Sustainability Phase: Improving Post-Operative Mobilization Rates in Patients Undergoing Elective Hepato-Pancreato-Biliary Surgery

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National Healthcare Group — Adding years of healthy life

Mission Statement

To increase post-operative day (POD) 2 mobilization* rate from 23% to 75% (stretch goal: 90%) in patients undergoing elective hepatic and pancreatic surgery at TTSH over a sustained period

*Mobilization: Sit out of Bed ≥ 6 hours & Walk 30 meters

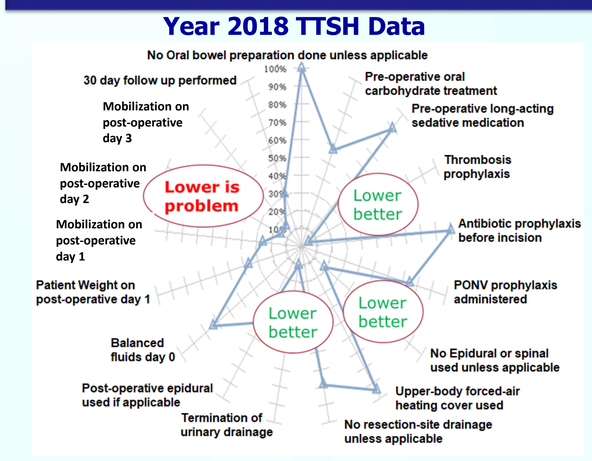
Why 30 meters are chosen?

- In the Ward: Distance from the Corner of the Ward Cubicle to Toilet = 15m
- At Home (e.g. 4 Room Flat): Distance from Living Room to Toilet = 15m
- Therefore, in order for Patients to walk independently (walking to & fro): 2 x 15 = 30m.

Team Members

	Name	Designation	Department
Team Leader	Adj Asst Prof Vishalkumar G Shelat	Senior Consultant	General Surgery
Team Members	Dr Tan Yen Pin	Consultant	General Surgery
	Ms Wang Bei	Senior Coordinator	General Surgery
	Ms Jaclyn Chow Jie Ling	Senior Physiotherapist	Physiotherapy
	Ms Chan Jia Ying	Senior Physiotherapist	Physiotherapy
	Ms Priscilla M Joseph	Staff Nurse	High Dependency Unit
	Ms Nursharazilla Abdul Rahman	Staff Nurse	Ward 11B
	Ms Low Yihui	Staff Nurse	Ward 11C
Sponsor	Adj A/Prof Glenn Tan Wei Leong	Head of Department	General Surgery
Mentors	Adj A/Prof Tai Hwei Yee & Ms Shirlene Toh		

Evidence for a Problem Worth Solving



POD 1, **2** & **3** mobilization rates following major elective hepatic & pancreatic surgery are **BELOW 10% EACH**

Poor post-operative mobilization causes:

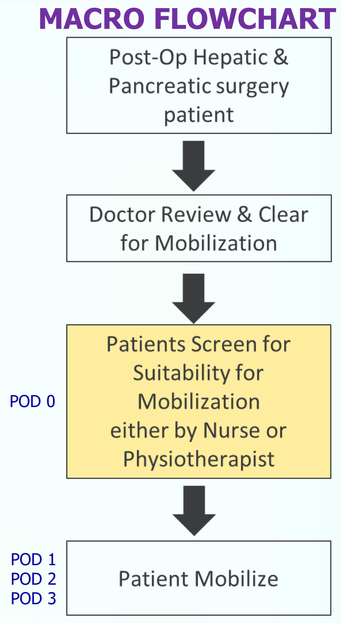
- Increased Muscle Loss
- Pneumonia
- Deep Vein Thrombosis (DVT)
- Prolong Length of Stay (LOS)

References:

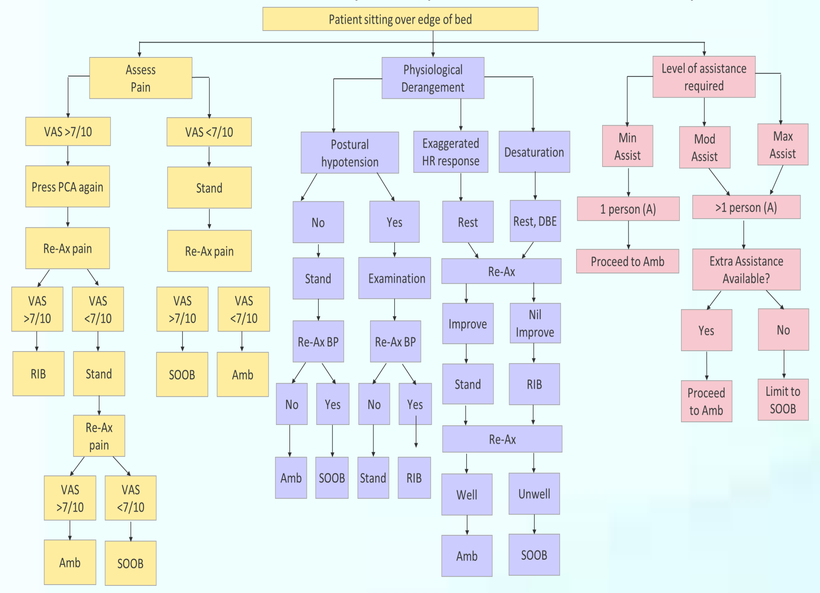
1. Ni et al 2018. Early enforced mobilization after hepatectomy. RCT.
2. Kapritsou M 2016. Fast-track recovery program after major liver resection. RCT.
3. Hendry PO et al 2010. RCT within an ERAS for liver resection (28%).

