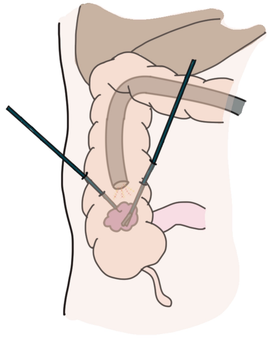
Percutaneous access to large intestine is feasible for submucosal dissection and suturing: an ex vivo porcine study

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Background



- Complex endoscopic procedures of the colon, such as endoscopic submucosal dissection (ESD), are becoming more common, and offer certain advantages over surgical resection.
- **Percutaneous access (PA)** to the upper gastrointestinal tract has gained popularity.
- We hypothesized that PA to the colon may facilitate quicker and safer complex endolumenal treatments.

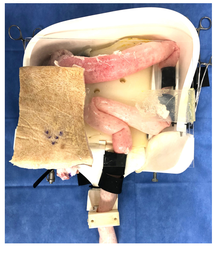
Conclusions

- In an ex vivo porcine colon model, PA expedites complex endoluminal procedures (e.g. ESD of large “polyp”) with fewer colon wall injuries than standard ESD methods.
- Mucosal defects and perforations can be firmly closed with PA, which may be helpful for establishing a safer and more secure endoluminal therapies.
- PA sites appear to be able to be reliably closed endoscopically. These methods should be evaluated further.

Methods

1. Using ex-vivo model with fresh porcine colon
2. Setup and closure for PA to the colon

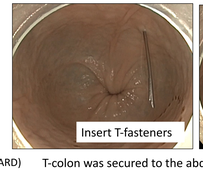
<Ex-vivo model>

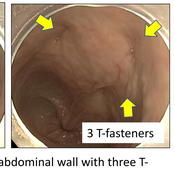


<Setup>

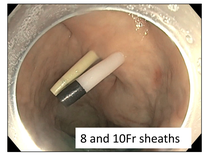


T-fasteners
(Gastrointestinal Anchor Set, HALYARD)

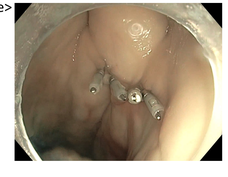




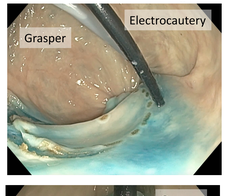
T-colon was secured to the abdominal wall with three T-fasteners and then 8 and 10 Fr sheaths were inserted.

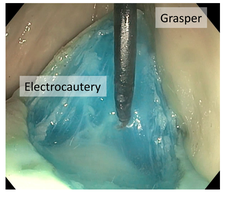


<Closure>



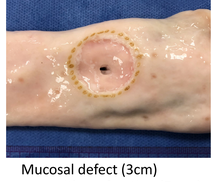
<Submucosal dissection using PA>





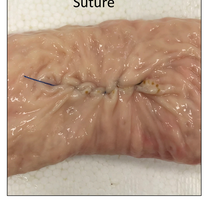
3. Submucosal dissection
   (1) Standard ESD: ESD group
   (2) Laparoscopic grasper and electrocautery were used through PA: PA group.

4. ESD perforation model was closed
   (1) Endoscopic clipping, and
   (2) suturing using 3-0 V-Loc with PA.



Mucosal defect (3cm)
with perforation (5mm)





Results

<Setup and Closure for PA>

	n=10
Setup	
Setup time (min)	4.4 ± 0.8
Closure	
Closure time (min)	3.2 ± 0.6
Number of clips	3.8 ± 0.6
Air leakage	0
Bursting pressure (mmHg)	60 ± 0

<Submucosal dissection: ESD vs. PA group>

	ESD (n=6)	PA (n=6)	*P* value
Size of resected specimen (mm)	43.3 ± 4.1	47.2 ± 2.2	$P < 0.051$
Total procedure time (min)	35.4 ± 6.7	11.6 ± 2.4	$P < 0.001$
Setup time (min)	0	2.8 ± 1.2	$P < 0.001$
Dissection time (min)	25.2 ± 13.4	7.0 ± 3.6	$P < 0.001$
Dissection speed (cm^2/hr)	25.6 ± 10.1	65.8 ± 21.6	$P < 0.001$
Volume of injected saline (ml)	47.1 ± 14.4	22.8 ± 4.2	$P < 0.001$
Margin positive	0	0	0
Number of muscularis propria injuries	2.1 ± 1.6	0.2 ± 0.6	$P = 0.015$
Perforation	0	0	0

<Clip vs Suture (ESD perforation model)>

	Clip (n=6)	Suture (n=6)	P-value
Procedure time (min)	14.7 ± 1.8	32.7 ± 10.2	0.002
Number of clips	9.4 ± 5.6	0	0.005
Bursting pressure (mmHg)	12.4 ± 16.0	52.7 ± 10.0	<0.001
Air leakage (up to 60mmHg)	6 (100%)	3 (50%)	0.023