



British Association Of Day Surgery

Promoting Excellence in Day Surgery

Predictive factors for Subtotal Cholecystectomy in Elective Laparoscopic Cholecystectomy

Maximilian Franke, Daniel Warrell, Rungphloy Jaroenchasri, Hari Nageswaran

Introduction

Subtotal cholecystectomy (STC) is carried out when **safe dissection of Calot's triangle** is not possible to allow total cholecystectomy (TC), thereby reducing the risk of major complications such as bile duct injury and with the aim of mitigating major complications such as bile duct injury. Patients undergoing STC normally require post-operative admission and monitoring for bile leak. Therefore, this study aimed to determine predictive factors for STC in *elective* laparoscopic cholecystectomy (LC) and therefore aid identification of patients **not suitable for day surgery**.

Methods

Data was collected between 01/01/2022 and 31/07/2023 from hospitals throughout Aneurin Bevan University Health Board, Wales, UK. All patients receiving elective LC had data collected on demographics, co-morbidities, intraoperative factors and complication rates. Variables with $p < 0.05$ on univariable analysis were included in a multivariate regression analysis. A p value of <0.05 was also used to define statistical significance in the multivariable model.

Results

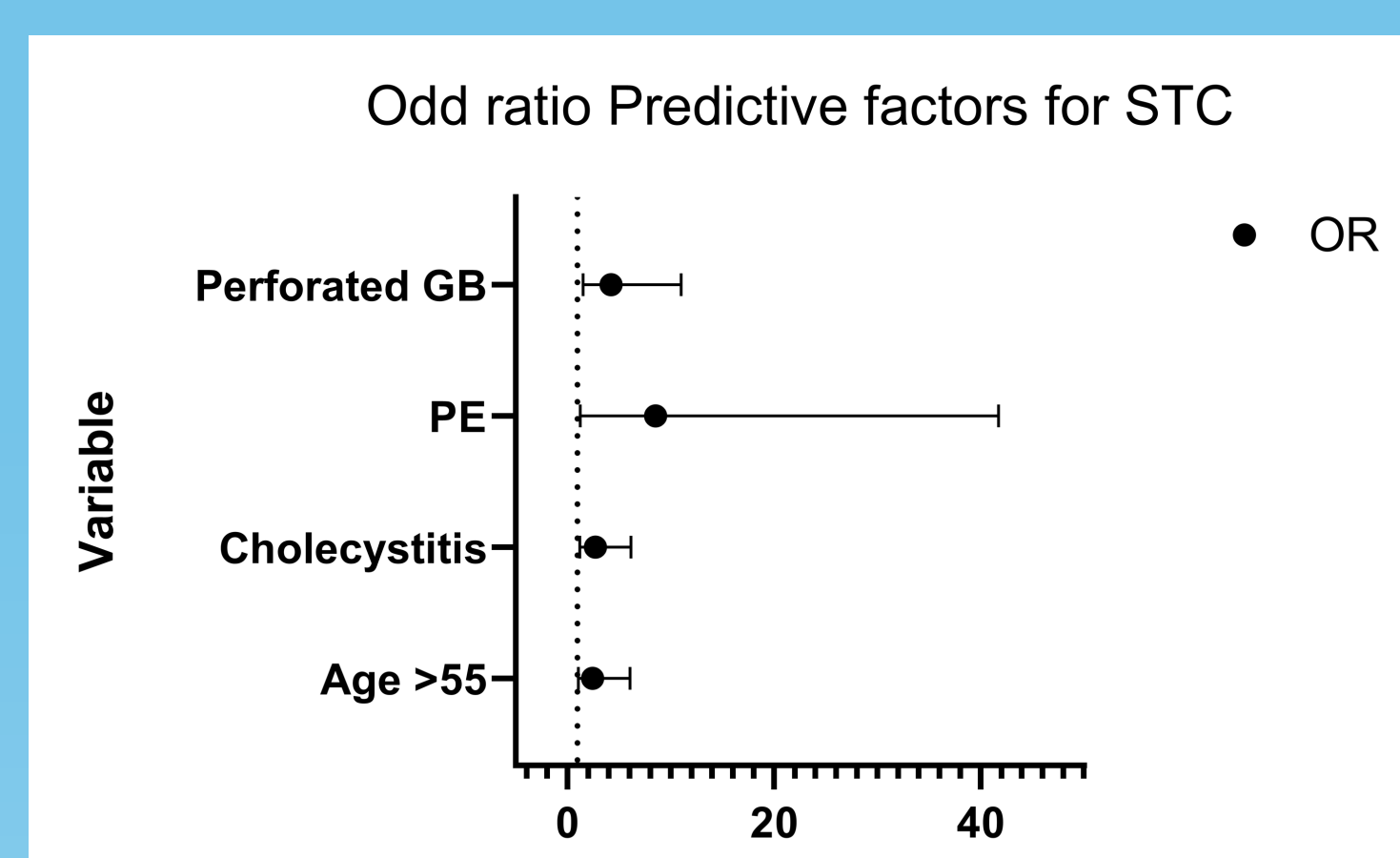
1,041 patients were included in this study, 22% male 78% female. **34 (3.27%)** underwent STC. On univariable analysis statistical variables those who underwent STC were typically of **advanced age** (61.21 vs. 50.14 years, $p = <0.0001$) and more likely **males** (47.06% vs. 19.66%, $p = 0.0012$) compared to those who underwent TC. On Univariate analysis, previous **acute cholecystitis** (67.65 vs 28.7%, $p = <0.0001$), **perforated gallbladder** (26.47 vs 3.48%, $p = <0.0001$), and **choledocholithiasis** (41.18 vs 12.31%, $p = <0.0001$) were significantly more prevalent in the STC group. Patients with a history of **ERCP** were more likely to undergo subtotal cholecystectomy (41.18% vs 9.83%; $p = <0.001$) but this association was not significant if surgery occurred within 3 months post-ERCP. Of the co-morbidities examined, only an incidence of **previous pulmonary embolism** (8.82% vs 0.81%, $p = 0.0046$) was significantly correlated with STC.