Flow Chart of Process

MACRO FLOWCHART

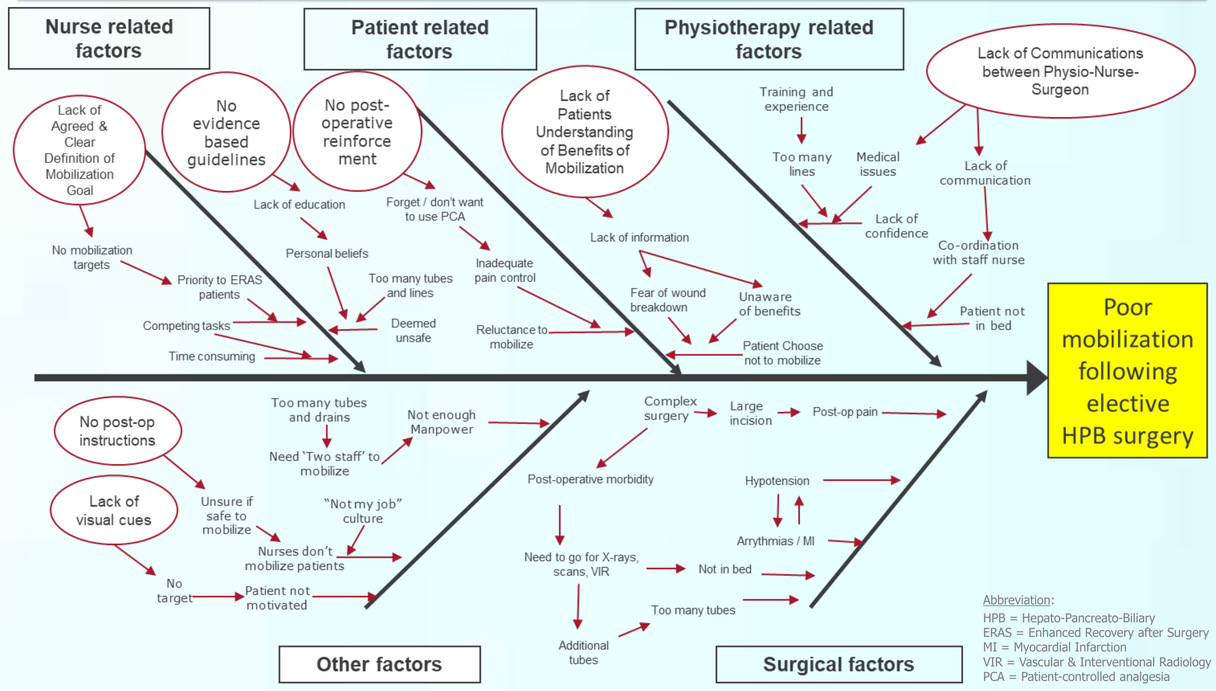


MICRO FLOWCHART: Nurse or Physiotherapist Screens Patient for Suitability of Mobilization



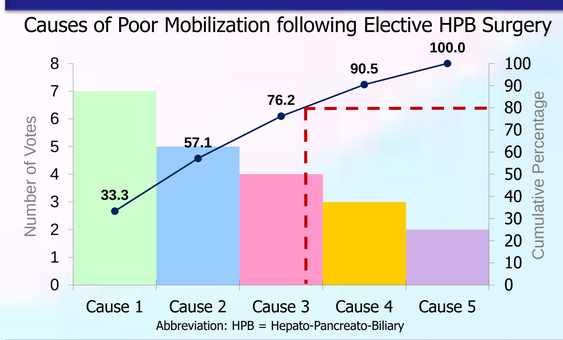
Abbreviation:
POD = Post-Operative Day | VAS = Visual Analogue Scale | Re-Ax = Reassessment | RIB = Rest in Bed | SOOB = Sit out of Bed | Amb = Ambulate | BP = Blood Pressure | DBE = Double-balloon Enteroscopy | HR = Heart Rate

Cause and Effect Diagram



Abbreviation:
HPB = Hepato-Pancreato-Biliary
ERAS = Enhanced Recovery after Surgery
MI = Myocardial Infarction
VIR = Vascular & Interventional Radiology
PCA = Patient-controlled analgesia

Pareto Chart



Abbreviation: HPB = Hepato-Pancreato-Biliary

Cause 1	Lack of Agreed & Clear Definition of Mobilization Goal
Cause 2	Lack of Patients Understanding of Benefits of Mobilization
Cause 3	Lack of Communications between Surgeon-Nurse-Physio
Cause 4	No Post-Operative Order
Cause 5	Lack of Visual Cues

