New single-use disposable esophageal manometry catheters: Comparison with solid-state catheters.

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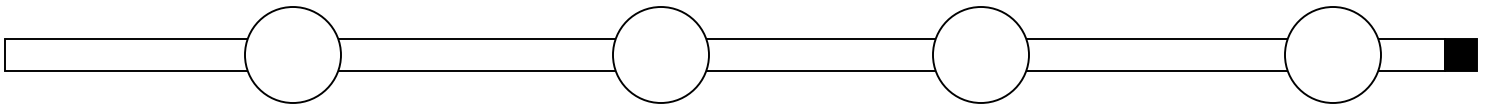
Background

- Esophageal manometry is a diagnostic test that measures intraluminal pressures and coordination of pressure activity of the muscle of the esophagus
- Esophageal manometry systems
  - Water-perfused systems: low-cost catheters, difficulty in operation
  - Solid-state systems: high-cost catheter, easy to operate

Background (cont'd)

- Balloon-based catheter
  - Air-filled balloons transmit pressure to external transducers
  - Circumferential pressure measurements
  - Disposable catheters
  - Easy to operate

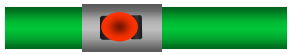


Aim

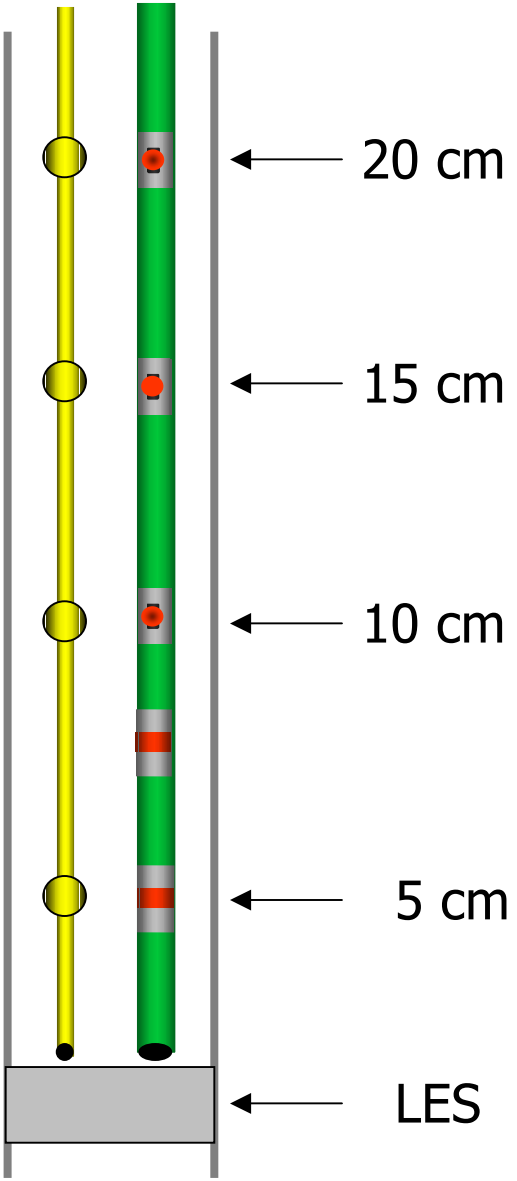
- Compare data obtained from balloon-based catheters to that from solid-state systems.