In multivariate Diagnosis of **pulmonary embolism** and **perforated gallbladder** exhibited the most substantial association with the likelihood of undergoing STC, with adjusted odds ratios of 8.523 (95% CI 1.257–41.71.57, $p = 0.0138$) and 4.233 (95% CI 1.151–11.04, $p = 0.0041$) respectively. **Acute cholecystitis** demonstrated an adjusted odds ratio of 2.701 (95% CI 1.232–6.149, $p = 0.0144$). **Age exceeding 55 years** was another significant predictor, with an adjusted odds ratio of 2.451 (95% CI 1.079–6.060, $p = 0.0392$).

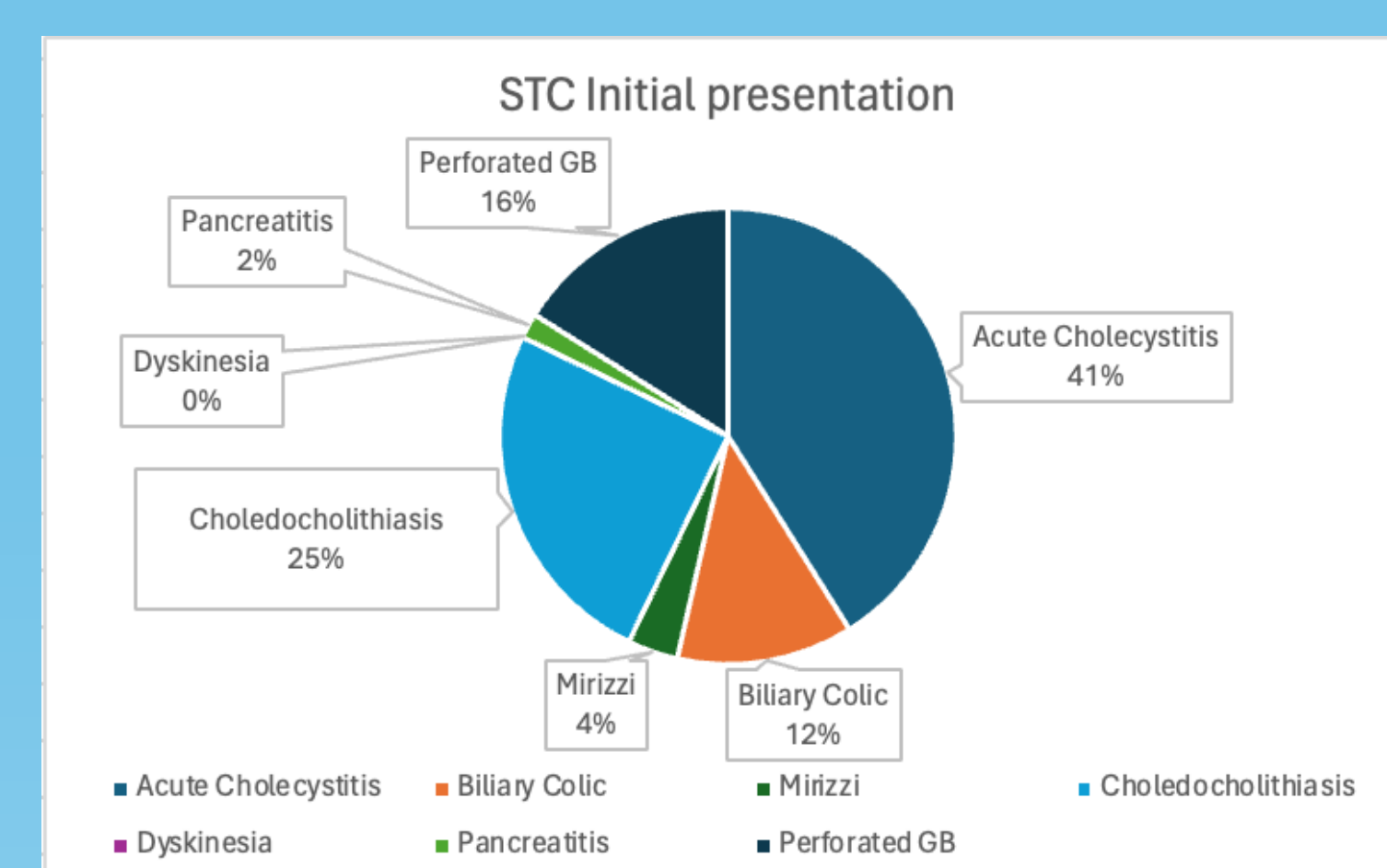
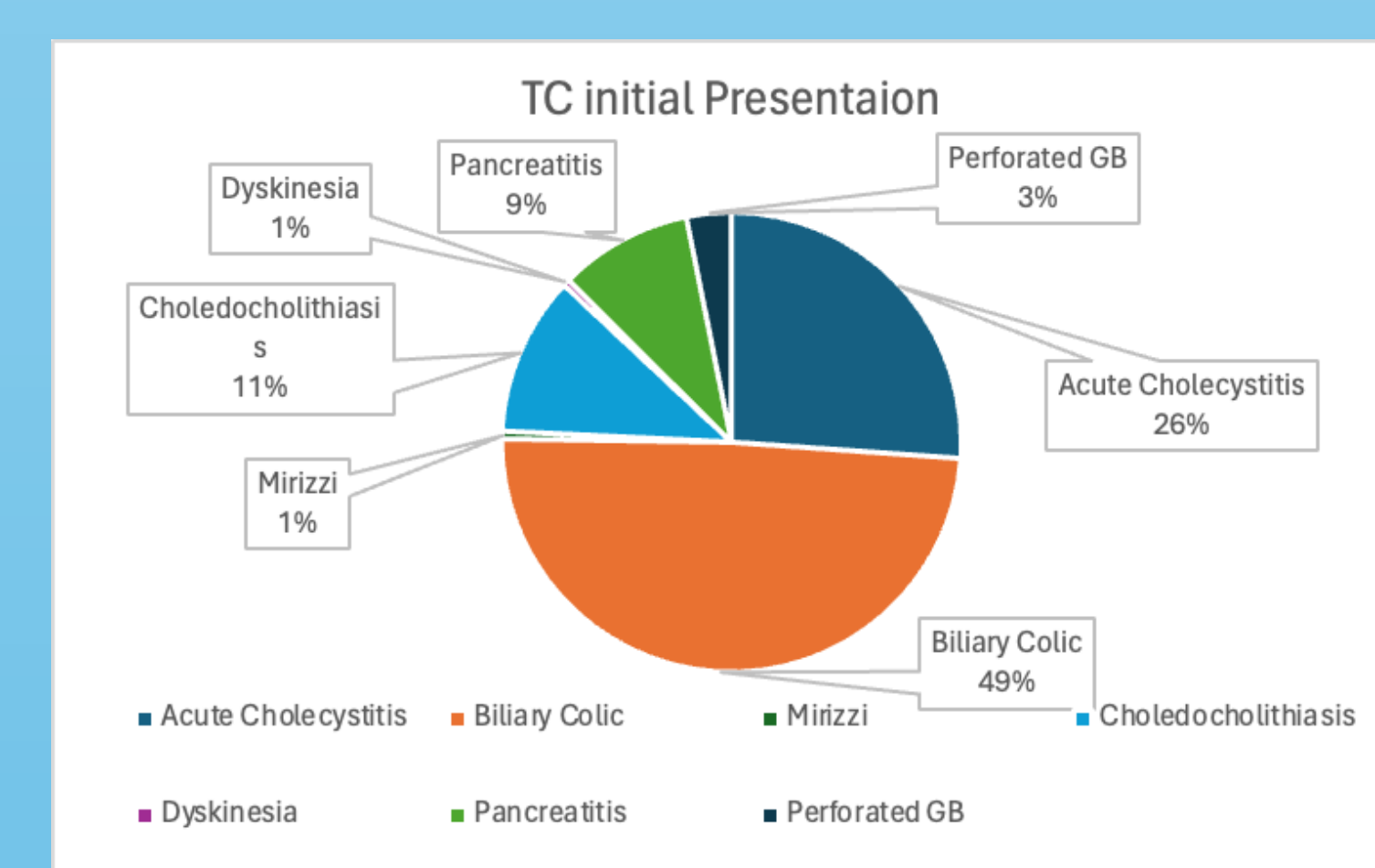
The **mean operative time was significantly higher** in the subtotal group with a median of 128 min, (range 74–287) compared with 77 min (range 19–275 mins) in the total cholecystectomy group; ($p = 0.0001$). The **length of admission** was also increased in the subtotal group with median 2 days, (range 0–14 days) compared with median 0 days, (range 0–14 days), $p = 0.0001$