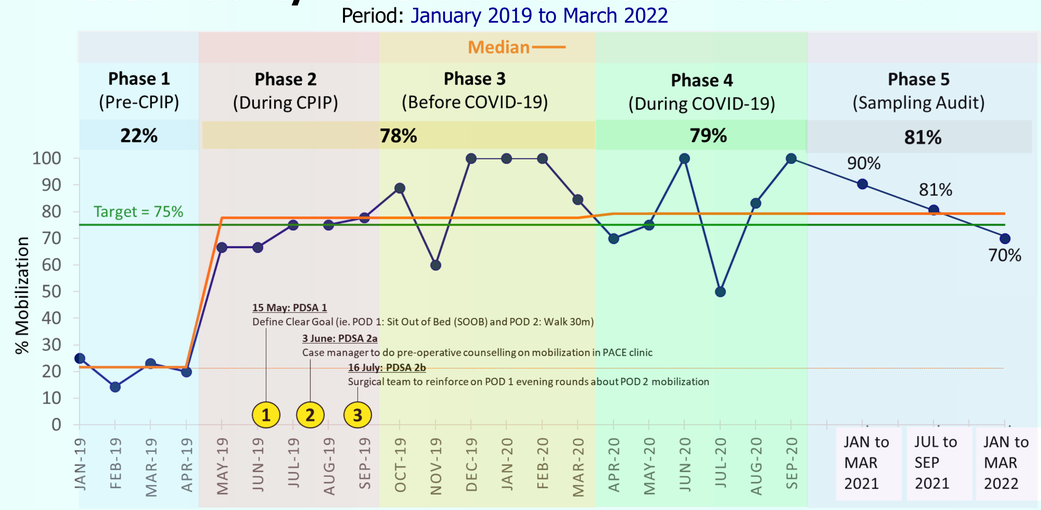
Implementation

Root Cause	Intervention	Implementation Date
Cause 1: Lack of Agreed & Clear Definition of Mobilization Goal	**PDSA 1**: Clearly define mobilization targets / goals (ie. POD 1: Sit Out of Bed & POD 2: Walk 30m)	15 May 2019 to 2 June 2019
Cause 2: Lack of Patients Understanding of Benefits of Mobilization	**PDSA 2A**: Case Manager at Pre-operative Anaesthesia Counselling & Evaluation (PACE) clinic to include post-operative mobilization into counselling	3 June 2019 to 15 July 2019
	PDSA 2B: Surgical team to reinforce on POD 1 evening rounds about POD 2 mobilization	16 July 2019 to 31 July 2019

Results

Sustainability Run Chart: Mobilization Rates on POD 2

Period: January 2019 to March 2022



Details			
No emphasis on early mobilization *Before implementation of CPIP*	*Direct oversight to improve early mobilization through use of Plan-Do-Study-Act (PDSA) cycles*	*Indirect oversight of early mobilization* *Mobilization rates still monitored though no active intervention from surgeons* *Occurred **prior** to the peak of COVID-19 pandemic locally*	*No oversight over early mobilization* *Occurred **during** peak of COVID-19 pandemic locally*

Cost Savings

	Pre-Intervention	Post-Intervention
Average Length of Stay (Per Patient)	8 days	6.5 days
Average Length of Stay Saved (Per Patient)	8 - 6.5 = **1.5 days**	
Cost of Inpatient Stay (Per Patient)	8 x 1114 = $8,912	6.5 x 1114 = $7,241
Cost Savings (Per Patient)	$8,912 - $7,241 = **$1,671**	
Assume No. of Patients under Hepatic & Pancreatic Surgery in 1 Year = 90		
Total Length of Stay Saved (Annualised)	1.5 days x 90 = **135 days**	
Cost Savings (Annualised)	$1,671 x 90 = **$150,390**	

Note: Unit Cost for Inpatient Stay Per Day Per Patient = $1,114

Problems Encountered

1. Lack of mobilization criteria, heterogeneity in defining mobilization.
2. Bed rest recommendation after chest tube removal, blood transfusion, etc.
3. Co-ordination between staff nurse, physiotherapy and patient clinical care.

Strategies to Sustain

1. Template in Operating Theatre ordering
2. POD 1 evening round reinforcement by surgical team
3. Include in HPB handbook for orientation for new staff

Publications

- Tang JH, Wang B, Chow JLJ, Joseph PM, Chan JY, Abdul Rahman N, Low YH, Tan YP, Shelat VG. Improving postoperative mobilization rates in patients undergoing elective major hepato-pancreato-biliary surgery. Postgrad Med J. 2021 Apr;97(1146):239-247
- Chan KS, Wang B, Tan YP, Chow JLJ, Ong EL, Sameer PJ, Low JK, Cheong WTH, Shelat VG. Sustaining a Multidisciplinary, Single-Institution, Postoperative Mobilization Clinical Practice Improvement Program Following Hepatopancreatobiliary Surgery During the COVID-19 Pandemic: Prospective Cohort Study. JMIR Perioper Med 2021;4(2):e30473