Catheters

CI catheter
- diameter: 2.1mm
- balloon sensor



KI catheter
- diameter: 4.5mm
- solid-state sensor



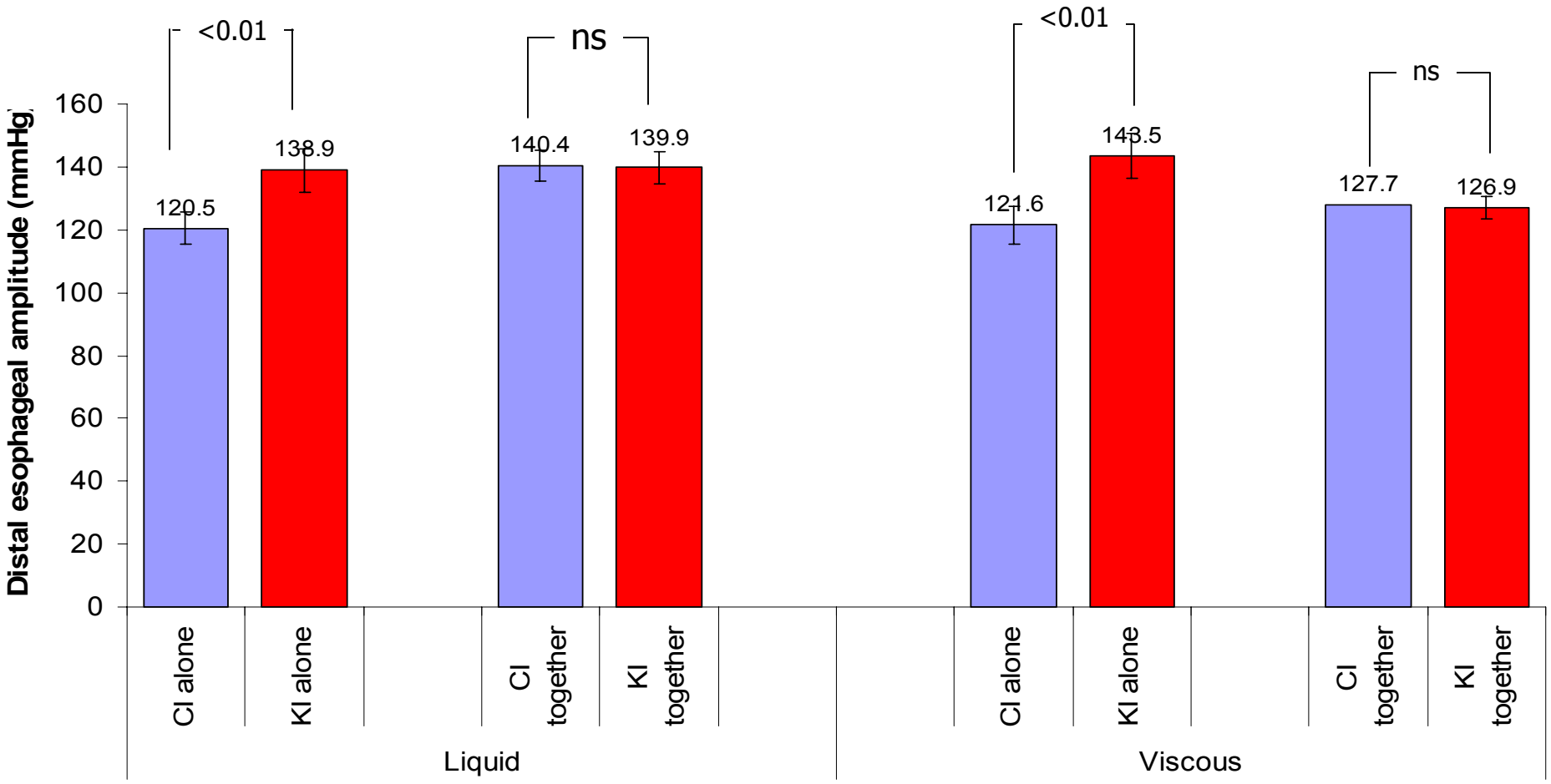
Methods

- Healthy volunteers
  - CI catheter: 10 liquid and 10 viscous swallow
  - CI + KI catheter: 10 liquid and 10 viscous swallow
  - KI catheter: 10 liquid and 10 viscous swallow
- Patients with IEM and nutcracker esophagus
  - CI + KI catheter: 10 liquid and 10 viscous swallow

Results

- 5 healthy volunteers, 5 patients with IEM and 5 patients with nutcracker esophagus
- Both catheter in the esophagus at the same time
  - 150 liquid and 150 viscous swallows
- One catheter in the esophagus at a time
  - 50 liquid and 50 viscous swallows

