P306 Inefficiency analysis of laparoscopic colorectal surgery -OTRS analysis-

Tokyo Medical University, Tokyo, Japan
1, Department of Gastrointestinal and Pediatric Surgery
2, Research and Development Center for Minimally Invasive Therapies, Medical Research Institute

Junichi Mazaki, Yuichi Nagakawa, Tetsuo Ishizaki, Yoshitaka Kiya, Hiroaki Osakabe, Kenta Kasahara, Chie Takishita, Hiroshi Kuwabara, Shingo Kozono, Masanobu Enomoto, Masahiro Sugimoto, Kenji Katsumata, Akihiko Tsucchida

SAGES 2021

THE MEETING THE 2021 SAGES
COI DISCLOSURE

JUNICHI MAZAKI

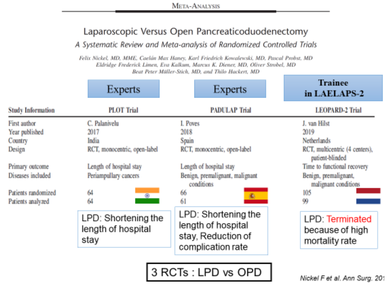
The speaker have no financial conflicts of interest to disclose concerning the presentation.

東京医科大学 TOKYO MEDICAL UNIVERSITY × OLYMPUS

Backgrounds

LAELAPS-2 Trial in Netherlands





Further educational system

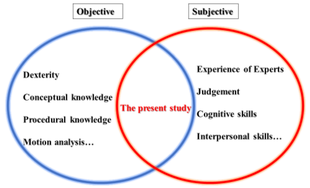


For individual surgeons with different learning curve:

What are surgical inefficiencies for them and

which should they focus on training?

Evaluation of operations





Aim

What are **inefficiency** factors in laparoscopic surgery?

➡ Novel **evaluation system** for an individual surgeon

with OTRS® in laparoscopic sigmoidectomy

Laparoscopic Sigmoidectomy

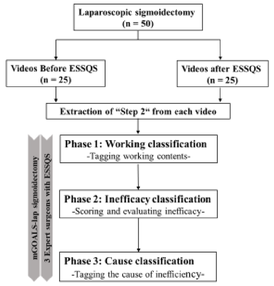


The surgical steps of laparoscopic sigmoidectomy

- Step 1: Preparation for resection
- Step 2: "Medial approach"
- Step 3: "Lateral approach"
- Step 4: Tumor-specific mesorectal excision ("TSME")
- Step 5: Transection of the anal side mesorectum
- Step 6: Resection of anal side of colon
- Step 7: Extra-abdominal resection and anastomosis, closure of surgical incision

Methods

Study design

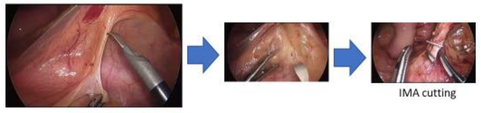


ESSQS: The Endoscopic Surgical Skill Qualification System (Japan)
GOALS: The Global Operative Assessment of Laparoscopic Skills
Vassiliou et al. A global assessment tool for evaluation of intraoperative laparoscopic skills. Am. J. Surg. 190:107-113

Methods

Step2: "Medial approach"

Definition: From the start of peritoneal incision until the inner gauze is exposed on the outside.



The start of peritoneal incision

IMA cutting

IMV/LCA cutting

Exposure of the inner gauze

Methods

Phase 1 Working classification — Dissection — Development — Stop bleeding

Separation:
When making an incision with an electric knife; when performing blunt dissection

Development:
When developing and creating a scene

Hemostasis:
Hemostasis operation



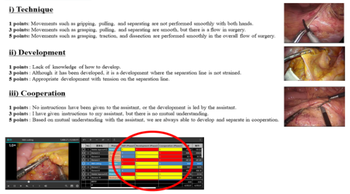
Phase 2 Efficacy classification

mGOALS –LS
(Laparoscopic Sigmoidectomy)

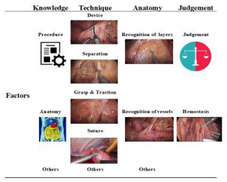
i) Technique
3 points: Movements such as gripping, pulling, and separating are not performed smoothly with both hands.
2 points: Movements such as gripping, pulling, and separating are smooth, but there is a flaw in surgery.
1 points: Movements such as grasping, traction, and dissection are performed smoothly in the overall flow of surgery.

ii) Development
3 points: Lack of knowledge of how to develop.
2 points: Although it has been developed, it is a development where the separation line is not strained.
1 points: Appropriate development with tension on the separation line.

iii) Cooperation
3 points: No instructions have been given to the assistant, or the development is led by the assistant.
2 points: I have given instructions to my assistant, but there is an mutual understanding.
1 points: Based on mutual understanding with the assistant, we are always able to develop and separate in cooperation.