Significant raise in **overall complications** in the STC group was identified, but this was only associate with an expected post-operative bile leak (14.71% vs. 1.59%, $p = 0.0004$), no other increase rates in complications were associated, including **BDI** (0% vs. 0.01%, $p = >0.9999$). There were **2 mortalities**, one in each 30-day and 90-day post-operative period, both occurring in **TC** group ($p > 0.9999$).

Multivariate	Odds ratio	95% CI	P value
Male	1.952	0.9003 - 4.174	0.0849
Age >55	2.451	1.079 - 6.060	0.0392
Cholecystitis	2.701	1.232 - 6.149	0.0144
mirizzi	4.539	0.3408 - 34.78	0.1833
Cholecodocholithiasis	2.292	0.8207 - 6.090	0.1038
PE	8.523	1.257 - 41.71	0.0138
ERCP	1.201	0.2201 - 4.782	0.8112
ERCP >6month	2.011	0.5077 - 10.48	0.3516
Perforated GB	4.233	1.515 - 11.04	0.0041



	Subtotal cholecys tectomy n = 34 (%)	Total cholecys tectomy n = 1007 (%)	P-value	
Post-op				
Complications n=74 (7.11 %)				
Overall	6 (17.65)	68 (6.75)	0.0286	
Bile leak	5 (14.71)	16 (1.59)	0.0004	
Collection	1 (2.94)	6 (0.59)	0.2079	
Wound infection	0 (0)	35 (3.48)	0.6249	
Bleed	0 (0)	4 (0.40)	>0.9999	
Pancreatitis	0 (0)	2 (0.20)	>0.9999	
BDI	0 (0)	1 (0.10)	>0.9999	
Pain	0 (0)	8(0.79)	>0.9999	
Pyrexia	0 (0)	1 (0.10)	>0.9999	
Conversion	0 (0)	2 (0.19)	>0.9999	
Re-admission	3 (8.82)	35 (3.48)	0.1234	
Mortality (day)				
	30	0 (0)	1 (0.10)	>0.9999
	90	0 (0)	2 (0.19)	>0.9999



Conclusion

STC is a **safe alternative** to TC when dealing with difficult gallbladders. Predictive factors for STC are previous **perforation** of gallbladder, **acute cholecystitis**, diagnosis of **PE** and age **> 55 years**. Prospective studies to validate these findings could emphasise the importance of meticulous preoperative assessment and risk stratification to tailor surgical approaches effectively. Furthermore, recognising these predictive factors may pave the way for the development of predictive models or scoring systems to aid clinicians in identifying patients at higher risk of requiring **STC**.