Comparison of pressures in the distal esophagus

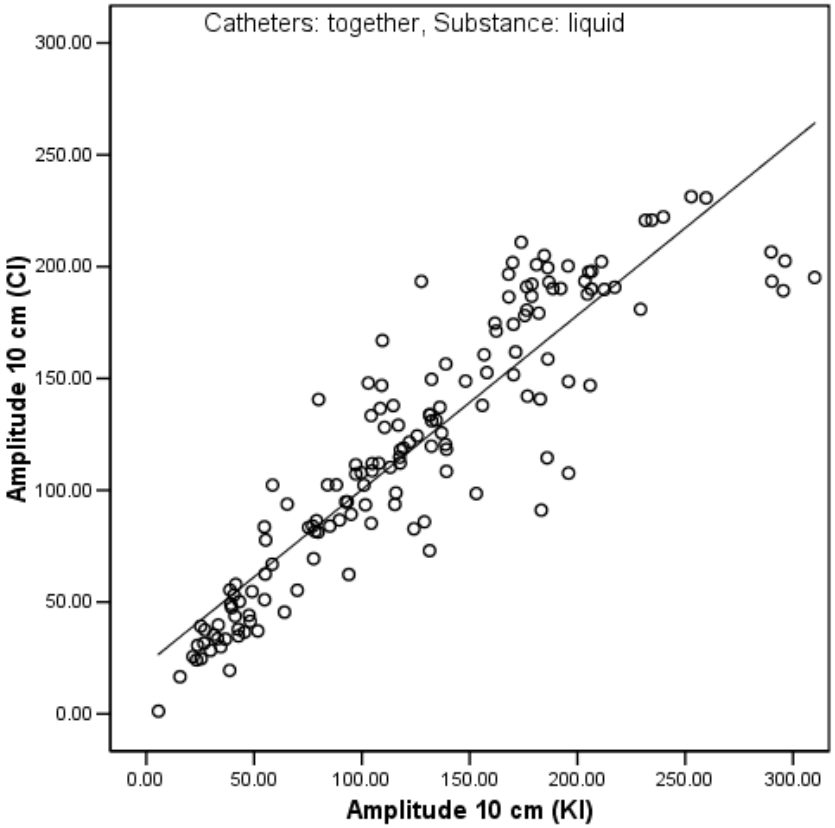


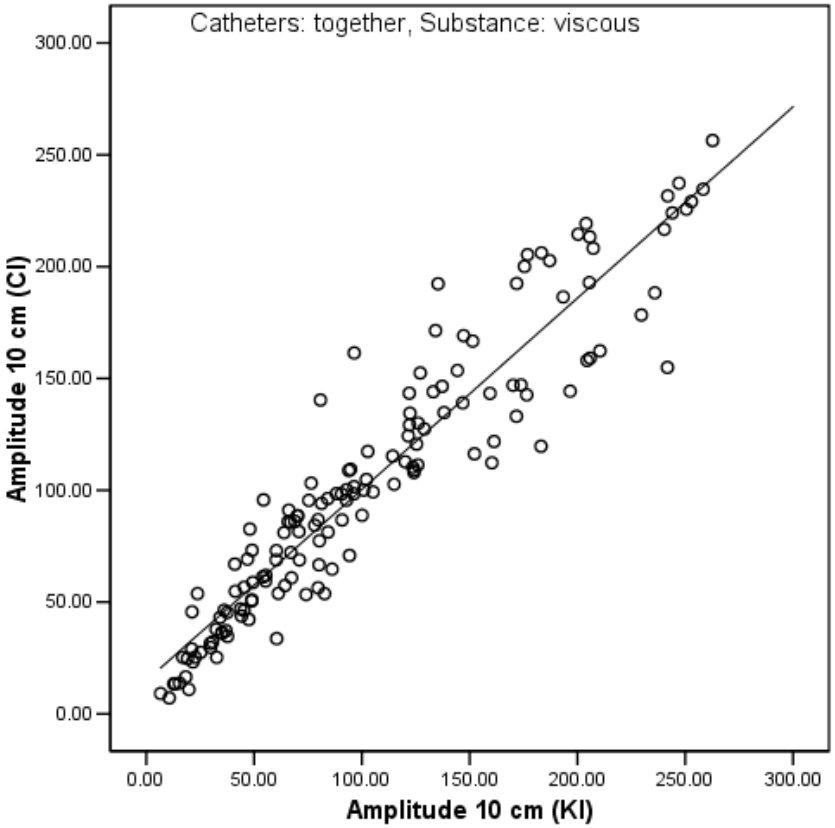
P-value (paired T-test)

