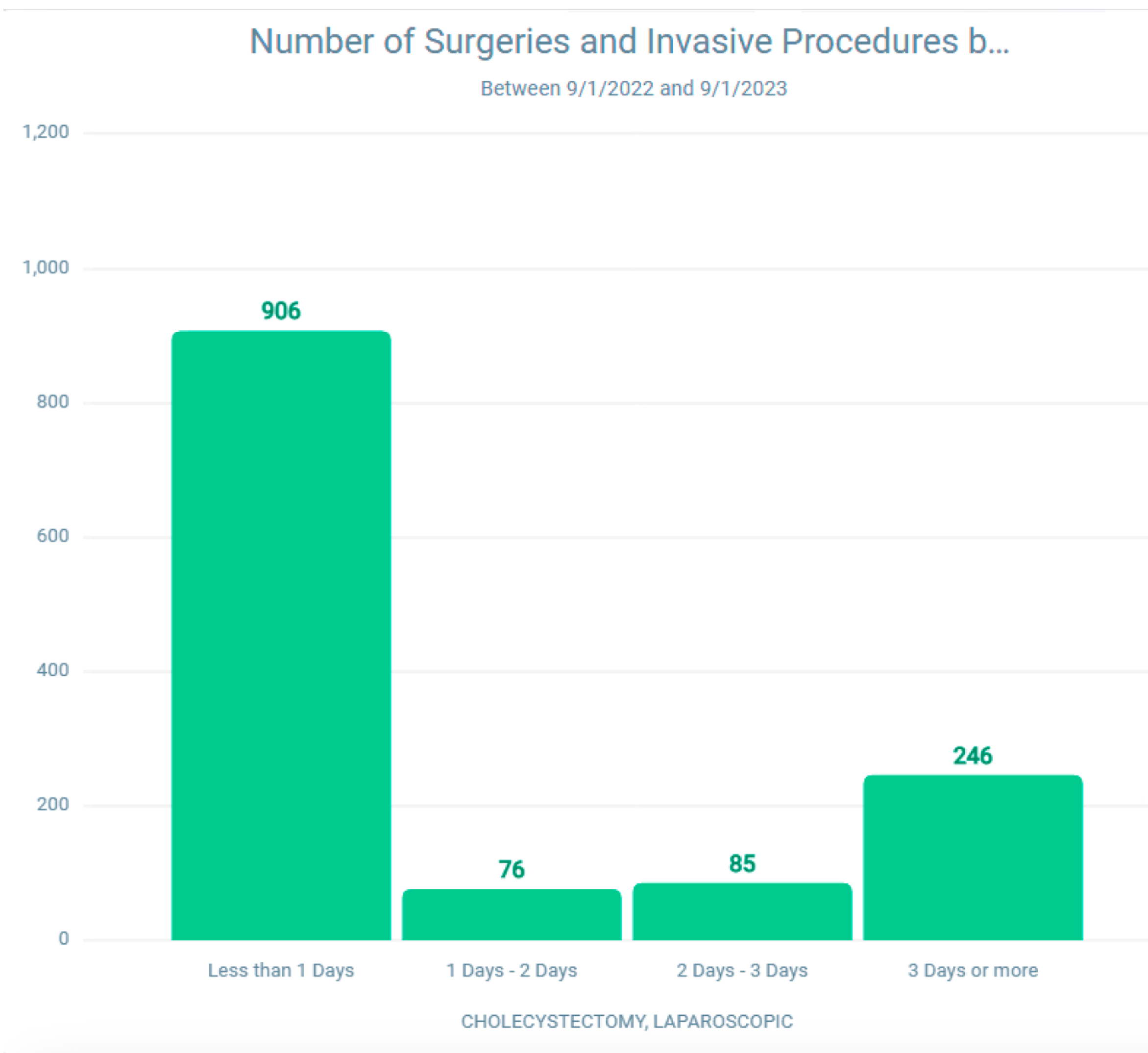


Figure 1. LOS for cholecystectomy operations at our tertiary care hospital

Variable	LOS (mean)	Standard error
ERCP then LC	5.08 days	0.198
LOS for patients awaiting ERCP	2.2 days	0.135

Table 3. Mean LOS for two-stage pathway

Variable	LOS (mean)
LC average OR cost	\$600 per case
Average cost / day in the state of RI	\$2851
Average cost for MRCP in New England	\$919
Average cost of ERCP at our institution	\$3000-5000
Spyglass disposable scope cost	\$3000

Table 4. Mean cost for components of two-stage pathway

Variable	Components	Total
Single stage	LC (\$600) + 2 hospital days (\$5702) + spyglass (\$2950)	\$9302
Two stage	LC (\$600) + 5 hospital days (\$14255) + MRCP (\$919) + ERCP (\$3000)	\$18744

Table 5. Mean cost for Single vs two stage pathways

Conclusions

- Early implementation of Spyglass-assisted single-stage choledocholithiasis pathway at an academic teaching hospital demonstrated safety, effectiveness, financial sustainability, and unique educational values for residents and fellows in advanced biliary surgery.