Phase 3 Cause classification



Results

Agreement of the algorithm

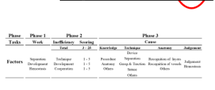
Fleiss Kappa for the Scoring
Number of cases size = 965
Number of raters or instruments=3
Minimum score = 1
Maximum score = 5

Factors (Phase 2)	κ	SE	96%CI
Skill	0.610	0.011	0.5891 - 0.6314
Development	0.704	0.010	0.6837 - 0.7240
Cooperation	0.746	0.011	0.7244 - 0.7668
Total	0.518	0.006	0.5058 - 0.5305

Fleiss Kappa for the Causes
Number of cases size = 1605
Number of raters or instruments=3
Minimum score = 0
Maximum score = 12

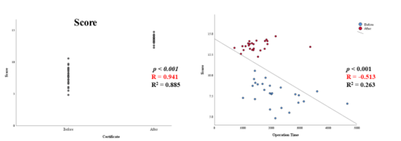
Factors (Phase 3)	κ
Acknowlegement	0.495
Technique	0.559
Development	0.523
Judgement of situation	0.482





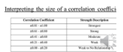


Correlation
- Phase 2, Score -



Score and the ESSQS

Score and Operation Time



Correlation
- Phase 3 (Cause) and the ESSQS -

Factors		Score
1: Grasp & Traction	R	-0.648
	p-value	<0.001
2: Separation	R	-0.701
	p-value	<0.001
3: Device	R	-0.757
	p-value	<0.001
4: Judgement	R	-0.836
	p-value	<0.001
5: Recognition of layers	R	-0.826
	p-value	<0.001
6: Recognition of vessles	R	-0.669
	p-value	<0.001
7: Hemostasis	R	-0.568
	p-value	<0.001
8: Anatomical knowledge	R	-0.554
	p-value	<0.001
9: Procedure knowledge	R	-0.601
	p-value	<0.001
10: Suturing	R	-0.115
	p-value	0.428
11: Procedure, others	R	-0.202
	p-value	0.16
12: Technique, others	R	-0.276
	p-value	0.052
13: Anatomical others	R	-0.429
	p-value	0.002

-TOP 3-
1st : Judgement
2nd : Recognition of layers
3rd : Separation

Strongest
Strong
Moderate
Weak

Feedback

-Simple Simulator for each individual

Simulator for a individual surgeon

Surgeon A : 4.8%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	4	0.3536
Judgement of situation	-0.4335	4	0.1766
Recognition of layers	-1.3103	10	0.0000
	12.9039	1	
ESSQS		0.6487	

Surgeon B : 47%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	3	0.4583
Judgement of situation	-0.4335	4	0.1766
Recognition of layers	-1.3103	8	0.0000
	12.9039	1	
ESSQS		0.4769	

Surgeon C : 56%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	5	0.2727
Judgement of situation	-0.4335	5	0.1145
Recognition of layers	-1.3103	7	0.0001
	12.9039	1	
ESSQS		0.5658	

Surgeon D : 97%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	2	0.5846
Judgement of situation	-0.4335	2	0.4202
Recognition of layers	-1.3103	4	0.0053
	12.9039	1	
ESSQS		0.9081	

Future prospects

Surgeon A : 4.8%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	4	0.3536
Judgement of situation	-0.4335	4	0.1766
Recognition of layers	-1.3103	10	0.0000
	12.9039	1	
ESSQS		0.6487	

Required training
Animal laboratory
VR Simulator
Video conference
Video conference

Surgeon B : 56%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	3	0.4583
Judgement of situation	-0.4335	5	0.1145
Recognition of layers	-1.3103	7	0.0001
	12.9039	1	
ESSQS		0.5658	

Required training
Animal laboratory
Video conference

Surgeon C : 97%

Simulation

Covariates	Coefficient	Value	OR
Separation	-0.2599	2	0.5846
Judgement of situation	-0.4335	2	0.4202
Recognition of layers	-1.3103	4	0.0053
	12.9039	1	
ESSQS		0.9081	

Required training
web conference

Conclusions

- We developed a simple and easy system for analyzing the surgical inefficiency of surgeons with OTRS® and our algorithm.
- This system could be useful for evaluating and giving feedback on operations tailored to each individual.