Correlation between measurement

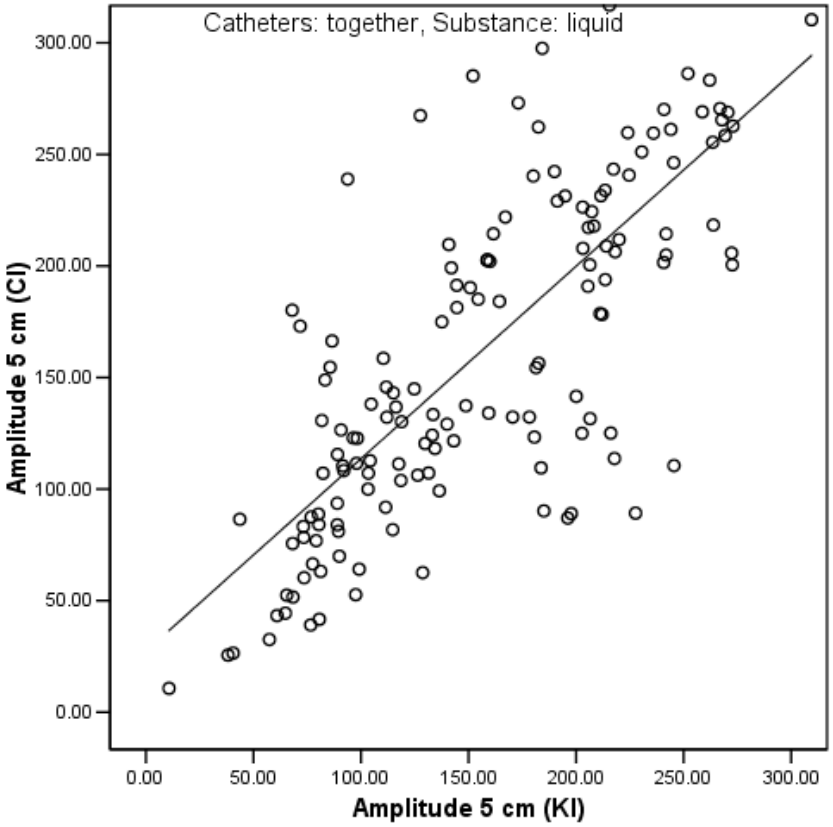
		Separate		Together	
		Liquid (N=50)	Viscous (N=50)	Liquid (N=150)	Viscous (N=150)
Amplitude	20 cm	0.913	0.903	0.536	0.664
	15 cm	0.282	0.069	0.540	0.769
	10 cm	0.464	0.791	0.904	0.943
	5 cm	0.223	0.159	0.745	0.721
	DEA	0.352	0.607	0.893	0.857
Duration	20 cm	0.717	0.244	0.346	0.575
	15 cm	-0.018	0.125	0.515	0.394
	10 cm	-0.235	0.340	0.791	0.812
	5 cm	0.024	0.505	0.866	0.852
Distal onset velocity		0.440	0.656	0.516	0.548

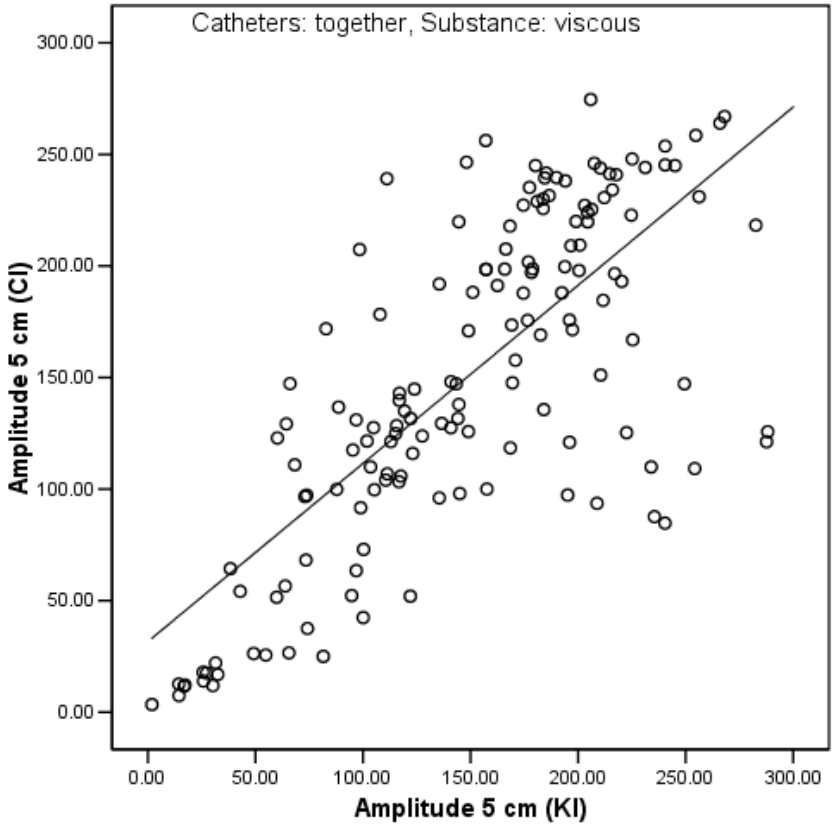
Correlation pressure 10cm above LES





Correlation pressure 5cm above LES





Summary

- Esophageal body manometry data obtained from the new disposable, balloon-based catheter system correlate well with data obtained from solid-state catheters.

Conclusion

- Disposable, balloon-based catheter systems may become promising alternatives to current manometric systems.